



Calvin College

The college of the Christian Reformed Church

The catalog for 1987-88

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1987-88

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CALENDAR

The Fall Semester 1987

SEPTEMBER	1	Tuesday	Faculty conference
	2	Wednesday	Residence halls open to freshmen
	3	Thursday	Registration for new students begins
	4	Friday	Residence halls open to upperclassmen
	5	Saturday	Registration for new students ends
	7	Monday	First semester classes begin 8:00 a.m. Convocation 9:45-10:40 a.m.
	NOVEMBER	4-5	Wednesday, Thursday
12-23		Thursday- Monday	Registration for interim and spring semester for all currently enrolled students
23		Monday	Friday class schedule in effect
24		Tuesday	Thursday class schedule in effect
25		Wednesday	Thanksgiving recess 10:00 p.m.
30		Monday	Classes resume 8:00 a.m.
DECEMBER	10	Thursday	Classes end 10:00 p.m.
	11	Friday	Reading recess
	12	Saturday	Examinations begin 9:00 a.m.
	17	Thursday	Examinations end 9:30 p.m. Christmas vacation begins

The Interim 1988

JANUARY	5	Tuesday	Interim term begins 8:00 a.m.
	27	Wednesday	Interim term ends 5:00 p.m.

The Spring Semester 1988

FEBRUARY	1	Monday	Spring semester classes begin 8:00 a.m.
MARCH	31	Thursday	Spring vacation begins 10:00 p.m.
APRIL	12	Tuesday	Spring vacation ends 8:00 a.m.
	19	Tuesday	Reading recess/advising day
	25	Monday	Registration for fall semester begins
MAY	2	Monday	Registration ends
	5	Thursday	Honors Convocation
	12	Thursday	Reading Recess
	13	Friday	Examinations begin 9:00 a.m.
	18	Wednesday	Examinations end 9:30 p.m.
	21	Saturday	Commencement 3:00 p.m.

The Summer Sessions 1988

MAY	31	Tuesday	Summer Session I begins 8:30 a.m.
JUNE	22	Wednesday	Summer Session I ends
	27	Monday	Summer Session II begins 8:30 a.m.
JULY	20	Wednesday	Summer Session II ends
	21	Thursday	Summer Session III begins 8:30 a.m.
AUGUST	12	Friday	Summer Session III ends



President Anthony J. Diekema

THE MISSION OF THE COLLEGE

The history of the college and its objectives

CALVIN COLLEGE is a college of the Christian Reformed Church, a century-old denomination with a five-century-old heritage. It bases its whole faith and life on the sacred Scriptures, God's holy, inspired, infallible Word, and thus takes its stand with the churches which have their roots in the Protestant Reformation.

In America the Christian Reformed Church traces its origin to a band of immigrants who sought freedom in the nineteenth century from the established church of the Netherlands. They settled in western Michigan and, after an early period of religious unrest among the thousands of Dutch settlers who soon joined the earlier immigrants, organized the Christian Reformed Church in 1857.

The Christian Reformed Church subscribes to three statements of faith (in addition to the early Christian Apostles Creed) which stem from the Reformation period: the Heidelberg Catechism, which is the most famous and widely translated of all Reformation creeds; the Confession of Faith written by the Belgian theologian, Guido de Brès, in 1561; and the Canons of Dordt.

The Christian Reformed Church stresses the sovereignty of God in every part of life—in the family, the church, the state; in world affairs; in economic, social, and political life; in business; and in learning and the arts.

The founding date of Calvin College and Seminary is 1876. In that year the Christian Reformed Church adopted a six-year curriculum for ministerial training. The first four of these years were spent in the Literary Department and the last two in the Theological Department. In 1894 students who were not pre-theological students were admitted to an expanded curriculum, and thus the school became a type of preparatory school or academy. In 1900 the curriculum was further broadened and made more attractive to students interested in teaching or in preparing for preprofessional courses in the universities. By 1906 the Literary Department, which provided the four years of preparatory and two years of college work, became known officially as the John Calvin Junior College. The two-year college in time became a four-year college, and the preparatory department was discontinued. In 1921 Calvin College awarded its first Bachelor of Arts degree.

The school, which had started with seven students, grew slowly during the early years, but by 1930 it had reached its pre-World War II size of 350-450 students. By 1950 the enrollment had climbed to 1,270 and now is approximately 4,000.

In 1956, when it became obvious that the college could expand no further on its Franklin Street campus, the trustees purchased the 165-acre Knollcrest Estate on the edge of the city. The new campus was planned as a unit before the first buildings, the seminary complex, were completed in 1960. Two years later the college constructed four residence halls and a dining hall, thus beginning what

was to be the decade of the divided campus. In the same year the first section of the library combined with Heritage Hall and a classroom wing, Hiemenga Hall, were opened. Other buildings followed: the Physical Education Building in 1965, the Fine Arts Center and four more residence halls in 1966, a new student Commons in 1967, and a Science Building and two more residence halls in 1968. In 1970 the Library was expanded and two additional residence halls were opened. Since then, the William Spoelhof College Center, the Bergsma Natatorium, the Knollcrest East apartment complex, and the recent additions to the Commons and the Science Building have been completed, thereby providing for the potential of 4,000 students with over half living on campus. The Johanna Timmer residence hall was opened in 1981 and the H. H. Meeter Center for Calvin Studies in 1982.

Aim and Purpose

Calvin College aims to provide an education that is Christian and is shaped by the Christian faith as reflected in the Reformed standards. This finds its broadest expression in the study of the various liberal arts, where students are encouraged to develop value judgments which are grounded in the knowledge of man's relationship to God, to himself, to his fellowman, and to the world, and to acknowledge the Lordship of Christ over all. It is in this setting of Christian commitment that the college seeks to promote sound scholarship, earnest effort, and an obligation to use one's talents fully in response to a divine calling.

The end of such Christian commitment is the Christian life. Informed and mature Christian faith calls for a life of action and involvement. It seeks personal piety, integrity, and social responsibility. It recognizes that service to God and to one's fellowman is possible and necessary in all professions and all walks of life. It asserts that the life of Christian service must be lived now. Accordingly, Calvin College provides many opportunities for students to apply their learning to Christian action and service. Some of these are in the formal academic setting, some are voluntary in the broad urban community which surrounds the college, others involve participation in local churches.

The faculty members subscribe to the creedal position of the denomination and strive, in their teaching and personal relations, to reflect the Lordship of Christ and the authority of the Word of God.

The college admits not only students from the Christian Reformed Church and from other evangelical Protestant churches, but also others who are interested in the benefit of the Christian atmosphere and Reformed character of the academic programs of the college and in the aims of the college.

Government

The corporate name of the college is CALVIN COLLEGE AND SEMINARY. It is governed by a single board of trustees which represents the ecclesiastical divisions of the church, arranged along geographical lines. The administration, the staff, the student body, and the physical facilities of the college and the seminary are largely separate and independent. The membership of the board is constituted of representatives elected by the various classes and approved by synod and regional trustees elected by synod. The board of trustees meets in February and

May of each year. An executive committee, which meets on the second Thursday of each month, functions for the board throughout the academic year.

Compliance with Legal Requirements

Calvin College, in accordance with Title VI of the Civil Rights Act of 1964, operates in a non-discriminatory manner with regard to race, color, age, or national origin. Furthermore, as required by Title IX of the 1972 Education Amendments, Calvin College does not discriminate on the basis of sex in its educational programs, activities, or employment policies. Calvin College also provides equal opportunity for qualified handicapped persons in accordance with the requirements of Section 504 of the Rehabilitation Act of 1973. Instructional and other physical facilities are readily accessible to handicapped students and special rooms in the residence halls are designed for barrier-free living. Mr. Thomas Hoeksema of the Department of Education is the advisor for handicapped students. Inquiries and appeals regarding compliance with these federal requirements should be directed to Mr. Henry De Wit, Vice President, Calvin College Business Office, as Civil Rights, Title IX, and Section 504 coordinator. Student appeals will be heard by the Academic Standards Committee.

Accreditation and Affiliation

Calvin College is accredited by the Commission on Institutions of Higher Education of the North Central Association of Colleges and Schools. It is also accredited by the American Chemical Society, National Association of Schools of Music, and the National Council for Accreditation of Teacher Education. The Hope-Calvin Nursing Program is accredited by the National League for Nursing. It is on the American Association of University Women list of institutions qualified for membership in the association. It maintains membership in the American Council on Education, the American Association of Colleges for Teacher Education, the College Entrance Examination Board, the National Education Association, the Mathematical Association of America, the Michigan Academy of Sciences, Arts, and Letters, and the American Mathematical Society. It is a member of the Christian College Coalition and an affiliate member of the American Society for Engineering Education.

Calendar, Summer School

The academic calendar at Calvin College forms the typical 4-1-4 plan consisting of two semesters, each approximately four months in length, plus a one-month interim term in January. During each of the two semesters, students normally take four courses and during the interim, one course. A reading recess during the first semester and the spring vacation during the second provide an opportunity for students to do research and to complete major projects. As part of the 4-1-4 program an honors program has been established for the superior student as well as a special program of assistance for students admitted on probation.

The summer school consists of consecutive three-and-a-half week sessions; a student is permitted to register for one regular course during each session.

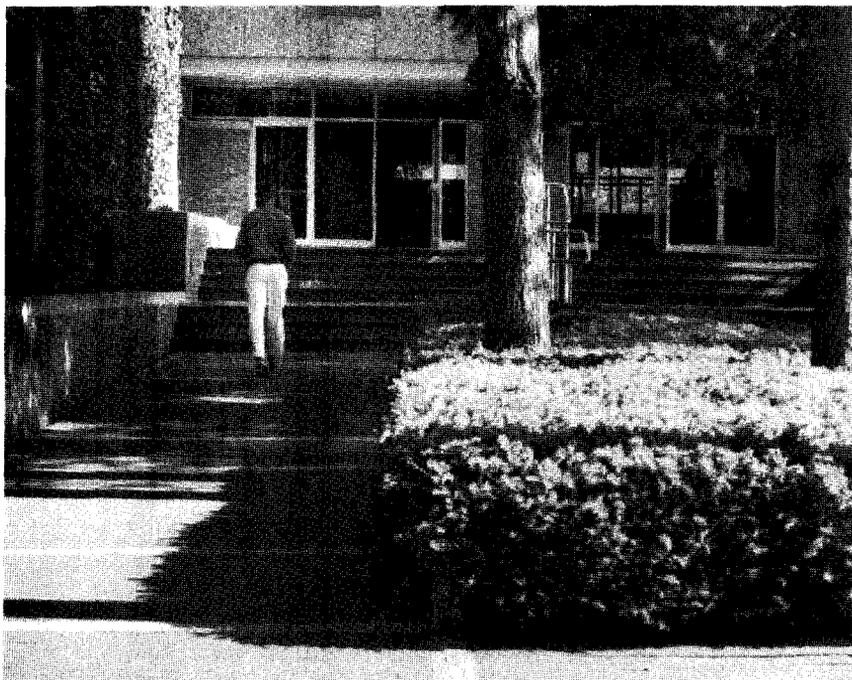
The Calvin Alumni Association

The purpose of the association is to support Christ-centered education through service to Calvin and to its alumni and friends.

The Calvin Alumni Association is composed of all persons who have attended Calvin College for at least one year or who have completed eight courses. Persons who have graduated from Calvin Seminary are also considered members of the association. There are currently more than thirty-six thousand Calvin alumni around the world, many of whom are part of local alumni chapters.

The Calvin Alumni Association is governed by a board of sixteen persons who serve for three years. The board meets five times during the year. Board meetings are open to all alumni, and an international board meeting is held each year at Homecoming. The work of the Association is facilitated by the director of alumni relations.

The association sponsors *Spark*, the alumni magazine; services to alumni chapters; career networking systems; numerous educational and social programs, including Summerfest (Calvin's vacation college); and contributes to faculty research projects. The alumni-financed program of freshman grants and upper-division scholarships is of special interest to students. Information concerning all of these may be obtained from the Alumni Office.



STUDENT LIFE AND SERVICES

The student life on campus and its regulation

THE AIM OF CALVIN COLLEGE is to prepare students to live productive lives of faith to the glory of God in contemporary society—not merely lives that have a place for religion, or lives which formally relate religious commitment to the academic disciplines, but lives which in every part, in every manifestation, in their very essence, are Christian. Accordingly, the college attempts, through its rules, its organizations, and the counsel of its personnel, to show students how a life of commitment can be lived in their rooms, on the athletic field, in their academic work, and in daily religious practices. This matter of being totally Christian cannot be deferred until graduation. Confrontation with the secular world, cooperation with Christians in common cause, and the development of personal expressions of faith must be part of current college life. This being in the world while not of it, this testing of the spirits, whether they be of God or not, this searching, seeking, learning, trying—this is the business of Christian education at Calvin.

Worship and Christian Service

All students are expected to worship regularly at a church of their choice. Sunday worship services are held on the Knollcrest campus under the auspices of four local churches. Students are encouraged to avail themselves of the counseling services of the local pastors or of the college chaplain.

Chapel services are held at 10 o'clock, Monday through Friday mornings. The main chapel is held in the Fine Arts Auditorium, but a variety of other services such as Fellowship chapel, foreign language chapels, and group devotions are held at other places at this time. Students are expected to attend some chapel services during the week. In addition there are many opportunities for voluntary religious activities. Bible study groups, student prayer groups, Christian service activities, and evangelistic outreach are a few of these voluntary programs. This part of campus religious life is supervised by the Student Affairs Division, various committees, and the college chaplain.

The Fine Arts

Many sorts of fine arts activities thrive at Calvin both as part of the academic life and as the result of spontaneous student interest. Bands, orchestras, choral groups, and chamber ensembles are part of the program of the Department of Music for the participation of all qualified students. Theatrical productions, including Thespians activities, are sponsored by the Department of Communication Arts and Sciences. Students from all departments participate. The long

Calvin tradition of creative writing for publication and for private reading is encouraged by the members of the Department of English. *Dialogue* and *Chimes* provide opportunities for student publication. The Department of Art seeks to arouse interest in the various graphic and plastic arts. Student-organized fine arts guilds provide a forum for independent expression in dance, filmmaking, and other fields of creative endeavor.

The Student Senate, through several of its committees, provides a program of speakers, films, and entertainment for the entire campus. Other public performances sponsored by various academic departments, by the Alumni Association, and by community groups are also presented on campus.

Intercollegiate and Intramural Athletics and Recreation

Intercollegiate athletics play an important role in student life at Calvin. Calvin is a member of the Michigan Intercollegiate Athletic Association (MIAA) and the National Collegiate Athletic Association (NCAA). Calvin men compete in cross-country, golf, basketball, soccer, swimming, ice hockey, baseball, track, and tennis. Calvin women compete in cross-country, field hockey, volleyball, basketball, swimming, track, softball, and tennis.

Intramurals are also an important phase of the physical education program and provide students with the opportunity to participate throughout the year in a variety of programs.

Both indoor and outdoor facilities are available for recreation whenever classes or scheduled contests are not being conducted. The Physical Education Building and Natatorium are usually open for student recreation daily except Sunday until 9:30 p.m.

Student Senate and Other Organizations

The twenty-one-member Student Senate plays an important role in the life of the college. Not only does it serve as the official voice of the student body, but it also supervises most student activities. It oversees the budgets of student organizations and concerns itself with student publications, homecoming, the film arts, the campus radio station, and similar groups. Student members serve on most faculty committees.

All residence halls have their own governing councils and judiciary committees. These units work in cooperation with the staff members to enhance community life in the halls.

Numerous clubs and organizations exist on campus, some of which are related to particular academic departments. All organized clubs and similar groups must have a faculty sponsor and must have formal approval through the dean of student life.

The Student Volunteer Service (SVS) is a student service group which encourages Christian social responsibility through volunteer activities. It provides assistance to local schools, to non-profit agencies, to senior citizens, and to the community in general and provides a great variety of experience for the students involved. Students tutor children and adults, assist in special education, serve as big brothers and sisters, support art and recreational therapy programs, provide

transportation for those who need it, and offer moving and home maintenance services for those in need.

Student Conduct

Admission to Calvin College is a privilege that may be withdrawn from any student who does not meet the academic standards of the college. In addition, the college not only expects students to conduct themselves both on and off campus in accord with the Christian goals and standards of the college but also may refuse admission to, may discipline, or may expel any student who in its judgment displays conduct or attitudes unworthy of the standards of the college. The *Student Handbook* and *Residence Hall Living* booklets describe the regulations and their implementation.

The *Discipline Code*, approved by the Faculty, the Student Senate, and the Board of Trustees, is the official document which spells out college regulations and judicial processes. A copy of this code is available at the Student Affairs Office.

While the *Code* does not seek to develop a detailed and exhaustive summary of what a student may or may not do, it does contain, in addition to Christian principles of behavior, a list of proscribed conduct. Among those proscribed actions are all kinds of dishonesty, acts of violence, disruption of institutional activities, theft, unauthorized entry, sexual misconduct, use of alcoholic beverages and drugs on campus and at institutionally sponsored activities, and profane and obscene language. Sanctions for misconduct range from verbal warning to expulsion.

The judicial processes require a hearing before the dean of men or women or before the All-Campus Discipline Committee, guarantee student rights to testify, to examine evidence, and to enlist counsel at the hearings, and provide for appeal to higher judicial bodies.

Housing Regulations

Freshman and sophomore students under 21 years of age not living at home are required to stay in the Calvin College residence halls. Juniors and seniors (students who have successfully completed sixteen or more courses), married students, and students 21 or older as of October 1 of the fall semester may choose their own type of housing and are permitted to reside off campus.

The college requires all students to register their place of residence with the Housing Office and to notify that office of all changes in residence during the period of their enrollment. Information on available housing and further interpretation of these rules is available from the college Housing Office.

Use of Motor Vehicles

Motor vehicles owned or operated by Calvin students must be properly registered in the Security Office and must carry an official college vehicle permit. Motor vehicles may be parked only in approved student parking areas, and the drivers will be fined if they park elsewhere. Because parking areas are limited,

parking regulations are enforced stringently. The driving regulations and requirements of the Michigan Motor Vehicle Code apply to all driving on the campus.

Health Services

The college provides limited outpatient medical care for all students. Charges for services provided are kept as inexpensive as possible. The Health Center, located in the basement of Heyns Hall, is staffed by registered nurses and a team of physicians with consultation hours on weekdays. Serious health problems are referred to the student's family physician or to the local physician of choice after discussion with Health Center personnel.

In addition to caring for health problems the Health Center staff encourages health teaching and preventive medicine. For the protection of everyone in the Calvin community, current physician-documented immunization status for polio, diphtheria, pertussis, tetanus, measles, mumps, rubella, and tuberculin skin testing is mandatory for students entering Calvin. Students who lack such documentation are not permitted to register for succeeding semesters until this requirement is met.

A Group Accident and Sickness Expense Protection Plan is available to all students on a low-cost, voluntary basis. This plan primarily covers conditions for which hospitalization is required and provides little in the way of outpatient benefits. All students are strongly urged to be certain they have adequate broad-range coverage. Family plans for married students are also available. Information is available in the Business Office.

The Calvin College Mobile Blood Drive, sponsored by the SVS program and chartered by the Grand Valley Blood Program, conducts four blood drives each academic year in the college community.

The college is not liable for injuries sustained by students in their activity as students, even though such injuries occur on college premises, in laboratory work, or in physical education classes. The college does not undertake to be the insurer of its students, and its liability under the law must be based on fault. It is necessary, in order to establish the liability of the college for such injuries, not only to prove negligence or carelessness on the part of the college, but also to show that the student was free from any negligence or carelessness which might have contributed to the injuries. Accordingly, students are advised to be certain that they are covered by personal health and accident insurance.

Orientation and Advising

All new students are required to participate in a program of orientation held just prior to registration. Guided by upperclassmen serving as orientation leaders, they will meet key faculty members and administrators, receive information about college activities and facilities, and obtain registration materials. The orientation schedule is mailed to new students during the month before registration.

All freshmen are assigned individual advisors from the faculty. These faculty members keep office hours during which they are available to assist students in making decisions about courses and programs.

After their freshman year, students are expected to ask a faculty member in

their field of interest to assist them in developing appropriate academic programs and in other matters. By the end of the sophomore year, each student must work out with a faculty advisor the appropriate counseling forms defining a program which will lead to graduation. This usually requires declaring a major in a given department or group of departments. The faculty member who signs the counseling form becomes the advisor of record. The Registrar and Associate Registrar are available to students for help with advising problems.

Additional general and specialized advising services are provided for all students. The college chaplains, the deans of men and women, and the dean of student life are available to counsel students; the Academic Support Program instructors provide specialized assistance designed to improve academic work.

Library

The Calvin Library, at the center of the campus, serves students of both the college and the seminary. Its 385,000-volume collection of books and bound periodicals is distributed over four floors of open stacks which are arranged according to the Library of Congress classification. More than 2,550 current periodicals are available for use in the library. Two major microfiche collections, The Library of American Civilization and The Library of English Literature, are part of the 55,000-item collection of microfilm, microfiche, and microcards. The library, which is air conditioned, can seat 1,200 persons, mainly in individual study carrels and at tables. There are also seminar rooms and a spacious lounge.

Several special collections are housed in the library. The H. H. Meeter Calvinism Research Collection, located on the fourth floor of the library, is one of the most extensive collections of books and articles on John Calvin and Calvinism available anywhere. The Colonial Origins Collection, which consists of manuscripts, archives, and other records of the Christian Reformed Church, its leaders, its Dutch origins, and closely related institutions, is located on the second floor of the library. The Calvin Library is a partial depository of government documents, holding approximately 100,000 items. The Cayvan Room with its many recordings and tapes is available for both the study and enjoyment of music.

Computer Center

The Calvin College Computer Center is centrally located in the William Spoelhof College Center. It provides computing services to the faculty by supporting instruction and research, to administrative offices of the college, to agencies of the Christian Reformed Church, and to students by providing and maintaining both terminals attached to the mainframe and micro-computers for their usage.

Major hardware consists of a Prime 9755 mainframe (16 megabyte memory, 1140 megabyte hard disk drive), two Prime 750s (one with 8 megabyte memory and 4x300 megabyte disc and one with 5 megabyte memory and 3x300 megabyte disk) and one Prime 550 (2 megabyte memory and 1x96 megabyte disk). There are 56 terminals attached to the Prime system and available for student use. Micro-computers available to students include thirty Zenith PC compatibles, ten ITT PCs, fifteen IBM PC Jrs., and several Apple IIs.

Software available to students consists of Word MARC Word Processing System, SPSS, SPSSx, S2020, Mini-Tab, Lotus 1-2-3, Multiplan, and Wordstar. Languages currently available at Calvin include Pascal, FORTRAN 77, BASICV, COBOL, LISP/PROLOG, C, and Macro Assembler.

The Computer Center offers free non-curricular computer classes to faculty, staff, and the student body, with instruction in word processing, spreadsheet, data analysis, editor, and the Tex typesetting system. The Computer Center staff is committed to serving the Calvin College community by meeting its growing needs with the latest in software and hardware.

Instructional Resources Center

The college maintains an Instructional Resources Center in Hiemenga Hall which serves the instructional programs of the entire college. It includes audio-visual services, the audio-visual laboratory, a graphics production center, a television studio, the Language Laboratory, cable television distribution service, and the Curriculum Center, which contains a wide variety of textbooks and demonstration teaching material useful to teachers and prospective teachers.

Broene Counseling Center

The Broene Counseling Center offers counseling in the areas of career and personal concerns and life enrichment. The staff provides assistance for students searching for careers by helping them recognize their own resources and talents, and by exploring with them the variety of careers available and appropriate for them. The career resource area contains a wide selection of career information including two computerized career informational systems. The staff also offers individual and group counseling and provides enrichment programs in such areas as interpersonal relationships, self-understanding, Christian self-image, communication skills, stress management, and career planning. Student concerns are kept confidential.

Career Placement

The college maintains a series of services for graduating students to assist them in securing teaching positions and career placement.

The Placement Office assists graduates and alumni in securing employment. All seniors and graduates are eligible for this service and are encouraged to establish a credential file in the Placement Office. There is a \$10 annual fee for the service extended to seniors, and a \$20 annual fee for service extended to alumni.

Seniors in education are assisted in developing credentials early in their final year. At their request credentials are forwarded to school officials who are considering candidates for teaching positions. The Placement Office lists 2,000 teaching vacancies annually and hosts administrators who desire to interview candidates on campus.

The Placement Office also assists seniors and alumni in finding post-graduation employment in fields other than teaching. Job opportunities are posted, and through a monthly publication, *Placement Profiles*, information that is of interest to

those seeking employment is publicized. The *Intra-Campus Bulletin* and *Placement Profiles* list the times when prospective employers will conduct interviews. Personal counsel is given in job-search techniques such as résumé writing and interviewing skills. The Placement Office maintains a Placement Resource Center which makes available information on employers and employment in various parts of the United States, in Canada, and in foreign countries, as well as with federal and state governments. Seniors who will be seeking the assistance of the Placement Office are asked to register for placement services early in their final year at Calvin.

The college maintains information on graduate school programs and on such competitive national fellowships as the Rhodes scholarships, the Marshall fellowships, the National Science Fellowships, and the various Fullbright grants. Interested students should consult the chairman of their major department or the registrar.



Vice President Jeanette R. De Jong



Provost Gordon L. Van Harn

ADMISSION AND STANDARDS

Regulations concerning admission

IN SELECTING STUDENTS for admission, Calvin College looks for evidence of Christian commitment and for the capacity and desire to learn. Students who are interested in the Christian perspective and curriculum of Calvin and who show an interest in its aims are eligible for consideration. Although the prospect of academic success is of primary consideration, the aspirations of the applicant, the recommendations of the pastor or a school official, and the ability of Calvin to be of service will also be considered in admission decisions. The college admits students of any race, color, and national or ethnic origin.

Prospective students requesting application material will be sent the forms necessary to apply for both admission and financial aid. They will be notified concerning admission as soon as the Office of Admissions receives the following documents:

1. *A completed application form*
2. *Academic transcripts from high schools and colleges attended*
3. *Entrance examination results, preferably ACT*
4. *The recommendation of a pastor, spiritual counselor, or school official*

Candidates applying for scholarships should take their entrance examinations no later than December. All applications received later than July 1 must be accompanied by a \$10 late fee.

Applicants should be graduates from an accredited high school and have completed satisfactorily at least fifteen units of college preparatory work, including three in English and two in algebra and geometry. (A unit is the equivalent of five class hours per week for thirty-six weeks in one field.) Specifically, applicants must present a three-unit sequence from mathematics, the natural sciences, the social sciences, or a single foreign language and at least two units from two other of these fields. The remaining units may be in any courses which count for graduation.

Applicants with high school averages of C+ (2.3) or higher in their college preparatory courses whose ACT-Composite is 16 or higher or whose SAT-Verbal is above 370 and SAT-Mathematics above 390 are normally given regular admission. Applicants with lower grades and scores or with deficiencies in their high school preparation are reviewed individually to find evidence of the ability to do satisfactory college work. Such applicants may be admitted under special conditions, as described on page 20.

Some students are able to earn advanced college credit in certain subjects. This may be secured in any of three ways:

1. *A grade of 3 or higher on an Advanced Placement (AP) Examination conducted by the College Entrance Examination Board.*
2. *A satisfactory score on any of the Subject Examinations of the College-Level Examination Program (CLEP) of the College Entrance Examination Board.*
3. *The passing of special departmental examinations at Calvin College, as described on page 23.*

Furthermore, students who have completed appropriate courses in high school may be exempted from certain college graduation requirements. This is possible in foreign language, mathematics, literature, and the sciences. Consult pages 46-48 for a description of the ways high school courses satisfy college requirements.

Because student applications are not considered until entrance examination (SAT or ACT) results have been received, prospective freshmen are advised to take the entrance examination during the spring semester of their junior year or in the fall of their senior year. Canadians may substitute the Preliminary Scholastic Aptitude Test (PSAT) if other tests are not available. Candidates for entrance examinations must apply for them at least a month prior to the testing dates.

The American College Test is normally given five times per year. Application forms are generally available from high school principals and counselors but may be requested from the American College Testing Program, Box 168, Iowa City, Iowa 52240. This test is required by the State of Michigan for its competitive scholarship program. Testing dates for the 1987-88 academic year are October 24, 1987; December 12, 1987; February 27, 1988; April 16, 1988; and June 11, 1988.

Applicants not able to take the ACT may submit Scholastic Aptitude Test results. Subsequently they will be required to take the ACT on campus at the expense of the college. The Scholastic Aptitude Test will be given this academic year on October 10, 1987; November 7, 1987; December 5, 1987; January 23, 1988; March 19, 1988; May 7, 1988; and June 4, 1988. Application forms are generally available from high school principals and counselors but may be secured by students living east of the Rocky Mountains from the College Entrance Examination Board, Box 592, Princeton, New Jersey 08540. Those who live in the Rocky Mountain states or farther west, including those from Western Canada and foreign countries of the Pacific area, should apply to the College Entrance Examination Board, Box 1025, Berkeley, California 94701.

Statistical profiles of the Calvin College student body include the following information about the 1986 entering freshman class: the average high school GPA was B (3.14); the average ACT composite score was 22.8; the ACT English score was 21.8; and the ACT mathematics score was 22.2. The SAT averages for those students who submitted scores were: verbal 502 and mathematics 543.

After students are formally admitted, they must confirm their acceptance by making a deposit, which is applied to their tuition. For freshmen, the deposit of \$100 is required by May 1 and will be refunded if requested before July 1.

Former students of the college, including students who have been dismissed and applicants who previously had been given papers entitling them to admission but who did not register, must apply for readmission.

Nondiscriminatory Policy

Calvin College admits students of any race, color, national and ethnic origin to all the rights, privileges, programs, and activities generally accorded or made available to students at the school. The college does not discriminate on the basis of race, color, sex, national and ethnic origin, or disability in the administration of its educational policies, admissions policies, scholarship and loan programs, and athletic and other school-administered programs.

Transfer Students

Students transferring from other colleges or universities must follow the same procedures of applying for admission as freshmen, and they should have a cumulative grade point average of C (2.0) or higher. A high school transcript and ACT or SAT test results are also required. They will receive credit for work done in accredited institutions, provided the courses were of an academic nature and the students have received an honorable dismissal. No more than seventy semester hours of advanced credit will be allowed for work completed at an accredited junior college. Furthermore, no matter how much work done at other institutions may be accepted, a student must complete his last year in residence and at least one upper-level course in his major to graduate from Calvin.

Transfer applicants who have been admitted must make a deposit of \$100 by June 1 which will be refunded if requested before July 1.

A maximum of three course credits or nine semester hours will be allowed for courses taken by correspondence from accredited colleges and universities. Courses taken in residence at other accredited institutions are accepted, provided they have been approved by the registrar in advance. In no case, however, will work in a junior college be accepted after a student has accumulated more than twenty course units of credit at Calvin.

Veterans will receive credit, as recommended by the American Council on Education, for liberal arts courses taken through the USAFI and for a maximum of nine semester hours taken by correspondence courses from accredited universities in the program.

MODEL HIGH SCHOOL PROGRAM

High school students should recognize that the quality of their high school education will determine the ease with which they will do college work and their ability to follow certain courses of study. At Calvin the nature and quality of a student's high school preparation may reduce his college graduation requirements (see pages 46–48).

English	4 units	
Mathematics	3 units	One year each of algebra and geometry. An additional course in algebra is recommended. Four units are desirable for students entering mathematics-related majors.
Foreign language	2 units	Preferably three; ideally the last unit in grade 12.
Science	2 units	Biology, chemistry, or physics; one with a laboratory. Chemistry and biology are recommended to prospective nurses. Three units are desirable for students considering programs in the sciences.
History	2 units	
Electives	3 units	Typing and college preparatory courses.

Admission Under Special Conditions

The college is eager to serve students who show promise of benefiting from a college education even if they do not meet normal admission standards. Those who have not followed a college preparatory program, particularly one including algebra and geometry, should make up their deficiencies during the summer before their freshman year. Approximately 10 percent of the freshman class is admitted conditionally.

Applicants who are at least nineteen years of age but have not completed high school or its equivalent may be admitted on condition provided they have successfully completed the General Educational Development Test and submit satisfactory scores on one of the freshman entrance examinations.

Some applicants with weak high school records and/or low ACT or SAT test scores may be admitted on condition because of other evidence of academic promise. Such students will receive special counsel, must register for four courses, one of which is an Academic Support Program course, are required to participate in the Academic Support Program, and are advised to restrict sharply their involvement in employment, in social life, and in campus activities.

Applicants who meet all the requirements for admission but who do not desire to become candidates for an academic degree may be enrolled as special students for such studies as their preparation qualifies them.

Admission of International Students

Calvin College welcomes international students who can demonstrate their potential ability to meet the academic standards of the college, who are prepared to do college-level work in English, whose application is supported by the results of the American College Test (ACT) or the Scholastic Aptitude Test (SAT), and who can show evidence of their ability to pay most of the cost of their education. The ACT or SAT is not required of students presenting a Senior Matriculation Certificate or transferring from another college or university where they have earned at least one year of credit. Such students should be certain that Calvin College offers the programs they need. The college is authorized under Federal law to enroll nonimmigrant alien students.

When applicants are accepted for admission, they will be sent a formal letter of admission by the director of admissions. The next step for applicants is to forward a minimum deposit of \$1,000 (preferably \$4,000). The Certificate of Eligibility (I-20) will then be forwarded to the prospective student, provided that there is evidence of sufficient financial support. Prospective students should make application immediately with the United States Consul in their area for a student visa.

Applicants for whom English is a second language must have an adequate command of English as demonstrated by their performance on either the Michigan Test of English Language Proficiency (MTELP) or on the Test of English as a Foreign Language (TOEFL), administered periodically throughout the world by the Educational Testing Service. (The TOEFL code number for Calvin College is 1095.) The testing schedule for the MTELP can be obtained from the English Language Institute of the University of Michigan, Ann Arbor, Michigan 48109.

Students must have scores of at least 85 on the MTLP or 500 on the TOEFL. Upon enrollment, international students must take English courses each semester until they have successfully completed English 100 and an English literature course, courses required of all students for graduation. However, the college may require a review course in English as a Second Language if the need is indicated by placement testing administered during orientation. International students can satisfy the graduation requirements in a foreign language with their native language.

Visitors and Auditors

Members of the community who are not enrolled as students in any college are invited to register as visitors in most lecture classes. Admission to the college is not required, but each visitor must register with the Registrar's Office before attending class. The fee for each course visited is \$15, which includes campus parking privileges. Courses in accounting, applied art, computer science, English composition and creative writing, foreign language, applied music, speech, and courses in which a laboratory experience is an integral part of the classroom activity are not open to visitors but only to credit-seeking students and auditors.

Most courses are open to auditors, who must be formally admitted to the college and must pay the tuition for auditing, which is half the regular per-course rate. Auditors are expected to attend all classes and participate in the assigned activities of the class. They may take all tests and submit assigned papers for evaluation, but they are not required to do so. Auditors may change their registration from audit to credit only during the first four weeks of the semester; students enrolled in a course for credit may change to audit only during the first four weeks.

Enrollment in Seminary Classes

Full-time college students may, as a part of a program worked out with their departmental advisors, carry up to two courses in the seminary in any one semester. Approval by the registrar of Calvin Seminary and the registrar of the college is required, and under no circumstances may credit for a single course be counted toward degree programs in both college and seminary. Full-time seminary students may enroll for not more than two courses in the college, provided the dean of the seminary and the college registrar approve.

Student Load and Classification

The typical student load is four to four and one-quarter course units a semester. The normal course load, however, may range from three to four and three-quarter course units, permitting students to register for quarter courses in applied music, basic physical education, and drama in addition to a typical load. Non-credit remedial courses are counted as part of a normal load, and students on probation or condition may be required to limit their load to three course units for credit. In exceptional cases a student may apply for permission from

the registrar to carry more than four and three-quarter course units. Such an application requires the recommendation of the student's academic advisor or department chair and the approval of the registrar. To be eligible for consideration the student must have a cumulative grade point average of 3.0, must have received no grades of incomplete during the previous two semesters, and is expected to limit outside employment.

Not more than two units of applied arts courses, except for music majors in certain applied music concentrations, and no more than one course unit of basic physical education may be applied to graduation requirements.

Students with a minimum of seven course units of credit completed will be classified as sophomores; those with sixteen, as juniors; and those with twenty-five, as seniors. For the purposes of conversion, a course unit is considered to be equivalent to 3.5 semester hours or 5.25 quarter hours.

Grading Systems

Grades given during the regular semester are designated by letters A, excellent; B, good; C, average; D, just passing; F, failure; I, incomplete; W, authorized withdrawal; and N, unauthorized withdrawal. An honor student taking a fifth course may elect to have it graded as S, satisfactory, or U, unsatisfactory.

For purposes of averaging grades, the following numerical values or grade points are assigned to each of the above grades: A, four points per course; B, three; C, two; D, one. A plus-grade is computed at three-tenths of a point above these figures and a minus-grade at three-tenths below. Grades for courses completed in cooperative programs at other colleges and universities are recorded on students' records but are not included in the compilation of their average at Calvin.

Ordinary grades for the interim are H, honors; S, satisfactory; and U, unsatisfactory. These do not carry honor point values and are not averaged in the student's total record, but the student receives one course credit toward the thirty-six required for graduation for each interim course satisfactorily completed. Interim courses carrying core credit are graded according to the traditional letter system and will be included in the student's average.

Auditors are given grades of Au. However, if they fail to attend classes, the instructor will report a grade of W.

Students may alter their schedules during the first week of classes without grades of W being recorded on their records. After that time, grades of W, authorized withdrawal, will be recorded if they leave courses with the written approval of their instructors by December 1 of the first semester or by May 1 of the second. Students who discontinue classes without permission or notification are not entitled to a grade of W but will be given an N, unauthorized withdrawal. This grade is computed as an F in determining a student's grade point average. However, students who withdraw from school at any time with the approval of the dean of women or dean of men and of the registrar will be given grades of W in all courses.

Students may repeat any courses by properly registering for them but must inform the instructor when they are repeating a course. Only the latest grade, whether higher or lower, shall be included in the compilation of a student's

cumulative grade point average. It shall be entered on the record preceded by an R. The original grade is not expunged from the record.

If students fail to complete all the required work or to sit for the final examination, instructors may, if they consider a student's reason valid, give a grade of I, incomplete, rather than a grade of F. The grade of I shall be computed as an F in determining a student's grade point average. Students given an I in the fall semester or in the interim must make up the deficiency by May 1 of the following spring semester; if given an I during the spring semester or summer session, they must make up the deficiency by December 1 of the following fall semester. If they fail to do so, grades of F will be entered on their records. A grade of F will be altered only if a student reregisters and retakes the course in which it was given. Grades of I are never expunged from the records. When students complete the work and professors submit the grades, the credits, honor points, and grades become new and separate entries on the record.

Course Credit and Exemption Examinations

Students who know the material covered by any college course are encouraged to demonstrate their mastery by examination. This can be done in three ways.

First, at the time of admission, freshmen may satisfy this requirement by submitting a grade of 3 or higher on an Advanced Placement (AP) Examination conducted by the College Board.

Second, students may receive course credit by securing a satisfactory score on any of the Subject Examinations of the College-Level Examination Program (CLEP) of the College Board. The minimum score for credit is that which corresponds to the final course grade of C on the tables published by the College Board. For instance, a minimum score is required in English composition, calculus, general chemistry, general psychology, western civilization, and American government. Scores on other subjects are higher or lower and, in foreign language, they determine the amount of credit that will be granted.

Third, regularly enrolled students may meet any core requirement by departmental examination and may, except when the department deems this inappropriate, receive regular academic credit for any course by examination. The student's performance on such tests will be recorded on the student's record, and the student will be charged a \$5 fee for an exemption examination and \$20 for a credit examination. Students wishing to take departmental examinations should apply at the Registrar's Office by October 1 if they wish to take the examinations during the fall semester and by February 15 for the second semester.

Honors, Eligibility

Full-time students with an average grade of A- (3.50) or higher for any semester and a cumulative average of 3.3 or higher will be placed on the Dean's List.

Part-time students may participate in extracurricular activities but may not assume leadership roles. Students on academic or disciplinary probation may

not participate in any organized extracurricular activity. For details of these regulations, see the *Student Handbook*.

Students desiring to graduate with an honors designation must participate in the honors programs. Consult page 49 for details.

Student Rights and Student Records

The Family Educational Rights and Privacy Act of 1974 declares that "institutions must provide. . . student access to official records directly related to students and an opportunity for a hearing to challenge such records on the grounds that they are inaccurate, misleading, or otherwise inappropriate; that institutions must obtain the written consent. . . before releasing personally identifiable data about students from records to other than specified lists of exceptions; that. . . students must be notified of these rights."

Calvin College assures the safekeeping and confidentiality of student records and files. It also recognizes the rights of students and the responsibilities incumbent on the college because of this legislation. The guidelines for the implementation of this legislation, intended to preserve confidentiality and to assure students access to their records, are available in the Office of the Registrar.

At the end of each term a grade report will be mailed to the home address of each student unless the student files a written request with the registrar that this not be done. Students may obtain a copy of their complete academic records at any time.

Official transcripts are released only when requested by the student. The fee for currently enrolled students is \$1 a copy; the fee for former students is \$2. Transcripts will not be released for students who have failed to meet their financial obligations to the college.

Any student found guilty of dishonesty in any examination or test or in written work of any character is subject to disciplinary action. The normal sanction is a failing grade on the piece of work involved, but a failing grade in the course is also a permissible sanction.

The student who wishes to appeal the action of a faculty member should follow the guidelines in the Student Protest and Appeals Procedure document, which can be obtained from the Provost's Office.

Academic Probation and Dismissal

Each student admitted to Calvin College is assumed to have the preparation, the desire, and the ability to make satisfactory progress toward a degree. In practice, however, some students do not make the progress expected of them. Such students are notified, offered special assistance and academic counseling, and given an opportunity to improve their records. Failing in that, however, they will be dismissed.

Applicants whose test scores or past records indicate the likelihood that they will experience academic difficulty will be given conditional admission. They will be limited to four courses and required to complete successfully any review courses prescribed by the program advisors. Transfer students whose

previous college records are weak will be admitted on probation, and may also have conditions stipulated.

The records of all undergraduate students are reviewed after each semester, and the academic status of full-time students is determined according to the following schedule. The performance of part-time students is judged on the basis of full-time equivalent enrollment.

<i>Semesters of full-time enrollment¹</i>	<i>Minimum cumulative grade point average needed for continuation</i>	<i>Minimum cumulative grade point average needed for good standing²</i>	<i>Minimum credit units completed needed for good standing</i>
1	1.0	1.50	2
2	1.0	1.65	5
3	1.3	1.75	8
4	1.45	1.85	12
5	1.60	1.95	15.5
6	1.75	2.00	20
7	1.90	2.00	23.5
8	2.00	2.00	28

1. Interims are considered a part of the spring semester for the purpose of determining academic status. Summers may be used to make up deficiencies. If a student discontinues prior to December 1 of the first semester, or prior to May 1 of the second semester, or at any time because of illness, that semester will not be counted. The semesters of enrollment of transfer students include the number of semesters of full-time enrollment at all the colleges combined, but only Calvin grades are considered in determining averages.

2. A student receiving Veterans Administration benefits is placed on academic probation if his GPA falls below 2.0 and must within the next two semesters raise it to 2.0 in order to continue to be certified for such benefits. Such students must, prior to enrolling for the final four course units, have earned a cumulative grade point average of 2.0. If any student receiving veteran's benefits fails to come off probation within the prescribed probation period, the school will inform the Veterans Administration. That student will be informed in writing that the Veterans Administration has been notified.

Any student whose average falls below the minimum required for continuation is subject to dismissal. Those permitted to continue but not meeting the requirements for good standing are placed on probation. Students placed on probation must in the semester following earn a current grade point average equal to or better than the cumulative average required for good standing in that semester: e.g., a student placed on probation after the first semester must in the next semester's courses average 1.65 or above; one placed on probation after the third semester must in the fourth semester average 1.85 or above. Freshmen placed on probation may register for no more than four courses and may be required to complete an Academic Support Program review course or to complete a program of academic counseling with an advisor. All students on probation are expected to limit extracurricular activities. Failure to meet the terms of probation or other specific conditions will constitute grounds for immediate dismissal.

Students not permitted to continue may appeal their academic dismissal to the Academic Standards Committee, whose decision is final. One year must

elapse before students dismissed for poor academic performance are eligible to petition for readmission. A request for readmission will be reviewed by the Admissions Committee; readmission following academic dismissal will be based upon evidence that the difficulties previously encountered can be overcome and that eventual completion of degree requirements can reasonably be expected.

Application for Degrees and Certificates

In addition to the formal requirements for degrees described in the section on "The Academic Programs" beginning on page 45, students must satisfy certain technical requirements. Normally, they must complete their last year in residence at Calvin. They must also complete a Major Concentration Counseling Sheet and have it signed by their departmental advisor and must meet all of the conditions specified in that sheet. (These sheets normally are completed during the sophomore or junior year.) Finally, they must file a formal application for a degree at the Office of the Registrar not later than the beginning of the semester in which they expect to graduate. If they are completing teacher education programs, they must also file an application for Michigan certification at the same time they apply for a degree or not later than a semester before they complete the certification requirements.

Students desiring to graduate with an honors designation must apply for admission to a departmental honors program and meet those requirements and the general honors program requirements. Consult page 49 for details.

FINANCIAL INFORMATION

Tuition and fees

TUITION FOR THE ACADEMIC YEAR is \$5,650; room and board on campus is \$2,470; and the estimated cost for textbooks and classroom supplies is \$300.

Students taking fewer than four course units of credit in a semester will be charged on a per-course basis, if that results in a lower total charge. Those taking more than 4.75 course units will be charged at the per-course rate for the additional. The interim is considered a separate course for which there is no charge if the student pays full tuition either semester or pays for at least six non-interim courses during the academic year.

Most Calvin College students receive financial assistance from the grant and scholarship programs. A special grant-in-aid, called a Denominational Grant, is available to members of the Christian Reformed Church in North America which reflects the direct support such students and their families provide the college through the church.

BASIC CHARGES

Tuition, up to 4.75 course units a semester	\$2,825
Tuition, per course-unit rate	*710
Tuition, auditing, per course unit	355
Tuition, clinical years, B.S. in Nursing	7,200
Room and board, academic year	2,470

Full-time tuition covers student activities such as the Student Senate and student publications.

**After completion of six course units, part-time graduate students who have not had the opportunity to take an interim course will be entitled to one free course per graduate degree. Such students should check with the dean for academic administration to see if they qualify. This policy is subject to revision when the fee schedule is revised.*

DEPOSITS

Housing deposit	\$ 50
Physical education locker deposit	5

SPECIAL FEES

Visitor fee, per course	15
Directed teaching fee	10
Examination fee (course credit)	20
Examination fee (exemption)	5
Late application fee	10
Late installment payment fee	5
Individual music instruction	
One hour weekly lesson per sem.	300
Half-hour weekly lesson per sem.	150
For concentrates, per sem.	225
Vehicle registration fee	10
Residence hall social fee	20
Knollcrest East Social Fee	25
Transcript, for current students	1
for former students	2

Students are encouraged to pay their tuition, fees, room, and board in full at the time of registration each semester. A payment schedule is available at registration for those students who need to pay in installments. This schedule calls for a down payment at the beginning of each semester and payments of approximately

one-third of the balance at the beginning of each subsequent month. The minimum down payment required at registration for resident students is \$1,850 for tuition, room, and board; the minimum for non-resident students paying tuition only is \$1,400. Denominational Grants and other financial aid are applied at the beginning of the semester and may be used to reduce the down payment. Accounts not paid on time are subject to a \$5 late payment fee, and those not paid by the end of the semester will be charged an additional 1 percent per month on the unpaid balance. A penalty fee of \$25 is charged students who have not paid their bills in full, unless arrangements are made with the Business Office by December 11 in the first semester and May 12 in the second. Transcripts are not issued for students owing money.

Prospective freshmen are required to make an advanced tuition deposit of \$100 by May 1; prospective transfer students must make the deposit by June 1. Part-time students must deposit \$50. These deposits are refundable if a request is made by July 1. Students applying for the interim or the second semester must make the appropriate deposit by November 14 and may apply for a refund before January 1.

If a student withdraws from the college his charges for the semester (tuition, room, board, etc.) will be prorated from the beginning of the semester until his official withdrawal at the Registrar's Office, but in no case will he be charged less than \$25. A student who withdraws from a single course will have his charges reduced if he withdraws at the Registrar's Office within the first ten weeks of the semester, and his charges will be prorated according to the portion of the ten weeks completed. The Denominational Grant for these students is prorated also and other financial aid of such students is reviewed and may be reduced.

Scholarships and Financial Aid

Calvin College participates in all federal and state student financial aid programs for which our students are eligible. In addition, the college sponsors a number of its own programs which are coordinated with and used to supplement federal and state programs. Programs sponsored by the college include: (1) academic scholarships designed to recognize students with excellent academic ability and to encourage superior academic work, (2) Denominational Grants which recognize regular contributions to the college through denominational quotas, and (3) need-based grants for students who are not eligible for state or federal grants or who need more grant assistance than state and federal programs provide.

Information about application procedures for financial aid is included with admission information for prospective students and is made available to current students in January of each year.

The Office of Scholarships and Financial Aid assists students in working out programs to cover college costs. Those who apply for need-based financial aid receive an award letter indicating the aid for which they are eligible including grants, scholarships, loans, and income from student employment. Students should determine before registration how they will meet their costs and, if

intending to carry a full academic load, should plan to work no more than twelve to fifteen hours per week.

Specific information about financial aid programs is given in the following pages and is divided into three sections: (1) Denominational Grants, (2) academic scholarships, and (3) need-based aid. The scholarships and need-based programs and their conditions are described in the following sections. Questions or requests for additional information should be directed to the Office of Scholarships and Financial Aid at the address or telephone number given inside the front cover of this catalog.

Enrollment and Academic Progress Requirements. Most scholarship and financial aid programs require attendance at least half time or enrollment in a minimum of one and one-half course units per semester. There are two exceptions to this: 1) the Denominational Grant which is not contingent on the number of courses for which a student is registered and 2) the Michigan Adult Part-Time Grant which is available to students taking one or more but fewer than three courses.

Minimum enrollment for academic scholarships awarded by the college is two course units per semester although many of the named scholarships assume full-time enrollment. Full-time attendance for financial aid requires enrollment in a minimum of three course units per semester and seven for the full year. Students who enroll at least half time but less than full time can be considered for financial aid but usually in reduced amounts.

Students who wish to receive financial aid must be meeting the normal standards for continuation as a student and must have completed the minimum credit units needed for good standing. These are described on page 24. These standards apply to Michigan Competitive Scholarships and Tuition Grants, to Calvin Scholarships, Grants, and Loans, to Pell Grants, Supplemental Educational Opportunity Grants, Perkins (National Direct) and Guaranteed Student Loans, Calvin Alternative Loans, Parent Loans for Undergraduate Students, and College Work-Study employment.

DENOMINATIONAL GRANTS

Students whose families are members of the Christian Reformed Church and who thus contribute regularly to Calvin College through denominational quotas receive a Denominational Grant. The amount of this grant is determined in part by the distance between the student's home and the college as measured in a direct line. For purposes of this grant, the home of an unmarried student is considered to be that of his parents; that of a married student to be his residence before enrolling at Calvin. However, out-of-state students who meet the residency requirements of the Michigan Competitive Scholarship or Tuition Grant, must also be considered Michigan residents for purposes of the Denominational Grant. If a student's parents are not members of the denomination, the grant is based on the location of the Christian Reformed Church of which the student is a member. When the need of a student is met by a State of Michigan Competitive Scholarship or Tuition Grant, the Denominational Grant is reduced to keep the total amount of aid within the maximum permitted by state regulations.

The Denominational Grants for 1987-88 are:

	Grant per semester, if paying full tuition	Grant per course, if paying by course
For Michigan students		
Within 10 miles of the campus	\$180	\$40
From 10 to 150 miles	230	50
Beyond 150 miles	290	60
For out-of-state students		
Within 300 miles	390	80
From 300 to 1,000 miles	440	90
More than 1,000 miles	490	100
Manitoba, Ontario, Quebec	440	90
Alberta, British Columbia, Nova Scotia, Prince Edward Island, Saskatchewan	490	100

ACADEMIC SCHOLARSHIPS

Scholarships are awarded to incoming students to encourage good students who are likely to do superior work to enroll at Calvin and to upperclassmen to encourage superior academic performance. Most scholarships are granted on the basis of the student's academic record and potential, but in some cases other factors such as program of study, financial need, and other designated criteria are taken into consideration. More than 300 scholarships are awarded annually to freshmen and more than 500 to upperclassmen. Students may be considered for a named scholarship or departmental scholarship in addition to one of the general college scholarships described below.

General College Scholarships

Incoming freshmen and transfer students are considered automatically for the general college scholarships described below on the basis of the information received at the time of admission and are not required to file a separate scholarship application form. For maximum consideration, freshmen must be admitted by February 1 and transfer students by March 1.

Selection for the scholarships is based primarily on high school grades, class rank, and ACT or SAT scores. Students who have more than one test score reported to the college will be judged by the better score, provided the information is received by February 1.

The Calvin National Merit Scholarship is a four-year scholarship and is renewable for three years, as long as the recipient continues to attend Calvin College. The Presi-

dential, Faculty Honors, and Honors Scholarships are available for four years as well if the recipient has a cumulative grade point average of 3.50 or better at the end of the interim each year.

Calvin National Merit Scholarships. Calvin awards National Merit Scholarships to all National Merit Finalists who have a high school grade point average of 3.5 or better, have designated Calvin as their first choice college, and are not selected to receive another scholarship through the National Merit Corporation. The amount of the scholarship can range from \$1,600 to \$2,000 depending on need and provides, in addition, an allowance of \$50 for books other than textbooks for the freshman year.

Presidential Scholarships. Scholarships of \$1,600 each are awarded to the top forty or

fifty incoming freshmen who are not selected to receive a Calvin National Merit Scholarship. To receive this scholarship a student generally needs to rank in the top one or two percent of the high school class and have an ACT composite score of 29 or higher or combined SAT scores of 1,300 or higher. These scholarships also provide an additional allowance of \$50 for books other than textbooks. Transfer students are considered for these scholarships if they had a cumulative grade point average at their previous college of 3.80 or higher.

Faculty Honors Scholarships. Approximately one hundred scholarships of \$1,000 each are awarded to incoming freshmen who demonstrate outstanding academic achievement and potential but are not selected to receive a Presidential Scholarship. This scholarship is awarded automatically to students who are valedictorians if they have a grade point average of 3.50 or higher and to National Merit Semifinalists who are not selected to receive a Calvin National Merit Scholarship. Others are selected on the basis of high school grades, class rank, and ACT or SAT scores. Normally, this requires a class rank in about the top five percent and an ACT composite score of 27 or higher or combined SAT scores of 1,150 or higher. Transfer students are considered for this scholarship if they have a cumulative grade point average of 3.65 or higher at their previous college.

Honors Scholarships. Scholarships of \$500 are awarded to students in approximately the top 25 percent of the incoming freshman class who are not selected to receive one of the above scholarships. Normally, a grade point average of 3.50 or higher is required for consideration. Transfer students who have a grade point average of 3.50 or better in their previous college work are considered for the scholarship if they do not receive a Faculty Honors or Presidential Scholarship. Students who do not have a scholarship when they enter Calvin will be awarded an Honors Scholarship for the sophomore, junior, or senior year if they had a cumulative grade point average at Calvin of 3.50 or better at the end of the interim of the preceding year.

Academic Achievement Awards. Students who receive an Honors or a Faculty Honors Scholarship for a given year can receive a larger award for the following year if they have the appropriate grade point average.

Honors Scholarship recipients will receive an Academic Achievement Award of \$500 in addition to the scholarship if they have a cumulative grade point average of 3.65 or better at the end of the interim, and Faculty Honors Scholarship recipients with a cumulative grade point average of 3.80 or better at the end of the interim will receive a \$600 Academic Achievement Award in addition to their scholarship. These awards are granted annually and are awarded each year the student has the 3.65 or 3.80 grade point average required.

Named Scholarships Funded by Donors

A number of scholarships and grants have been established by donors to recognize and provide financial support to students who meet the eligibility criteria described. Prospective freshmen are considered automatically for those scholarships open to freshmen and do not need to file a separate scholarship application form except in the case of the Steelcase Scholarship. Freshmen who wish to be considered for a Steelcase Scholarship should send a letter of application to the Office of Scholarships and Financial Aid. Returning students who want to apply for named scholarships must file an application with the Office of Scholarships and Financial Aid. The application deadline for returning students is March 1. Freshmen applicants must be admitted by February 1 to receive maximum consideration.

Clarence and Anne Beets Scholarship. Dr. William C. (Clarence) and Mrs. Anne Beets have contributed a gift to Calvin College, the income from which is used to provide two scholarships of \$1,000 each. Dr. and Mrs. Beets are interested in helping students who have been successful at Calvin and have the potential and motivation to continue to be successful but lack the financial resources to meet all of their expenses. To be considered for a scholarship a student must be entering the junior or senior year, demonstrate financial need, be making normal progress toward a degree, and have a cumulative grade point average of 2.5 or higher.

Beré Memorial Scholarship. The college has received a gift from Mrs. Jeanne L. Beré in memory of her late husband, Paul Beré, the income from which is used to award one scholarship of \$600 or more each year. The

scholarship is awarded to a prelaw student entering the junior or senior year, with primary emphasis on an evaluation of academic performance and potential. Need is a secondary factor in the selection.

J. Russel Bouws Scholarship. A scholarship fund has been established in honor of Mr. J. Russel Bouws, founder of Russ' Restaurants in Holland, Michigan, by Mr. Howard De Haan, owner of the franchise for Russ' Restaurants in Kent County. Scholarships of \$500 each are awarded to students at Calvin who are employed by one of the Russ' Restaurants in Kent County. Prospective as well as current students are considered. Selection criteria include the student's academic record, character, motivation, financial need, and length of service with Russ'. For 1987-88, two scholarships were awarded to prospective freshmen and four to upperclassmen.

Calvin College Minority Grant. Gifts have been received from constituents and friends of the college to fund this grant program for students who are members of a minority culture in North America. To be eligible for a grant from this fund, candidates must have a grade point average of 2.5 or higher and must demonstrate financial need. Candidates for renewal are given first consideration. Three grants of \$1,000 each were awarded to a freshman for 1987-88.

Dr. Paul and Mrs. Doris Dirkse Health Care Scholarship. Dr. and Mrs. Dirkse have provided the college with a fund, the income from which is used to award scholarships to students pursuing preprofessional courses in medicine, dentistry, nursing, physical therapy, and related professions and paraprofessions. Four scholarships of \$1,000 each were awarded for 1987-88. Selection criteria include vocational interest, academic record, character, and need.

Emerson Minority Grant. Each year Calvin College receives a gift of \$3,000 from Mr. and Mrs. James Emerson to be used for grants to North American students of minority cultures. Three grants of \$1,000 each are awarded yearly on the basis of the student's academic record and financial need, with preference given to students from single-parent families. Returning students are considered as well as incoming freshmen. A minimum grade point average of 2.5 is required for consideration.

Farmers Insurance Group Scholarship. Each year the Farmers Insurance Group of Los Angeles, California, provides the college with a gift of \$1,200. This is to be used to award one or two scholarships to second-, third-, or fourth-year students in mathematics or business administration. Financial need is a primary factor in selecting a recipient; however, an academic record of C+ or better is also required.

Grand Rapids Foundation Scholarship. As a result of a bequest by the late Stephen D. Lankester to the Grand Rapids Foundation, nine scholarships of \$500 each are available each year to juniors and seniors from Kent County. The primary purpose of this program is to provide assistance to students with good academic records (B or better) who have financial need. Recipients of this scholarship who wish to be considered for renewal must reapply each year.

Dr. Roger A. and Bradley J. Hoekstra Memorial Scholarship. A gift designated to provide student scholarships has been received from Mrs. Janice Hoekstra in memory of her late husband Roger and son Bradley. Scholarships of \$750 or more will be awarded to upperclassmen who plan to pursue the study of medicine. Selection is based primarily on the student's academic record and potential, although financial need will also be taken into consideration.

Wilhelmina Kalsbeek Memorial Scholarship. The family and friends of Wilhelmina Kalsbeek have established a fund in memory of her and her missionary work in China from 1922 until 1949. The purpose of the scholarship is to assist with a Christian college education for students from mainland China who in turn can bring the Christian faith to the Chinese people. To be eligible for the scholarship a student should be from mainland China, committed to return to China, proficient in speaking and writing the English language, and qualified to do college level work. Other criteria considered in the selection include the student's academic potential, potential for Christian service in China, and financial need. Typically, one scholarship in the amount of \$1,000 will be awarded each year.

Dr. Harry Kok Memorial Scholarship. A top scholarship of \$1,000 is presented each year, in memory of Dr. Harry Kok, to a junior student for use in the senior year at Calvin College. The award is given pri-

marily for achievement in scholarship, although other factors such as financial need, will be taken into account.

Leonard M. Krull Scholarship Aid Fund.

As a result of a bequest to Calvin College by the late Leonard M. Krull of Westborough, Massachusetts, three or more scholarships are available each year to prospective freshmen from the Whitinsville, Massachusetts, area. The scholarships range from \$350 to \$700 with selection based on the student's academic record, ACT or SAT scores, and, in some cases, on financial need. The \$700 scholarships are renewable for up to four years. Selection is made by the Scholarships and Aids Committee of the college in consultation with a representative committee from the Whitinsville area.

Mephibosheth Scholarship.

A scholarship has been established by an anonymous donor to provide scholarship assistance to students with physical disabilities. The donor, who has physical disabilities himself, has established this fund out of gratitude for all that God has done for him and has named it the Mephibosheth Scholarship because, as he indicates, "he too has dined at the King's table" (cf. II Samuel 9:13). First consideration for scholarships is given to prospective freshmen and transfers who have a physical impairment that is likely to continue indefinitely and who have the academic ability to be admitted as regular students. Preference is given to students who have financial need and to those who have an impairment that makes employment during the academic year less likely. Normally, one new scholarship of \$800-\$1,200 will be awarded each year. Scholarships are renewable for those who maintain satisfactory academic progress as required for other financial aid programs.

Amos Nordman Scholarship.

Funds have been received from the Amos Nordman Foundation Charitable Trust to be used for scholarships to students at Calvin College. Mr. Nordman was a resident of Marne, Michigan, and established a foundation that makes contributions to several colleges in Michigan for student aid. The scholarships are awarded to students who have a cumulative grade point average of 3.0 or better and are from families with limited income and assets. Four scholarships of \$500 each were awarded for 1987-88.

Theodore J. Peters Scholarship. A scholarship fund has been established by the late Mr. Theodore J. Peters, the income from which is used to provide scholarships to students from a number of West Michigan Christian High Schools. For 1987-88, a scholarship has been awarded to one student at each of the following Christian high schools: Calvin Christian, Grand Rapids Christian, Holland Christian, Kalamazoo Christian, Northern Michigan Christian in McBain, South Christian in Cutlerville, Unity Christian in Hudsonville, and West Michigan Christian in Muskegon. The number of scholarships awarded each year depends on the income from the fund and the amount of money awarded the previous year. The amount of the scholarship is equal to the difference between the cost of tuition for the freshmen year and the amount of aid the student receives from state and federal grant programs and from the college's Denominational Grant Program. Selection is made by the high school on the basis of the student's academic achievement, Christian character, leadership, and participation in extracurricular activities.

SCORR Grants. The Christian Reformed Church has authorized the Synodical Committee on Race Relations (SCORR) to provide grants of up to \$1,000 per year to North American students of minority cultures who are related to the Christian Reformed Church. Selection criteria include the student's academic record, financial need, and interest in serving God's Kingdom through the Christian Reformed Church. Returning students are considered as well as incoming freshmen.

Spalink Memorial Missions Scholarship.

The Spalink family has established a scholarship fund in memory of John Spalink, Jr., which provides one scholarship of \$600 each year. Its purpose is to encourage superior students to enter missions. The scholarship is awarded to a student of either sex who shows a definite interest in a missionary vocation. The award is given primarily for academic achievement, although other factors, such as financial need, will be taken into account. Generally, members of the Christian Reformed Church who aspire to a career with that church's missions will be shown preference.

Spectrum Colors, Inc. Each year Spectrum Colors, Inc. of Kalamazoo, Michigan, pro-

vides the college with \$4,000 to be used for scholarships. Scholarships are awarded, first of all to children of employees of Spectrum Colors, Inc., and secondly to other graduates of Kalamazoo Christian High School. Selection is made from a list of nominees provided by the corporation.

Steelcase Foundation Scholarship. The Steelcase Foundation of Grand Rapids, Michigan, offers scholarships totaling \$4,000 annually to applicants who are children of Steelcase employees. Typically scholarships of \$500 each are awarded to two freshmen and six upperclassmen. The recipients are selected by the Scholarships and Aids Committee of the college. Applicants are judged on the basis of scholastic ability, character, and need.

Edward C. and Hazel L. Stephenson Foundation Scholarship. Each year Calvin receives a gift of \$4,500 from this foundation to be used for scholarships. For 1987-88, five scholarships were awarded in amounts of \$900 each.

The Student Offices Minority Grant. A scholarship fund has been established by students from some of the student organizations on campus who wish to encourage the enrollment of students from minority cultures at Calvin. Each year these students contribute to this fund the money they would otherwise receive as an honorarium for their services. The college then matches these contributions with an equal amount from its own funds. Candidates for these grants must be prospective freshmen or transfer students, have a cumulative grade point average of 2.5 or higher in high school or in their previous college work, and qualify on the basis of financial need. If needs are comparable, preference is given to students from the greater Grand Rapids area. Grants range from \$1,000 to \$1,500 each and are renewable as long as the student maintains satisfactory academic progress as required for other financial aid and continues to qualify based on need. Four grants of \$1,100 each were awarded for 1987-88.

Sullivan Scholarship. Each year Calvin receives \$1,000 from the Sullivan Scholarship Fund Trust to be used for one or two scholarships to incoming freshmen. The scholarships are awarded to needy athletes from high schools in the greater Grand Rapids area with preference given to those who

have participated in athletics during the senior year. There is no requirement that the recipient participate in athletics in college. Selection is made by the college from nominations made by high school athletic directors.

The Vander Ark Family Scholarship. The Vander Ark family, known as the teaching family, has funded a scholarship which is available to students at Calvin who exhibit a strong commitment to Christian service, scholastic ability, diligent study habits, sound moral character, and promise of growth in spiritual and moral leadership. Preference is given to students pursuing a program in the humanities, and in some cases, financial need may be considered as well. For 1988-89 it is expected that two scholarships will be available in the amount of \$500 or more.

The Edward D. Vander Brug Memorial Scholarship. Up to four scholarships are awarded annually from a fund set up by the Vander Brug family of Detroit, Michigan, in memory of Edward D. Vander Brug. The program is designed to recognize academically-capable North American students of minority cultures who have demonstrated potential for leadership in high school, in college, or in previous experience. The recipient must intend to pursue an education leading to full-time service in agencies or institutions related to the Christian Reformed Church. Awards are in the amount of \$2,000 a year and are renewable if the student's cumulative grade point average is 3.0 or higher, or if the grade point average for the previous year is 3.5 or higher. Need is not a requirement for the scholarship. Returning students are considered as well as incoming freshmen.

Ralph Gelmer Vander Laan Memorial Scholarship. Mr. and Mrs. Joseph W. Vander Laan, in honor of Mr. Vander Laan's brother, have provided the college with a fund, the income from which is used to award scholarships. One of the scholarships is awarded to a prospective junior or senior who is pursuing a program in the health professions, with preference given to those interested in missions or some other type of Christian service. The other scholarships are awarded to top students in any area. For 1987-88, six scholarships of \$1,000 each were awarded. Selection criteria include the student's academic record, character, and need.

Charles and Anna Wabeke Memorial Scholarship. Calvin has received a gift from Mrs. Ruth Heerspink, daughter of Mr. and Mrs. Wabeke, which has been used to establish a scholarship fund. Scholarships are awarded to upperclassmen who are planning to enter full-time Kingdom service with preference given to those interested in missions. The student's academic record and faculty recommendations are primary factors in the selection (a grade point average of 3.0 or better is required) although financial need is considered as well. For 1987-88, one scholarship of \$500 was awarded.

Dr. Morris Wilderom Scholarship. The family of the late Dr. Morris Wilderom has established a scholarship in his memory to be awarded to students in medicine. Dr. Wilderom graduated from Calvin in 1931 and practiced medicine until his death in 1985. Candidates for this scholarship must be pursuing a premed program, entering the junior or senior year, and be in need of financial assistance. Other factors considered in the selection include the student's motivation, Christian character, and ability to contribute to the medical profession in future years. One scholarship of \$1,000 was awarded for 1987-88.

Woodlawn Christian Reformed Church Minority Scholarship. Each year the Woodlawn Christian Reformed Church of Grand Rapids, Michigan, provides the college with up to \$2,500 to be awarded to a North American student of a minority culture who is personally committed to Jesus Christ and His Church. The amount of the scholarship, which can range from \$1,000 to \$2,500, depends on the amount of the student's need and the availability of other aid. A minimum grade point average of 2.5 is required. Returning students are considered as well as incoming freshmen.

Departmental Scholarships Funded by Donors

A number of other scholarships have been established by donors to recognize students in particular departments. Applications for these scholarships must be submitted to the department for which the scholarship is designated.

Calvin Alumni Association Scholarships. The Calvin Alumni Association awards up to six scholarships of at least \$1,000 each to students who have been active in volunteer

work on and off the Calvin campus through membership and involvement in student and/or community organizations (where payment for services has been minimal or nonexistent.) Students who wish to qualify for these scholarships must also be able to articulate a connection between their volunteer activity and life goals, and have a minimum cumulative grade point of 2.5. Candidates should secure an application from the Alumni Office and return it by March 1. A team of Alumni Association Board members reviews the applications and interviews finalists.

Alumni Players Music Award. The Alumni Players of Calvin College have provided the Department of Music with funds to make an annual award of \$600 to an outstanding sophomore or junior music major for use in the junior or senior year. Applicants shall be judged by the following criteria: proficiency in performance, overall contribution to the musical life of the college, grade point average, particularly in music, and active participation in college ensembles.

Ervina Boevé Scholarship for Theater Arts. Through the generosity of former students and friends this scholarship honors Mrs. Ervina Boevé for her contribution to the theater and the college while serving as Director of Thespians. Each year a scholarship of \$150, to be applied toward tuition, will be awarded by the Department of Communication Arts and Sciences to a junior speech major with a theater arts concentration on the basis of academic record and proven ability and dedication in performance, production, or scholarly research in theater. Applicants for the scholarship must submit an application portfolio to the department by April 1.

Sandra Bowden Art Scholarship. Mr. Robert Bowden, from New York, has established this scholarship in honor of his wife, Sandra, who is an artist. They want to encourage Christian artists to prepare to become leaders in the field of art. The \$750 scholarship is available to a sophomore, junior, or senior majoring in art who has a minimum grade point average of 2.5 or higher. The recipient is expected to send slides of his/her art to Sandra Bowden and also an explanation of his/her motivation for doing one work of art represented by a slide.

The Margaret and Douglas Bush Family Scholarship. The Bush family has provided

the college with funds to encourage worthy students to prepare for positions in business and business education. Three or more scholarships of \$500 or more are awarded each year on the basis of diligence, character, commitment to service of the Lord and mankind, promise of growth, and, in some cases, financial need. Although the student's academic record is not a primary factor, a grade point average of 3.0 or better is required. Application forms are available from the Department of Economics and Business which administers this award. Submission deadline is March 1.

The Cayvan Award in Strings. An annual award of \$600 by Mrs. Leo Cayvan is offered to an outstanding sophomore or junior player of violin, viola, cello, or bass viol for use during the junior or senior year. This award is in memory of her late husband, Mr. Leo L. Cayvan, a great benefactor of the Music Department. Selection shall be made on the basis of proficiency in performance on the instrument, evidence of sound musicianship, grade point average, especially in music, and participation in the college orchestra and in a chamber music ensemble.

Peter and Margaret (Bell) De Haan Chemistry Award. Mrs. De Haan has established a scholarship fund for the benefit of students in chemistry in memory of her late husband, Peter. Awards of \$500 or more each are based on Christian character, personality, possible financial need, and promise of growth.

DeKryger-Monsman Memorial Prize. As a result of a gift to Calvin College by Mrs. Gerald Monsman in memory of her husband, one prize with a minimum of \$1,000 is awarded each year to a junior political science major for use in the senior year at Calvin College. The award reflects academic achievement and potential. Financial need may be taken into account. Selection of recipients is made by the Political Science Department in conjunction with the Scholarships and Aids Committee.

The De Vries Church Music Award. An annual award of \$600 is given by Douglas De Vries to an outstanding freshman, sophomore, or junior student who is considering a career in church music. The stipend is to be used during the sophomore, junior, or senior year. Applicants will be judged by the following criteria: proficiency in performance as a singer or keyboardist, evidence

of sound over-all musicianship, GPA, especially in music, and an interest in and aptitude for a career in church music.

The William and Betty De Young Memorial Scholarship. A scholarship in memory of Mr. and Mrs. De Young has been established by their grandchildren. The purpose of the scholarship is to encourage engineering students to be Christian, liberally-educated engineers. Four or more scholarships will be awarded each year in the amount of \$700 or more depending on the amount of money available each year. Candidates for the scholarship must be prospective seniors majoring in engineering and must have a cumulative grade point average of 2.5 or higher. Other factors that will be considered include the student's character, motivation, ability to solve practical problems, potential for leadership, potential to contribute to the profession, and maximization of academic potential during the first two and one-half years of college performance.

Bryan Dykstra Nursing Scholarship. The family and friends of the late Bryan Dykstra from Rochester, New York, have contributed funds to be used for scholarships in Bryan's memory. Bryan was a student at Calvin in 1982-1983 before he contracted leukemia and passed away in the fall of 1983. One scholarship of \$600 will be awarded each year to a student who is pursuing nursing as a career, in recognition of all that Christian nurses did for Bryan before his death.

The Helene Hekman Gezon Voice Award. Contributions have been received by the music department in memory of Mrs. Gezon, a prominent contralto soloist with The Calvin College Oratorio Society. Interest from this fund provides an annual award of \$600 to an outstanding sophomore or junior voice student for use in the junior or senior year. Applicants shall be judged on the basis of proficiency in performance as a singer, evidence of sound overall musicianship, and grade point average, especially in music.

The Holtvluwer Music Award. Contributions have been received by the department in memory of Henry Holtvluwer, first chairman of the board of The Calvin College Oratorio Society. Interest from this fund provides an annual award of \$600 to an outstanding sophomore student who is pursuing a major in music, for use in the junior

year. Applicants will be judged on the basis of overall grade point average at Calvin.

Kent Medical Foundation Grants. Each year Calvin College receives funds from the Kent Medical Foundation to be used for scholarships for students in nursing. Recipients of these awards must be residents of Kent County or bordering counties and enrolled or planning to enroll in the Bachelor of Science Nursing Program. Selection is made on the basis of the student's academic record, potential for service as a nurse, and financial need. Two grants of \$800 each were awarded for 1987-88.

Freshman Keyboard Scholarship. Two awards of \$600 are offered annually by an anonymous donor to keyboardists who have a record of superior achievement in high school music activities. The award is applied to four semesters of private piano or organ lessons. The recipients will be expected to participate in the scheduled rehearsals and performances of at least one faculty-directed ensemble or fulfill this requirement by accompanying student lessons and performances. Applicants will be judged on the evidence of talent and musicianship. See Oratorio Scholarship below for application procedure.

Mol Family Scholarship. Mr. and Mrs. Jacob "Jay" and Lois Mol, on account of their strong feeling for Christian education at all levels, established this scholarship to help in the training of education students at Calvin College who intend to become career teachers in Christian elementary and secondary schools. Two scholarships, one in the amount of \$1,500 and the other in the amount of \$500, are to be awarded annually. Candidates for the larger scholarship shall demonstrate qualified eligibility for need-based financial aid; candidates for the lesser scholarship shall be those who are unable to qualify for need-based financial aid. Candidates must have been accepted into the Teacher Education Program at the time of application, be in their junior or senior year, and intend to make Christian school teaching their professional calling and vocation. Candidates must carry a minimum grade point average of 3.0. Candidates for these scholarships will make application to and on forms provided by the Education Department of Calvin College.

The Anne Noordeloos Keyboard Award. Contributions have been received by the

department in memory of Anne Noordeloos, mother and grandmother of students active in Calvin's music program. Interest from this fund provides an annual award of \$600 to an outstanding sophomore or junior pianist or organist to be used during the junior or senior year. Applicants will be judged on the basis of proficiency in performance at the keyboard, evidence of sound overall musicianship, and grade point average, especially in music.

Oratorio Society Applied Music Scholarships. A number of awards of \$600 each are presented by the Calvin College Oratorio Society to prospective freshmen for use toward the cost of individual lessons in applied music. These awards are given to instrumentalists and vocalists who have records of superior achievement in high school music activities, who give evidence of outstanding talent and musicianship in audition, and who will participate in the scheduled rehearsals and performances of at least one of the following: band, Capella, Campus Choir, orchestra. The deadline for applying for the Oratorio Society awards is April 1. Application blanks and additional information are available from the Music Department. Awards are announced by the end of April.

The Plant Engineering Scholarship. The Grand Valley Chapter of the American Institute of Plant Engineers makes scholarships available to encourage good students to consider engineering as a career. The chapter is interested in making engineering students aware that there are organizations for engineers, such as the American Institute of Plant Engineers. Selection for the scholarships is based on the student's potential for a career in engineering and financial need. Two scholarships in a total amount of \$1,500 were awarded to prospective seniors for 1987-88.

John Scripps Wind Award. An annual award of \$600 is given by John Scripps to an outstanding sophomore or junior performer on a wind instrument. Applicants will be judged by the following criteria: superior performance on a wind instrument as evidenced in recital and ensemble performances, participation in and contribution to instrumental ensembles at Calvin, initiative and leadership in wind chamber ensembles, and grade point average, especially in music.

Earl Strikwerda Memorial Scholarship. Memorial contributions from the relatives and friends of Professor Earl Strikwerda have enabled the History Department to honor the memory of their former colleague with an annual scholarship of at least \$600 to a junior-year history major.

The Seymour Swets Voice Award. Contributions have been received by the department in memory of Seymour Swets, the founder of Calvin's Music Department. Interest from this fund provides an annual award of \$600 to an outstanding sophomore or junior voice student who is active in a faculty-directed vocal ensemble at Calvin, for use in the junior or senior year.

The Department of Communication Arts and Sciences Scholarship for Telecommunications. Contributions by friends of the Communication Arts and Sciences Department have made possible a \$250 scholarship, which is awarded annually to a junior telecommunications concentrate. The recipient is chosen by the department on the basis of academic record, spiritual maturity, and exceptional promise for a career in mass communications.

Jacob and Jennie Tuinstra Scholarship. Alumna Doris Tuinstra, in honor of her parents, has provided a fund to generate income for scholarships to be awarded to sophomore or junior women students for their junior or senior year at Calvin College in a business major, a B. S. in Accountancy program, or a group major with an emphasis in business. Two \$1,000 scholarships were awarded for 1987-88. Criteria for selection are primarily motivation and potential for Christian service in a business career, and secondarily academic record and financial need. Application forms are available from the Department of Economics and Business, which administers this award. Completed application forms should be submitted to the department chair by March 1.

Vander Heide Voice Scholarship. An award of \$600 is offered annually by Mr. and Mrs. Jan Vander Heide to a vocalist who has a record of superior achievement in high school music activities. The award is applied to four semesters of private voice lessons. The recipient will be expected to participate in the scheduled rehearsals and performances of at least one faculty-directed choral ensemble. Only incoming freshmen

are eligible. Applicants will be judged on the basis of evidence of talent and musicianship. See Oratorio Scholarship above for application procedure.

Randall K. Vander Weele Memorial Scholarship. Randall Vander Weele was killed in an accident shortly after his graduation from Calvin College in 1981. His family and friends have established a fund to generate income for scholarships to be awarded to junior students for their senior year in a business major or a B. S. in Accountancy program. Four \$1,000 scholarships were awarded for 1987-88. Criteria for selection include academic record and potential for Christian leadership in business. Application forms are available from the Department of Economics and Business, which administers this award. Completed application forms should be submitted to the department chair by March 1.

George J. Van Wesep Scholarship. Each year Mr. and Mrs. Richard De Vos of Ada, Michigan, provide Calvin with a gift of \$5,000 to be used for scholarships. The gift is given in recognition of Mrs. De Vos's father, Mr. George J. Van Wesep, who was a teacher/administrator in the public and Christian schools for more than fifty years. Because of Mr. Van Wesep's commitment to education, and to Christian education in particular, the scholarships are awarded to students planning to pursue education as a career. Scholarships are awarded to juniors and seniors primarily on the basis of the student's academic record and potential for Christian service in education. Financial need is considered as a secondary factor. For 1987-88, five scholarships were awarded of \$1,000 each.

The Pat Snyder Verduin Scholarship. The college has received a gift from Mr. Calvin and Mrs. Patricia Verduin of Grand Rapids, Michigan, the income from which is used to provide a scholarship of \$1,000 to a prospective junior or senior majoring in art. The purpose of the scholarship is to encourage artists who are Christians to prepare for a life of service in the field of art directed by Christian values. Candidates for the scholarship must have a minimum grade point average of 2.5 or higher and will be required to prepare a paper describing a work of art they have created. Financial need will be considered as well.

Victor R. Ver Meulen, Jr. Nursing Scholarships. Gifts have been received from Dr.

Victor and Mrs. Mildred Ver Meulen of Grand Rapids, Michigan, to fund a scholarship in honor of their son, Victor R. Ver Meulen, Jr. Each year two or more awards of \$1,000 each will be made to students who are entering the junior or senior year of the nursing program. Selection is based primarily on the student's academic record and potential for Christian service in nursing. Financial need is considered as a secondary factor.

Ruth Zylstra Memorial Scholarship. Each year Calvin College awards one scholarship of \$300 to a student in a nursing program who is entering the sophomore, junior, or senior year at Calvin. Selection is made by the Nursing Department on the basis of the student's academic record, potential, character, and financial need.

Scholarships for Graduate Students

Graduate students enrolled in the Master of Arts in Teaching or Master of Arts in Christian Studies programs are eligible for scholarships similar to the Presidential, Faculty Honors, and Honors Scholarships for undergraduates. Students currently enrolled at Calvin who want to be considered for a scholarship for the following year are required to file a scholarship application form. New students in master's degree programs are considered on the basis of their academic record at the time of admission. No separate scholarship application is required. New students must be admitted by March 1 to receive maximum consideration.

NEED-BASED FINANCIAL AID

Significant need-based financial aid is available to students from the college, the denomination, the federal government, and the various state and provincial governments. There are opportunities for part-time employment off campus as well.

Applications for need-based aid must be filed each year. To be fair to all students, requests for aid must be supported by a financial statement which provides information about income, expenses, assets, and indebtedness. This statement is reviewed for the college by an independent agency using nationally standardized criteria to determine the degree of need. Information about the criteria used to determine eligibility for need-based aid is given in a brochure entitled, *Do You Qualify?: a guide for estimating your eligibility for financial aid at Calvin College*. This brochure is available from the Office of Scholarships and Financial Aid.

Freshman applications for financial aid should be filed by February 15 (April 1 for Canadians) and upperclassman applications should be filed by March 15 to receive maximum consideration. Later applications are considered if funds are available.

Michigan Competitive Scholarships and Tuition Grants. The State of Michigan provides awards of up to \$2,400 to Michigan residents attending eligible institutions in the state. Competitive scholarships are awarded on the basis of ACT scores and need and can be used in both public and private colleges in the state. Tuition grants are awarded solely on the basis of need and

can be used only at private colleges. Competitive scholarships are available only to undergraduate students; tuition grants are available for graduate as well as undergraduate work.

Pell Grants. The Pell Grant Program, funded by the federal government for U.S. citizens and permanent residents of the

U.S., is designed to provide grant assistance of up to \$2,100 per year to students whose parents' income is approximately \$25,000 or less. Since there are factors other than income considered in the evaluation, some with incomes above \$25,000 may qualify for the program, and others with lower incomes may not qualify. Only students in undergraduate programs are eligible.

Supplemental Educational Opportunity Grant. This program, funded by the federal government, provides funds to the college for needy students. These grants are awarded to students who qualify for need-based aid but are not eligible for or do not receive enough grant assistance in the Pell and State Grant programs. Recipients must be U.S. citizens or permanent residents of the U.S. and must be enrolled in an undergraduate program. The maximum grant is \$4,000 per year.

Calvin Alumni Association Grants. Grants funded by the Calvin Alumni Association are awarded to nearly one hundred incoming freshmen from the United States and Canada. The Alumni Association also provides grants for minority and international students. Grants are awarded to students with good academic records (B or better) who do not receive one of the scholarships awarded by the college and are based on need. Most grants are in amounts of \$300 or \$400 except that for minority and international students the maximum is \$1,000.

Albert Postman Loan Program. The late Mr. Albert Postman of La Glace, Alberta, Canada, has established a loan fund to assist Canadian students attending Christian colleges. The primary purpose of the fund is to assist students who are planning to enter full-time Christian service with the Christian Reformed Church or its related agencies. To the extent that funds are available, however, loans will also be made to other Canadian students who are in need of assistance.

Calvin College Grants. The college has established a program of grant assistance for students who have financial need but are not eligible for other grant programs or whose need cannot be met with other grant programs. The program is open to graduate as well as undergraduate students; the maximum grant for 1987-88 is \$4,000.

Exchange Adjustment for Canadian Students. An exchange adjustment program

has been established by the college to offset in part the additional costs encountered by Canadian students resulting from the exchange on Canadian funds. This adjustment applies to tuition and room and board charges and is determined in one of two ways. 1) For students who qualify for a Canada Student Loan or need-based aid from Calvin, an adjustment is made to offset approximately one-half the additional cost resulting from the exchange. 2) For others, an adjustment is made so that the amount received is the same as the average received by those in the first category. For 1987-88, adjustments are expected to range from approximately \$400 to a maximum of \$1,000 for students in the first category. For students in the second category, adjustments will be \$650.

Michigan Adult Part-Time Grant Program. This program provides a limited amount of grant assistance to needy adult Michigan students who are enrolled in an undergraduate program on a part-time basis. To be eligible a student must have been out of high school at least two years, be enrolled for one or more but fewer than three courses, and qualify for financial aid as an independent student. Grants of up to \$600 per year are available for not more than twenty-four months of study. When there is not enough money to provide awards to all eligible applicants, preference is given to those with the greatest financial need.

Interim Grants. The college provides need-based grants to students enrolled in off-campus interim courses when there is an additional cost involved. These funds are made available so that students who need an off-campus course for their academic program are not denied this opportunity because of a lack of financial resources. Criteria used in awarding the grants include an evaluation of the importance of the interim course to the student's academic program and the student's need as determined from a financial statement. The amount of the grant depends on the cost of the interim course and on the student's need. The maximum grant is approximately \$700.

College Work-Study Program. Students who need employment to help pay for college expenses are eligible for employment by Calvin College or in approved off-campus agencies under this federally-supported program for U.S. citizens. The student's eligibility depends on need, with preference

being given to applicants with greatest need.

Carl D. Perkins. This program, formerly called the National Direct Student Loan, sponsored by the federal government for U.S. citizens and permanent residents, provides long-term loans to students with financial need. There is no interest charge on the loan, and repayment can be deferred as long as the borrower is enrolled in college at least half time. Repayment begins six to nine months after the borrower ceases to be at least a half-time student, and the interest rate during repayment is 5 percent simple interest. The minimum repayment is \$90 every three months with a maximum repayment period of ten years for loans which require larger payments. Under certain conditions, repayment and interest can be deferred and, in some cases, all or part of the loan may be cancelled.

Guaranteed Student Loan Program. Loans from private banks, guaranteed and subsidized by the federal government through various state and private agencies, are available from many banks and other lending institutions in amounts up to \$2,500 per year. Repayment of the loan is deferred as long as the student is enrolled at least half time and until six months after leaving school, during which time there is no interest charge. The repayment period can be as long as ten years, if needed, although a minimum payment of \$50 per month is usually required. Applications for these loans are available from local lending institutions.

Canada Student Loans. The Canadian government sponsors an interest-free loan program for Canadian citizens similar to the Guaranteed Student Loan Program described above, with a maximum loan of \$4,000 per year. Application forms are available from provincial Offices of Education.

OTHER STUDENT AWARDS

Anna Bruinsma Award in Music. The interest on \$750, given by the late H. J. Bruinsma of Grand Rapids in honor of his deceased wife, one of Calvin's alumnae, is to be used in the Department of Music, two-thirds of it serving as first, and the remaining third, as second prize. These awards to seniors are granted for the student's contribution to musical life on campus and academic achievement.

Beverluis Awards in Christian Philosophy of Education. Each year, from the income generated by a grant of money given by a retired Calvin College professor of education and his wife, two awards, one graduate and one undergraduate, of approximately \$250 each are offered to college or seminary students submitting the best essays on Christian Philosophy of Education and Curriculum Decisions. Although open to all students, those majoring in the departments of Education, Philosophy, and Religion and Theology are especially urged to submit essays. A member of each of these departments will serve on the panel of judges. Information regarding the awards can be obtained from the office of the Academic Dean.

The John De Bie Prize in History. In memory of Professor John De Bie an annual prize of \$50 is awarded for the best paper in history written by a Calvin student. Selection is made by the History Department faculty from submitted papers.

The Dr. Peter D. Hoekstra Memorial Award. Dr. Robert G. Andree and Mrs. Katherine Schuringa Andree have established a prize of \$2,000 to be awarded annually to an outstanding senior graduating with a major in history. The award is made in memory of the late Dr. Peter D. Hoekstra, a former professor of history at Calvin College. Selection is made by the faculty of the History Department on the basis of academic excellence. The recipient must have completed at least two years of undergraduate work at Calvin College.

The Dr. Roger A. and Bradley Hoekstra "Toward Christian Excellence in Medicine" Award. Roger A. Hoekstra, M.D., an alumnus and supporter of Calvin College, and his son, Bradley J., an outstanding sophomore premedical student at Calvin College, were tragically killed in an airplane accident in July, 1981. In their memory, the Hoekstra family has established a scholarship fund, a part of whose income is used for an annual award to the outstanding senior premedical student. The award consists of a cash gift and an appropriate commemorative plaque. The candidate for the award will be selected by a faculty committee. The candidate must be a graduating senior who has completed more than two years of undergraduate work at Calvin College and has been accepted into an accredited medical school. The award will be

based on academic excellence, strength of Christian character, and potential for excellence and Christian service in the practice of medicine.

Harmon D. Hook Memorial Award in English. An award of \$150 is offered each spring to an English major who has indicated a serious interest in English or American language and literature and whose work in the discipline gives evidence of personal enrichment and promise of future service. To be considered, a student should have demonstrated not only academic competence but also such qualities as an interest in humane letters and a Christian concern for cultural and spiritual growth through literature. The English Department selects the person to receive the award.

Monsma Communication Award. Each year, Dr. and Mrs. John W. Monsma, Jr., offer an award of \$100 to a student majoring in communication arts and sciences. The award is usually given to an undergraduate planning to return to Calvin for additional study and is given on the basis of the student's academic record, character, and personality. The Department of Communication Arts and Sciences selects the nominee to receive the award.

F. M. and E. P. ten Hoor Prize. The college has received a bequest from the late Mrs. Marie M. ten Hoor, the income of which is to be awarded to an outstanding student at the college for use in the junior or senior year. This prize of \$50 will be awarded by the Scholarship Committee to a student with an outstanding record who has not been selected to receive one of the special scholarships awarded by the college.

The Beets Calvinism Award. The late Dr. and Mrs. Henry Beets established a fund, the income from which is used to award a \$60 first prize and a \$40 second prize for the best research papers on annually specified themes in Calvinism studies, written by Calvin College students. The prize or prizes are awarded at the discretion of the Department of Religion and Theology.

The William B. Eerdmans Literary Award. The late Mr. William B. Eerdmans, Sr., established the William B. Eerdmans Literary Award in the interest of encouraging original, critical, and creative writing among Calvin College students. The \$50 award is

administered annually by the English Department.

O. K. Bouwsma Memorial Award in Philosophy. Through the generosity of the widow of Professor O. K. Bouwsma and other benefactors, an annual prize of \$100 will be awarded to one upperclass student for distinguished achievement in philosophy and promise of future contribution to Christian scholarship. The Philosophy Department selects the recipient on the basis of submitted papers.

The Rinck Memorial Award. A fund has been established by former students and friends as a memorial to William Rinck, professor of mathematics at Calvin College from 1905 to 1920. The income of this fund is devoted to an award for outstanding work in mathematics. The prize is awarded annually to the senior student majoring in mathematics who has, in the opinion of the Department of Mathematics and Computer Science, done superior work in undergraduate mathematics.

Jewish Evangelization Award. Dr. and Mrs. William J. Yonker have established a fund, the income from which is used to offer two prizes for the best essays on a subject bearing on the evangelism of the Jews. First prize is \$100; second prize is \$75. The contest is open to all college students and is administered by the Department of Religion and Theology.

Vander Ark Distinguished Teacher Education Student Award. The Vander Ark family, known for the number of family members who have served as teachers and administrators, sponsors annually an award by the Education Department to as many as four senior teacher education students who are nominated by their instructors for superior performance. The awards will be announced by May 1 of each year.

Henry Zylstra Memorial Award. In honor of the memory of Professor Henry Zylstra, an award of \$150 is offered each fall to one or more senior English majors at Calvin who plan to continue studies in literature on the graduate level upon graduating from Calvin College. The award is intended primarily to help defray expenses incurred in applying to graduate schools. Application should be made to the chair of the English Department by September 30 of the applicant's senior year. The recipient or recipients will be selected by the English

Department on the basis of demonstrated academic ability, commitment to and promise of success in graduate work, and a concern for Christian liberal education.

The Wall Street Journal Award. Dow Jones and Company, Inc., sponsors this honorary award which is presented annually to the outstanding business student in the field of finance. A rigorous, comprehensive financial-principles examination is administered by the Economics and Business Department each semester, and the award is presented annually to the student with the highest test score.

Annual Production and Inventory Control Society Award. A \$100 scholarship is awarded annually to a student who has exhibited academic excellence and has expressed a sincere interest in pursuing an education in the field of production and inventory control. The recipient is selected by the Department of Economics and Business.

National Association of Accountants (NAA) Outstanding Accounting Student Award. The local chapter of the NAA annually recognizes the top accounting student at Calvin College, based on a recommendation by the instructors in accounting. Ideally, the student should intend to pursue a career in accounting.

Calvin Alumni Chapter Scholarships. Several Alumni Association chapters offer scholarships, which are administered locally, to incoming Calvin freshmen. Candidates should consult the Calvin Alumni Office or a member of the local Alumni Association chapter for information.

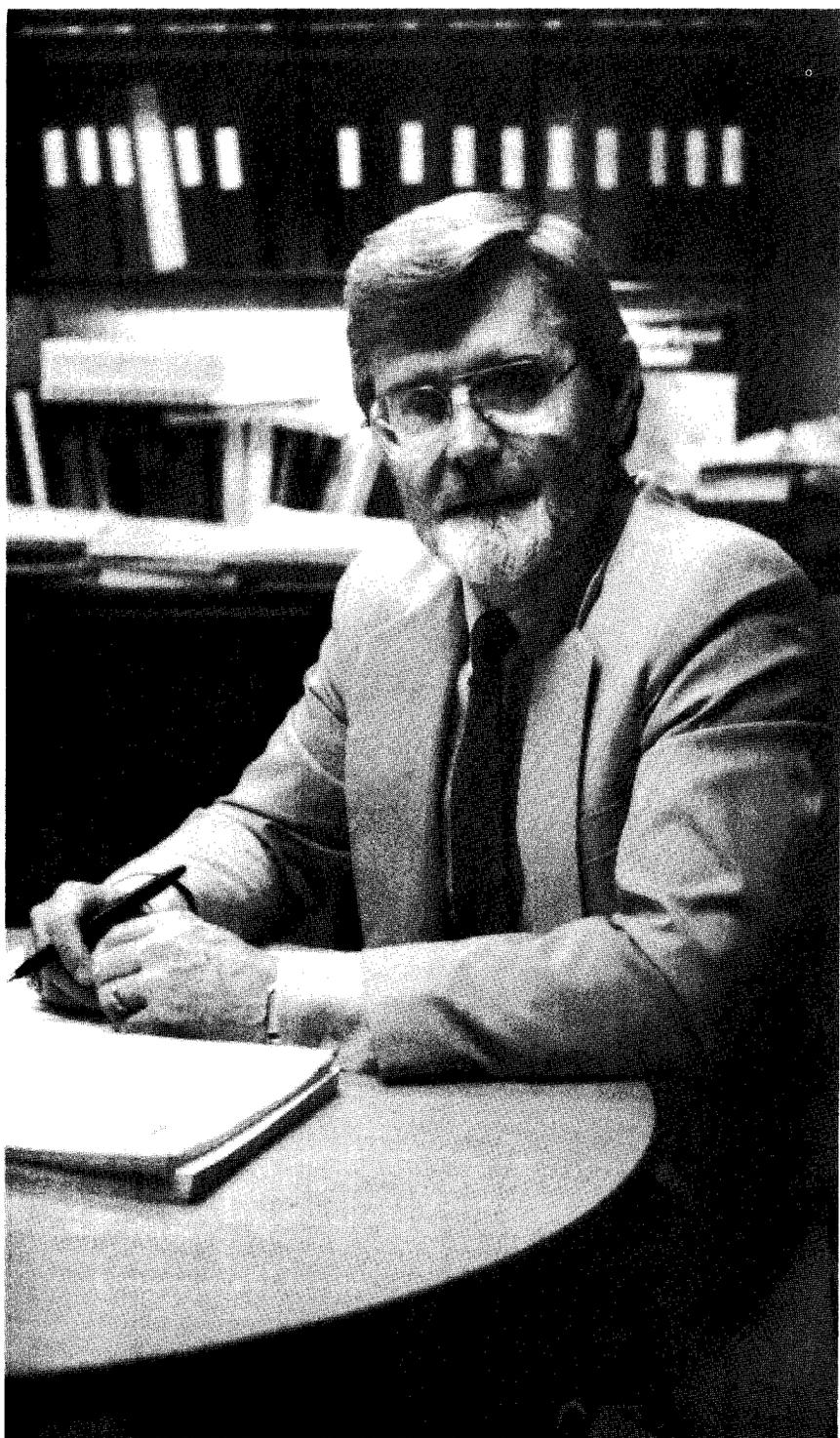
Henry Beets Mission Society Scholarship. The Henry Beets Mission Society of the La Grave Avenue Christian Reformed Church provides an annual grant to promote the

ministry of the Church to the American Indian. Initial funds for this grant were given by the Herrick Foundation of Detroit, Michigan. Those eligible are American Indians who intend, preferably, to minister as pastors or teachers to members of their own race. The amount of the grant is determined by the need of the student. The student should consult with the registrar when planning his program. Candidates should apply in writing to the Henry Beets Mission Society, La Grave Avenue Christian Reformed Church, 107 La Grave Avenue, Grand Rapids, Michigan 49503.

The Lauren Wondergem Memorial Scholarship. The Board of the Hearing and Speech Center of Grand Rapids presents, in memory of Lauren Wondergem, a Calvin graduate who served as the Center's Executive Vice-President from 1962-1982, an annual scholarship of \$250 to a student intending to enter the field of speech-language pathology or audiology. In addition to this requirement, the Department of Communication Arts and Sciences will recommend a nominee to the Board on the basis of the student's academic record, character, and personality.

POST-GRADUATE FELLOWSHIPS

Board of Trustees Scholarship. Calvin Seminary, under the authority of the Board of Trustees of Calvin College and Seminary, offers a scholarship to a member of the graduating class of Calvin College. The award will be made to a student who plans to attend Calvin Seminary and, eventually, to enter the ministry of the Christian Reformed Church. The amount of the scholarship for 1988-89 will be \$1,600. Applications should be in the hands of the Scholarship Committee of the college by March 1.



Dean Rodger R. Rice

UNDERGRADUATE PROGRAMS

Christian liberal arts education

THE PRIMARY FOCUS of a Christian liberal arts education at Calvin College is on teachers and students together engaging in the various scholarly disciplines, directed and enlightened in their inquiries by the Word of God. The faculty believes that in a complete liberal arts education students should be introduced to the disciplines on two different levels.

In the first place, students should acquire a general or extensive education by following a rationally determined pattern of required and optional courses in the various major disciplines, the fundamental unifying element in this pattern being the Christian perspective within which all courses are presented. From this extensive study it is hoped that students will acquire a knowledge of the more significant results or products of the various disciplines; an understanding of the methodologies of the disciplines, which will enable them to judge the products of the disciplines; and an acquaintance with alternative approaches to the same subject matter.

Secondly, the faculty believes that, in addition to such a general or extensive education, each student should also be required to concentrate in a particular discipline and thus to supplement the extensive study of the disciplines with an intensive study of some one discipline. This intensive study will have fundamentally the same aims as those for the extensive study. In this field of concentration, however, the student can achieve the same aims more fully, more intensively, in more detail.

The Christian liberal arts philosophy permeates all of the degree programs of the college. Traditionally, most students complete the Bachelor of Arts or the Bachelor of Science degree programs, either of which may include a teacher certification component. Other degrees offered by the college include the Bachelor of Fine Arts in art, the Bachelor of Science in Recreation, the Bachelor of Science in Nursing, the Bachelor of Science in Accountancy, the Bachelor of Science in Engineering, the Master of Arts in Teaching, the Master of Arts in Christian Studies, as well as a Bachelor of Science in Education in a combined curriculum plan with the Grand Rapids Baptist College. Cooperative bachelor of science degrees are offered with a number of other institutions in communication disorders, engineering, forestry, medical technology, natural science, and special education.

Bachelor of Arts, Bachelor of Science Degrees

Because of the flexibility of the Calvin curriculum and the many alternative ways of meeting the formal requirements, students must confer with their advisors regularly in planning their academic programs.

A typical student carrying a normal load for four years will complete thirty-seven and a half courses, including four interims. However, to provide flexibility, the formal requirements for the Bachelor of Arts degree are the successful completion of thirty-six courses, including three interims, of the designated liberal arts core, and of an approved concentration, typically with a minimum average grade of C (2.0) both overall and in the program of concentration. Not more than one course unit of basic physical education or two units in applied music, drama, and speech may be applied to graduation requirements except when such courses are a designated part of a required major or minor program.

Students who have completed at least fifteen courses in biology, chemistry, computer science, the earth sciences, engineering, mathematics, and physics may elect instead to receive a Bachelor of Science degree.

I. THE LIBERAL ARTS CORE

The liberal arts core is planned to provide a broad and significant educational foundation in a Christian setting. Strong high school preparation reduces the number of required courses in the core, and the number may be further reduced by examinations in any subject.

Six of the liberal arts courses provide the context for a Calvin education (history, philosophy, religion); eight provide an introduction to the major systematic disciplines (the sciences, the social sciences, the fine arts); two and a half assure a skill in the basic competencies (written and spoken rhetoric and physical education); and two, when preceded by language foundation in high school, provide minimal command of a foreign language. These core courses are described in the various departmental sections. The specific requirements are as follows:

1. Six courses are required in history, philosophy, and religion

One course in history from 101 and 102.

One course in philosophy from 153, 251, and 252.

One course in biblical studies from Religion 103, 108, 207, 208, 327, and 328.

One course in historical and theological studies from Religion 206, 301, 303, 304, 308, 311, and 312.

Two additional core courses from history, philosophy, religion, and Interdisciplinary W10 and 234, but not more than two of the required six may be in either history or philosophy or three in religion. Students in teacher education programs should take Philosophy 153 plus either Education 304 or Philosophy 209.

2. Three courses are required in mathematics and in the sciences

One course in mathematics from 100, 131, 155, and 161; 221 and 222 are required of students in the elementary education programs.

One course in physical science from Astronomy 110, Astronomy 201, Chemistry 110, Geology 103, Physics 110, Physics 111, Physics 123-124, and Physics 223; students in the elementary education programs must take either Chemistry 110 or Physics 111 plus Interdisciplinary 213.

One course in biology from 111, 114, 115, 116, or 131, which is required in pre dental and premedical programs.

The two requirements in the biological and physical sciences may also be met by a year's work in Biology 131–233 or 131–232; Chemistry 103–104 or 113–114; Geology 105–152 or 151–152; Physics 123–124 when accompanied by 181–182, 126–225, or 221–222.

Interdisciplinary 210, History of Science, will satisfy a semester's requirement in either physical or biological science for students who have completed one semester of college science.

Students, except for those in the elementary education programs, who have completed, with minimum grades of C, four years of college preparatory mathematics in high school are excused from the mathematics requirement; those who have completed with minimum grades of C three years of natural science in grades 10 through 12 can fulfill the science requirement by taking one core course in any natural science. Every student must take at least one college core course in natural science.

3. One course is required in economics or political science; one in psychology or sociology

One course in economics or political science from Economics 151, 221, Political Science 151, 201, 202, 203, and 210; Political Science 201 or 210 is recommended for elementary teacher education programs.

One course in psychology or sociology from Psychology 151, Sociology 151, 217, and Education 301, which is required for teacher education programs.

4. Three courses are required in literature and the other fine arts

One course in literature taught in English from courses numbered 200 through 319. English 325 and 326 do not meet this requirement.

One course in the other fine arts or in literature taught in a foreign language. These may be from Art 151, 231, 232, 233, 235, 236, 237, 238, 240, 241, Classics 221, 231, Music 103, 133, 233, 234, 236, 238, 241, Communication Arts and Sciences 203, 217, 253, 304, 317, 318, 325, or foreign literature courses. Art 215 and Music 238 are acceptable only in elementary teacher education programs; Art 215 is required in special education programs.

A third course from either of these groups or English 325 or 326. Students who have completed, with minimum grades of C, four units of high school English (excluding speech) or those who have completed in grades 11 and 12 either three semesters of literature (excluding composition, creative writing, journalism, film, and mythology) or one year of art history or music appreciation are excused from this requirement.

5. Competency is required in written rhetoric, spoken rhetoric, and physical education

A course in written rhetoric, English 100, or the passing of a competency examination.

A course in speech from Communication Arts and Sciences 100, 200, 240, or the passing of a competency examination. Communication Arts and Sciences 214 is acceptable only in elementary education programs.

A course unit (four quarter courses) in basic physical education: 104 followed by three additional courses from 110 through 199; 221 may substitute for one of the additional courses for students in teacher education and physical education. Not more than one course unit of basic physical education may be applied to graduation requirements.

6. Competency is required in one foreign language

Students must demonstrate a competency in a foreign language that is equivalent to two years' study in college or to four years' in high school with a minimum grade of C. Normally this is demonstrated by completing 123- or 202-level courses or by examination.

Students are advised to continue in languages they have studied previously and will be placed in classes at their level of ability as determined by placement examinations. Special three-course sequences (121-122-123), involving two semesters and an interim, are available in French, German, and Spanish for students who need review as part of their second year of language study. In no case, however, will students receive graduation credit for more than four courses from the 121-123 and 101-202 series in a given language. Languages other than those taught at Calvin may be accepted. Students for whom English is a second language are exempt from this requirement but are required to take English core courses each semester until they have completed the requirements in written rhetoric and in English or American literature.

A student usually should complete the core requirements in mathematics, history, and written rhetoric by the end of the freshman year and should complete the requirements in physical science, biological science, physical education, spoken rhetoric, and foreign language by the end of the sophomore year. At least one course in religion and theology should be taken in each of the student's first two years at Calvin.

Students in elementary education programs, whose choice of core courses is very limited, should confer with a program advisor in selecting core courses. The advisors are listed on page 53.

Certain professional-degree programs have a modified core curriculum approved by the faculty. These include accountancy (B.S.A.), engineering (B.S.E.), fine arts (B.F.A.), nursing (B.S.N.), and recreation (B.S.R.), whose model programs are described on pages 63-71.

II. INTERIM COURSES

A student must normally complete a minimum of three regular interim courses, courses numbered with a W as a prefix, for graduation. (Transfer students must complete one interim course for each year in residence.) Interim courses are graded honors (H), satisfactory (S), or unsatisfactory (U), except those courses that satisfy core requirements, which are graded in the conventional A-F system. Students may not take more than two interim courses in a single department.

Calvin College is associated with a number of similar colleges with January interim programs, making possible the exchange of students during the interim. Specific information is available at the Registrar's Office.

III. PROGRAMS OF CONCENTRATION (MAJORS AND MINORS)

Majors. As stated above, every degree-seeking student must fulfill the requirements of a faculty-approved departmental or group major. Although such major concentrations are not normally chosen until the second semester of the sophomore year, most programs do presuppose the completion of specific freshman and sophomore courses. Official admission to a major program requires the formal approval of a department or program advisor and the completion of a counseling form which details the student's remaining academic requirements. If at any time a student changes his major, he must again submit a counseling

form for the new major. Teacher education group majors and some departmental majors for teachers may be applied only to teacher certification programs.

To be admitted to a department's major program a student must have earned at least a C (2.0) in each course designated as a prerequisite for admission, unless that department stipulates a C (2.0) average in two or more prerequisite courses. To be admitted to a group concentration a student must have met the grade point average required for admission by the primary department within that group. A student not maintaining a minimum grade of C (2.0) in the program of concentration may be permitted to remain in that program for a single semester of probation.

The various programs of concentration are specified in the section of the catalog which describes departmental programs and course offerings, beginning on page 81. Group majors designed for teacher certification programs are described in the section on Teacher Education Programs, on pages 54 and following.

Students may also initiate interdisciplinary programs of concentration other than those formally approved by the faculty. Such group majors require a minimum of twelve courses, ten of which must be from two disciplines with no fewer than four from either. The remaining two must be chosen from a third discipline. Students must provide a written rationale for such programs, which require the approval of the registrar and the chairs of the departments from which the ten courses are selected.

Minors. Optional six-course departmental minors and group minors are possible in certain fields. A C (2.0) average is required for admission to such programs and for graduation in them. Most of the minors are described in the departmental sections of the catalog. The group minor in environmental studies is included under the Department of Geology, Geography, and Environmental Studies; that in journalism, under the Department of English; that in German studies, under the Department of German; and that in missions, under the Department of Religion and Theology.

Special academic programs

The Honors Programs

Calvin College offers two types of honors program. The General Honors Program provides flexibility and independence for the superior and self-motivated student. The Departmental Honors Program, which requires participation in the General Honors Program, intensifies the training in the student's major discipline and leads to an honors graduation designation.

A student is eligible for the General Honors Program if his cumulative grade point average is 3.3 or higher; incoming freshmen are eligible if their cumulative high school record meets this standard.

Students in the General Honors Program may register for a variety of types of honors courses—honors sections in large courses, special honors courses, or

honors registration in regular courses for which intensified work will be required. No student may carry more than two such courses at a time. Students in the program may avail themselves of the right to be exempt from core course requirements by examination and of the right to propose cross-disciplinary programs of concentration.

To graduate with honors, students must apply to their major departments, must have a cumulative grade point average of 3.3 or higher, and must complete at least six honors courses with an average of 3.0, including the structured honors requirements of their major departments, which must include at least two departmental honors courses. Regular interim courses with honors grades are not considered honors courses. Before applying to the department the student must have completed at least two honors courses in any department and must be maintaining a cumulative average of 3.3 or higher. Juniors and seniors in such Departmental Honors Programs may, subject to the approval of their department chair, register for a fifth course, which may be graded on the basis of satisfactory or unsatisfactory.

The Academic Support Program

The Academic Support Program provides training and assistance to students who desire to improve upon their past academic performance or who have encountered difficulties in their academic programs. It offers opportunity for development of college-level study and reasoning skills in a classroom setting, through personal academic counseling and from trained tutors.

Special intensive classes are offered in English rhetoric and English as a second language for students who need systematic review of language skills, and mathematics review courses are available to humanities students as well as science students who have limited preparation in mathematics. Course descriptions can be found on page 83.

Participation in the program is required of freshmen with conditional admission or probational standing, but its services are available to any student. Services available upon request include analysis of study efficiency, diagnostic testing, and development of individualized programs for improvement in reading, reasoning, spelling, specialized vocabulary, and mathematics.

Peer tutoring is available in most core courses, upon the recommendation of the course instructor. The tutor coordinator is Ms. Janice Heerspink.

Self-instruction in Languages Not Otherwise Taught at Calvin

Students may earn credit for foreign languages not otherwise taught at Calvin through a supervised, self-instruction program. Such languages include Arabic, Chinese, Indonesian, Italian, Japanese, Portuguese, Russian, Vietnamese, and may include others. This program is open to sophomores, juniors, and seniors with cumulative grade point averages of at least 3.0 who have had prior successful language study. Credit may be applied toward the foreign language graduation requirement only if fourth-semester proficiency is achieved. The director of this program for self-instruction in less commonly taught languages is Mr. James Lamse of the German Department.

The program normally requires ten to fourteen hours per week of independent study, using tape-recorded materials coordinated with a course text, and an additional minimum of three hours of private or small group tutorial drill sessions with a native speaker of the language. The student must comply with the schedule established by the program director and must complete the course within a specified period. Progress of the student is monitored by both the native speaker and the program director, with the final evaluation based on written and oral tests administered by an outside examiner. Chinese, Japanese, and Russian language studies are available in regularly scheduled classroom sections.

Students interested in such instruction should apply to the director at least a month in advance for languages presently being offered or four months in advance for others.

Off-Campus Programs

The college offers a variety of programs for students who want to study abroad and for those who would benefit from a different sort of academic experience in the United States than can be offered on campus. Although some of the programs are offered in conjunction with other institutions, they are officially Calvin programs, and students in them are eligible for financial aid. Students in most programs are juniors or seniors but students in some programs, such as the Study in Spain program, may be freshmen.

The specific requirements for admission differ from program to program, but for each a student must be in good academic and social standing and must be recommended by the advisor of the program concerned. Furthermore, the student and his academic advisor need to determine in advance how credit for such programs will be applied to graduation requirements. Once admitted, the students must make a special registration at the Registrar's Office and must make financial arrangements, which differ from program to program, to pay the appropriate fees at the Business Office.

The programs are described in greater detail on pages 155-160.

Programs for teacher education

Undergraduate Teacher Education Programs¹

Students wishing to become teachers must make formal application and be admitted to the teacher education program. Specified standards must be maintained to remain in the program and be recommended for certification.

Before taking any courses in the Education Department, students must

¹The Michigan code requires 40 semester hours of general education, a 30-semester-hour departmental major or a 36-semester-hour group major, a 20-semester-hour departmental minor or a 24-semester-hour group minor (or, for elementary education, three minors), and 20 semester hours of professional education.

apply for admission to the teacher education program. (Forms for application are available at the Department of Education.) To be eligible, students must have completed at least nine course units with a minimum cumulative grade point average of 2.5; must have completed at least twenty-five hours of supervised experience with school-aged people; must have passing scores on the Preprofessional Skills Tests; and must complete with a program advisor a Secondary, Elementary, or Special Education Program Sheet and have this on file with the registrar. Ordinarily students apply for admission at the end of their sophomore year, but transfer students may use course work and the grade point average from other institutions to meet these requirements for admission.

To be admitted to directed teaching, students must receive the positive recommendation of the instructor of Education 301 and 303 (also 216, if in special education); must have a cumulative grade point average of 2.5; must have completed at least twenty-five course units, including at least six in the departmental or group major or minor concentrations; and must have the approval of the major or minor department and of the Education Department. Students normally should apply for their directed teaching assignment by March 1 prior to the academic year in which they expect to student teach, and no applications will be accepted later than twelve weeks before the start of the semester in which the student intends to enroll in directed teaching. In addition students must have completed certain required education courses. These are specified in the *Teacher Education Program Guidebook*, available from the Education Department.

To be recommended to the State of Michigan for teacher certification, a student must have maintained the standards above, must have completed the degree requirements as listed on the counseling sheet, must have completed directed teaching with a minimum grade of 2.0, must be recommended by his or her college supervisor, and must have a cumulative grade point average of 2.5.

Transfer students, those entering teacher education tardily, and post-baccalaureate students must be admitted to the program if they seek teacher certification. They, too, must secure the appropriate forms from the Department of Education.

Students either not admitted or dropped from the program have the right to appeal in writing to a committee consisting of the chair of the Teacher Education Committee, the director of teacher education, and the chair of the Education Department Screening and Certification Committee. Further appeals may be made to the college Academic Standards Committee.

Canadian students can meet all or most of the teacher licensing requirements for any province while attending Calvin College. In addition to completing one of the four-year teacher education programs at Calvin such students must have met the standards required for admission to their provincial universities and must have completed nine courses in education. Because other provinces consider an Ontario Grade 13 certificate to be equivalent to their Grade 12 certificates, advanced credit given for work in Grade 13 is discounted by the ministries of education in the other provinces when evaluating teaching credentials.

Students from Ontario wishing to meet its requirements must complete four years of education (120 semester hours) beyond Grade 13 or five years beyond Grade 12 (150 semester hours). One year of that preparation (30 semester hours)

must be in professional education courses, including practice teaching. In addition, students completing their teacher education in another province or state must also earn the teacher credentials of that province or state.

The Ontario Christian Teacher Certificate requires that the teacher has met the requirements for provincial certification and has completed five course units (18 semester hours) in courses taught from a Christian perspective. All except a course in the history or philosophy of Canadian education or in Canadian school law can be completed at Calvin. In addition, such certification requires that the teacher has taught for two years in a Christian Schools International member school. For current information or any further clarification, consult Ms. Madge Strikwerda, director of teacher certification.

Graduates who have earned a Michigan Provisional Certificate since July 1970, must complete a 5.2 course unit (18 semester hours) planned program or enroll in a master's degree program to qualify for a Continuing Certificate. The Master of Arts in Teaching program at Calvin can be used not only to satisfy the requirements for continuing certification but also to develop additional areas for certification. Graduates seeking such certification should consult the director of teacher certification.

Because the specific requirements for students in the Bachelor of Science in Education degree in the combined curriculum plan with the Grand Rapids Baptist College differ from those given below, such students should consult the *Student Program Guide Book . . .* developed for that program.

The departmental advisors for education programs are as follows:

ART, Ms. Helen Bonzelaar, Department of Art	GENERAL SCIENCE STUDIES, Mr. Stanley Haan, Department of Physics
BILINGUAL EDUCATION, Ms. Ynés Byam, Department of Spanish	GEOGRAPHY, Mr. Henry Aay, Department of Geology
BIOLOGY, Mr. Bernard Ten Broek, Department of Biology	HISTORY, Mr. Robert Bolt, Mr. Samuel Greydanus, Mr. Daniel Miller, Department of History
CHEMISTRY, Mr. Kenneth Piers, Department of Chemistry	LANGUAGE ARTS STUDIES, Mr. Henry Baron, Mr. Edward Ericson, Mr. Kenneth Kuiper, and Mr. William Vande Kopple, Department of English
COMMUNICATION ARTS AND SCIENCES, Mr. David Holquist, Department of Communication Arts and Sciences	MATHEMATICS, Mr. Paul Boonstra, Mr. Gary Talsma, Department of Mathematics
COMPUTER SCIENCE, Mr. Paul Boonstra, Department of Mathematics	MUSIC, Mr. Dale Topp, Department of Music
ECONOMICS, Mr. Eugene Dykema, Department of Economics	PHYSICAL EDUCATION, Mr. Jeffrey Pettinga, Mr. Marvin Zuidema, Department of Physical Education
ENGLISH, Mr. Henry Baron, Mr. Edward Ericson, Mr. Kenneth Kuiper, Mr. William Vande Kopple, and Ms. Mary Ann Walters, Department of English	PHYSICS, Mr. John Van Zytveld, Department of Physics
FINE ARTS, Ms. Helen Bonzelaar, Department of Art	POLITICAL SCIENCE, Mr. Robert De Vries, Department of Political Science
FRENCH AND GERMAN, Ms. Barbara Carvill, Department of Germanic Languages	

PSYCHOLOGY, Mr. Roger Stouwie, Department of Psychology

RELIGION, ACADEMIC STUDY OF, Mr. John Primus, Department of Religion and Theology

SOCIAL STUDIES, Mr. Robert Bolt, Mr. Sam-

uel Greydanus, and Mr. Daniel Miller, Department of History

SOCIOLOGY, Mr. Donald Smalligan, Department of Sociology

SPANISH, Ms. Ynés Byam, Department of Spanish

Elementary education. Students interested in elementary education should secure copies of the *Teacher Education Program Guidebook* from the Department of Education. Programs should be worked out with a departmental advisor (see list above for the appropriate advisor) and have written approval. The minimum elementary education program requires the completion of the general education requirements (see pages 46–48 for the courses recommended for studies in teacher education), and the completion of one of the following options for a concentration:

1. Three minors, consisting of a group minor of seven course units, *and* a single departmental minor of six course units in a department other than those included in the group minor, *and* a planned minor consisting of six course units in subjects relevant to the curriculum of elementary schools. It is recommended that students who intend to teach in middle school or junior high complete two departmental minors and a planned minor.
2. A major of at least eight and a half course units *and* a planned minor of six course units in subjects relevant to the curriculum of elementary schools, *or* a departmental minor of six course units.
3. A group major of at least ten and a half course units *and* a planned minor of six course units in subjects relevant to the curriculum of elementary schools, *or* departmental minor of six course units.

In addition, prospective elementary teachers are required to take one course from each of the following groups. Students whose major or minors include none of these courses must complete a total of only two courses from the three groups:

1. English 325 or 326
2. Geography 101 or Environmental Studies 202
3. Psychology 201, 204, 207, 216 or Special Education 216

Students must complete the required education courses.

A nine-course departmental concentration may be selected from the following subjects: biology, English, foreign language (French, German, Latin, Spanish), history, mathematics, physical education, political science, and speech; an eleven-course concentration from art and music.

Most students in elementary education programs, however, complete either the three minors program or group concentrations. Group concentrations are

listed below, but students may consult the appropriate departmental advisor or the *Teacher Education Program Guidebook* for further advice.

Language Arts Studies Group Major. English 100 and Communication Arts and Sciences 214 are required. Students majoring in this group must also complete one of the following five-course departmental programs: English 200, 212, or 220; 325 or 326; 335; or Communication Arts and Sciences 203, 214, 215, and two others. In addition students must complete the three designated courses from the second department in this group. The remainder of the ten and a half courses and the electives must be chosen from departments in this group with the approval of the language arts advisor.

Social Studies Group Major. The four required courses for this major are History 101 or 102; Sociology 151; either Economics 151 or Political Science 201 (United States), 210 (Canada), or 151; and either Geography 101 or, if part of the three-course sequence below, Geology 100 or 103. Students must also complete one of the following five-course departmental sequences: Economics 221, 222, 323 or 324, and two others; History 101 or 102 and four others; Political Science 151, 201 or 210, 202 and two others; Psychology 151, 204, 310, and two others; Sociology 151 and four others. In addition, a student must complete three courses from a second department in this group, including any course designated above, or from a sequence in geography consisting of Geography 100 or Geology 103 and Geography 210 and 220. Students may not take sequences in both psychology and sociology. The remainder of the ten and a half courses and the electives must be chosen from departments in this group with the approval of the social studies advisor.

General Science Studies Group Major. The five required courses for any concentration in this group are: Biology 111, 114, 115, 116, or 131; Chemistry 110, 113, or 103; Environmental Science 201 or 202; Geology 100, 103 or 105, (151, if more than one geology course is chosen); and Physics 111 and Interdisciplinary 213. In addition a student must complete one five-course and one three-course sequence listed below. The recommended five-course sequence in biology is 111 or 131; 114 or 233; 115 or 232; 216 or 311S; and one elective. In chemistry, 103–104 and three electives. In earth science, Geology 100; 105 or 151; Astronomy 110 or 201; Environmental Science 202; and one elective. In environmental science, 201, 202, and 395; Geology 100; and one course from Biology 216, Geology 103, Chemistry 103, 111, and 113. In geology, 103, 105, or 151; 152; 212; and two approved electives. In health science, Biology 105, 106, 107, and interim courses in health and nutrition. In physics, 123, 124, 181, 183, 225, 226, and one elective. In the physical sciences, Astronomy 110; Chemistry 103, 110, or 113; Geology 100, 103, 105, or 151; Physics 111 and Interdisciplinary 213; and one elective. The recommended three-course sequence in biology is made of any three courses listed for the five-course sequence. In chemistry, 103–104 or 113–114 and one elective. In environmental science, 201, 202, and Biology 216 or Geology 100. In geology, 103, 105, or 151; 152; and 212 or 311. In health sciences, Biology 107, 215, and an interim course in health or nutrition. In physics, 123, 124, 181, 182, and one elective; or 221, 222, and one elective.

Fine Arts Studies Major. Required are Art 215, Communication Arts and Sciences 214, and Music 238 or, if the student is completing a five-course sequence in music, Music 339. Students majoring in this group must complete a five-course departmental sequence from: Art 205, 209, 215, 231, and 232; Music 103, 233, 234, 237, 339, and four semesters of 110, 120, 130, 140, 150, 160, 170, 131, 141, 161, or 171; or in drama, Communication Arts and Sciences 203, 214, 217, and two additional courses from 219, 304, 317, 318, or an approved interim course. In addition, a student must complete one of the following three-course sequences: Art 205, 215, 231 or 232; two from Music 133, 233, 234, or an approved interim, plus 238 or 339 and two semesters of applied music; Communication Arts and Sciences 203, 214, and 217. The remainder of the ten and a

half courses and the electives must be chosen from other departments in this group with the approval of the fine arts advisor.

Language Arts Studies Group Minor. The seven required courses for this minor are: English 200, 212, 220, or 240; English 325 or 326; English 335; Communications Arts and Sciences 203 or 215; Communication Arts and Sciences 214; one course from the following: Communication Arts and Sciences 150, 215, 230, 253, or one other English course approved by the advisor; and an approved interim in the area of language arts.

Social Studies Group Minor. The seven required courses for this minor are: Economics 151; Geography 101 or Environmental Studies 201 or 202; History 101 or 102; Political Science 201 or 210; Sociology 151 or 217; an approved course in United States history; and one elective from psychology, geography, political science, sociology, or history.

General Science Studies Group Minor. The seven required courses for this minor are: Biology 111, 114, 115, 116, or 131; Chemistry 103, 110, or 113; Environmental Studies 201 or 202; Geology 100, 103, 105, 151; Physics 111 and Interdisciplinary 213 or Physics 123 and 124; and two additional courses from: Astronomy 110, 201, Biology 111 or 131, 114 or 233, 115 or 232, 116 or 311S, 207, Chemistry 103, 103-104, 113, 113-114; Environmental Studies 201, 202, Geology 100, 103, 105, or 151; 152; 212; Physics 123-124 and 181-182, 221-222, and an approved interim in the area of science studies.

Fine Arts Studies Group Minor. The seven required courses for this minor are: Art 215; Communication Arts and Sciences 214; Music 238; a three-course sequence from one of the following: Art 205, 215, 231 or 232, and an approved art interim course; Communication Arts and Sciences 203, 214, 217, and an approved Communication Arts and Sciences interim course; Music 233, 234, or 238; a two-course sequence from one of the following: Art 215 plus an approved art course; Communication Arts and Sciences 214 plus an approved communication arts and sciences course; Music 238 or 239 plus an approved music course; and one approved elective or interim course in communication arts and sciences or music.

The appropriate departmental minors are listed under each department in this catalog.

The appropriate education courses for students in elementary education are 301, 303, 304, 305, 322, 324, 325, and 345. The six-course planned program required for Michigan certification typically is met automatically by students meeting the general graduation requirements. Courses recommended for this dual function include: Art 215, Biology 111, 215, 216, or 217, English 100 and any literature course in English or in a foreign language; Geography 101, Geology 100 or 103, History 101 or 102 and any other history course, Mathematics 100, 221, 131, or 161, Music 238 or 339, Physics 111 and Interdisciplinary 213, Psychology 204, Political Science 151, 201, or 210, and Communication Arts and Sciences 214. Physical Education 221 is recommended as a substitute for a quarter course of basic physical education. A minor in the academic study of religions is also possible. The advisor is Mr. John Primus of the Department of Religion and Theology.

Secondary education. The minimum secondary program requires the completion of the general graduation requirements (see pages 46-48 for the courses recommended for students in teacher education); a departmental concentration of at least eight and a half courses or a group concentration of at least ten and a

half courses; a minor of six courses in another department or a group minor of seven; and seven professional education courses. Students interested in secondary education should obtain copies of the *Teacher Education Program Guidebook* from the Department of Education. Programs should be worked out with the appropriate departmental advisor and have the approval of Mr. LeRoy Stegink, director of teacher education.

The programs of concentration should be selected from the following subject areas: art, biology, chemistry, economics, English, French, German, history, Latin, mathematics, music, physical education, physics, political science, Spanish, and speech. Majors in art and music require ten and a half courses. The minor should be selected from these subject areas or from geography, psychology, religion and theology (the academic study of religions), and sociology.

Group concentrations have particular advantages for middle or junior high school programs but must be planned with care to meet the North Central standards defined in the paragraph below in addition to the standards of Michigan. A major group concentration consists of ten and a half courses, at least five of which must be in one department, three in another, and the remaining in either the same or related subjects. Such concentrations may be in the language arts (English, foreign language, speech), the sciences (earth science, biology, chemistry, geography, geology, and physics), and the social sciences (economics, geography, history, and political science). Group minors of seven courses with the minimum of three in one subject may be chosen from the same areas.

The North Central Association has requirements that differ from state and college requirements. It requires that teachers in the schools they accredit have the following minimum preparation in each of their teaching fields: *art*, seven course units; *English*, seven course units, a course and a half of which may be in speech; *foreign language*, six course units in each language taught; *mathematics*, six course units; *music*, seven course units; *physical education*, six course units; *science*, a total of seven course units with at least three and a half in any science taught; *social science* (economics, U.S. history, world history, political science, sociology), a total of seven course units with at least two and a half in any subject taught; *speech*, seven course units, five of which may be in English.

The appropriate education courses for students in secondary programs are: 301, 303, 304, 307, 308, 346, and 356.

Special education. Calvin College offers a program in special education, which leads to teacher certification at the elementary or secondary level as well as to endorsement as a teacher of the mentally impaired. Students in the program must complete the liberal arts core, the professional education requirements for elementary education, a ten and a half course concentration in special education, and a six-course planned minor.

Calvin College also offers a Bachelor of Science in Special Education degree in cooperation with Grand Valley State Colleges. This program usually requires four years and two summers to complete. Admission is limited to students who wish to teach the hearing impaired, emotionally impaired, or the physically impaired. Students in cooperative programs with Grand Valley must complete a designated core of thirteen liberal arts courses, a group concentration in social studies, a six-course planned minor, six professional education courses, and the

additional requirements for endorsement in special education. Additional costs include summer school tuition and, for those who are not Michigan residents, approximately \$800 additional tuition during the last semester of the program. Students interested in either the mentally impaired program or in the consortium programs with Grand Valley State Colleges should consult Mr. Thomas Hoeksema.

In addition, Calvin College offers a Master of Arts in Teaching degree in learning disabilities. Part of the program leads to certification as a teacher of the learning disabled. Applicants must possess an elementary or secondary teaching certificate and must have completed coursework in the education or psychology of exceptional children and in child or adolescent psychology. Two years of regular teaching experience are recommended. Students in this program complete two courses in the context of education, four and a half courses in the learning disability concentration, two electives, and a project. Practicum experience is included. A non-degree endorsement program is also possible. Both programs satisfy the course requirement for continuing certification. Students interested in the master's degree program in learning disabilities should consult Ms. Myra Kraker.

Bilingual education. Because bilingual teachers must be prepared to teach all subjects in both English and Spanish, Calvin's bilingual program requires the completion of a typical elementary education program with some modifications. A group major in language arts is appropriate and reduces the total number of courses required. Students should request a bilingual assignment in Education 303 and will do half of their directed teaching in a bilingual classroom. Furthermore, they must be prepared to demonstrate competency in reading, writing, speaking, and listening in both English and Spanish.

The additional course requirements for the seven-course program, which leads to an endorsement minor in bilingual education, are: Interdisciplinary 301, Introduction to Bilingual Education; English 329, Linguistics; Spanish 360, Spanish-English Linguistics; Spanish 373, Hispanic Culture in the United States; and either History 211, Survey of American History, if the student has little background in American history, or 356, Social and Cultural History of the United States.

The advisor for this program is Ms. Ynés Byam of the Department of Spanish.

Post-Baccalaureate Non-Degree Teacher Education Programs

Post-Baccalaureate Non-Degree Program Leading to a Michigan Provisional Teacher Certificate. This program is for those who have graduated with a bachelor's degree from an accredited institution without having obtained a teacher certificate. All persons interested in certification will require an evaluation of their undergraduate programs for certification requirements.

Required professional courses in this program include Education 301, 303, Education 581 or Philosophy 501, and two to three course units of teaching internship or the equivalent. Prospective elementary teachers must complete Ed-

Education 305, 322, and one of the following: Education 540, 541, 542, or 543. Prospective secondary teachers must complete Education 307-308 and 356. Certification requirements for teaching majors and minors must also be met.

Requests for admission to this program should be addressed to the dean for academic administration. To be eligible students must have a bachelor's degree from an accredited college or university, a minimum cumulative graduate point average of C (2.5), two letters of recommendation, and must have completed at least twenty-five hours of supervised experience with school-aged people. Information regarding teacher certification should be obtained from the director of teacher certification, Ms. Madge Strikwerda. Information regarding majors and minors should be obtained from the appropriate departmental advisor as listed on page 53.

Students in this program must pass competency tests in English, mathematics, and reading before permission for directed teaching will be granted. Students should take the competency tests before being admitted to the teacher education program or, if transfer students, immediately upon arrival at Calvin College. Information regarding test dates can be obtained from the Education Department.

Post-Baccalaureate Non-Degree Program Leading to a Michigan Continuing Teacher Certificate. This program is for those who have a bachelor's degree and a provisional teacher certificate. It is intended for teachers who would like to take graduate courses but not enroll in a master's degree program. Courses taken under this program may be transferable to a master's degree program at a later time, if applicable to a particular concentration.

A minimum of eighteen (18) semester hours beyond initial certification is required for recommendation for a continuing teacher certificate. A few special endorsements may require more course work. If all course work is taken at Calvin, five Calvin course units fulfill this requirement. Courses in the major and minor(s) should be chosen in consultation with an appropriate departmental advisor (as listed on page 53) at the time the program of study is initiated. Previous course work and planned selections must be evaluated by the director of teacher certification. Only courses in which a grade of C (2.0) or higher is received may be applied to the program. Students who graduated from and were recommended for their provisional teacher certificate by Calvin College must take at least two of the course units at Calvin. All others must take at least three of the course units at Calvin.

Requests for admission to this program must be addressed to the dean for academic administration and designated Non-Degree Program for Continuing Certification. Information regarding teacher certification should be obtained from the director of teacher certification, Ms. Madge Strikwerda.

Post-Baccalaureate Non-Degree Special Education Program Leading to a Michigan Endorsement in Learning Disabilities. This program is for those who have a bachelor's degree and a teacher certificate and who wish to obtain an endorsement in learning disabilities.

This program includes education or psychology of exceptional children, introductory psychology, child or adolescent psychology, and one elective, all of

which may be transferred from previous undergraduate or graduate work. In addition, the following courses must be taken at Calvin: Education 550, Theories of Learning Disabilities (1 unit), Education 551, Diagnosis and Prescription: Learning Disabilities (1 unit), Education 582, Curriculum and Instruction: Learning Disabilities (1 unit), Education 548, Directed Teaching: Learning Disabilities (1 1/2 units).

Application to Calvin College and to this program should be made to the dean for academic administration. The advisor for this program is Ms. Myra Kraker.

Post-Baccalaureate Non-Degree Special Education Program Leading to a Michigan Endorsement in Mental Impairment. This program is for those who have a bachelor's degree and a teacher's certificate and who wish to obtain an endorsement in mental impairment.

The program includes the following courses: Art 215, Art for the Classroom Teacher; Psychology 151, Introductory Psychology; Psychology 313, Mental Health in the Classroom; Special Education 216, Education of Exceptional Children; Special Education 306, Mental Retardation; Special Education 310, Diagnosis and Prescription: Mental Impairment; and Special Education 330, Curriculum and Instruction: Mentally Impaired (1.5 course units).

Application to Calvin College and to this program should be made to the dean for academic administration. The advisor for this program is Mr. Thomas Hoeksema.

Preprofessional programs

The programs in this section prepare students for admission to professional graduate schools while also meeting the requirements for a Bachelor of Arts or Bachelor of Science degree from Calvin.

Law

There is no prescribed program specifically designed for the student planning to enter a law school after graduation. Law school applicants must have a college degree and must take the Law School Admission Test, but law schools do not require that applicants have taken specific courses or have a particular major concentration. Prospective law school applicants should complete the requirements for a Bachelor of Arts degree as they are listed on page 46. The prelaw advisor, Mr. Charles Strikwerda of the Department of Political Science, can advise students on suitable electives and can help them plan programs which provide good preparation for law school. Prelaw students should declare their interest in law at registration time and are advised to consult the prelaw advisor before or during each semester's registration. Juniors and seniors, whatever their field of major concentration, should choose their electives with care and in consultation with the prelaw advisor.

Medicine and dentistry

All students planning to enter the premedical or pre dental programs should consult Mr. Peter Tigchelaar of the Department of Biology, faculty advisor for the premedical and pre dental programs. Students should also note the general college admission requirements on pages 46–48.

A student may select any major concentration and still meet the entrance requirements for most medical and dental schools. However, for most students a concentration in biology is suggested.

The minimum science requirements for entrance into nearly all medical or dental schools are met by: Biology 131, 232, 323, and one course unit from 264, 321, 331, 334, and 336; Chemistry 103–104 and 261–262; and Physics 221–222 or the equivalent. Mathematics 161–162 is recommended and is required by some medical schools.

Because a few schools have unique requirements, students should consult with Mr. Tigchelaar to determine specific requirements of the schools to which they intend to apply.

Premedical and pre dental students normally should take their Medical College Admissions Test (MCAT) or Dental Admissions Test (DAT) in the spring of their junior year and should apply for admission to the medical or dental school during the summer prior to their senior year.

Most medical and dental schools give preference to students who complete a four-year college course. However, students with exceptionally high qualifications who have completed only three years of college may be accepted by dental and medical schools. Such students who wish to secure a baccalaureate degree from Calvin College on the combined curriculum plan must complete twenty-seven courses, including eleven courses from biology, chemistry, and physics, and the eleven designated core courses in subjects other than foreign language, mathematics, and the sciences. For their electives, students should choose such subjects as are required for admission to the particular medical or dental school which they expect to attend. Upon satisfactory completion of this course and one year of successful work in a recognized medical or dental school, the student will be eligible for the degree of Bachelor of Science in Letters and Medicine, or Bachelor of Science in Letters and Dentistry on the combined curriculum plan.

Students who desire to secure a baccalaureate degree on the combined curriculum plan must notify the Registrar's Office by April 1 of the year in which they expect to receive the degree.

Ministry

The Association of Theological Schools (A.T.S.) recommends that pre-seminary students develop to a satisfactory degree the ability to think independently, to communicate effectively, to do research, and possess a basic general knowledge of past and present culture through studies in the humanities and the natural and social sciences. The A.T.S. also states that Biblical languages may be acquired in the pre-seminary period, that Latin is important, and that modern languages are valuable. The A.T.S. discourages those concentrations in the

study of religion which would duplicate later seminary work and which would narrow the liberal arts base for later theological studies. Preseminary students are advised to consult the catalogs of the seminaries which they intend to enter for their specific admission requirements. Catalogs are available in the library.

The advisor for all preministry programs is Mr. Louis Vos of the Religion and Theology Department.

In order to qualify for admission to Calvin Theological Seminary in any of its programs the student should meet all of the regular college requirements for a bachelor's degree as well as the admissions requirements of the seminary for the specific programs. A grade point average of 2.67 or higher is required for admission. College concentrations of particular relevance for subsequent seminary studies are: English, Greek, history, philosophy, psychology, sociology, and theology.

To enter the Master of Divinity (M.Div.) program, Calvin Seminary requires the following courses for admission:

	COURSES
Economics, political science, and/or sociology	2
Education and/or psychology	2
English	3
Greek	4
History	3
Modern foreign language (See paragraph below.)	0-4
Science	2
Philosophy (excluding courses in logic)	3
Religion and theology	2
Communications	2

The seminary expects that Calvin College students planning to enter the Master of Divinity program will satisfy the above requirements by including the following courses in their programs: a course in educational psychology or Psychology 201 or 204; Greek 205-206; History 301 or Classics 211, 311, or 312; at least two philosophy courses chosen from the Intermediate or Advanced Historical Courses; and Communication Arts and Sciences 100 and 200. Communication Arts and Sciences 203 and 240 are recommended and, in exceptional cases, either of these courses may be substituted for Communication Arts and Sciences 100.

The foreign language requirement may be met by the successful study of one foreign language through the second-year college level or by demonstrated competence at this level. Dutch is recommended as the preferred language and German as the second choice, but other languages are acceptable.

Calvin Seminary's Master of Church Education program is for persons who, though not seeking ordination, wish to prepare themselves for other positions of leadership in the church, particularly in its educational ministry. The courses required for admission are generally met by the college graduation requirements, with the addition of two courses from education and psychology, including a course in educational psychology.

Calvin Seminary's Master of Theological Studies program is designed for those who do not seek ordination but desire a theological education with a view toward various vocational objectives. Specific requirements beyond those re-

quired for graduation from the college include four courses in Greek and competence in a modern foreign language through the second-year college level.

Professional-Degree Programs

Accountancy (B.S.A.)

The Bachelor of Science in Accountancy degree is intended for students who want to prepare for a career in accounting in the context of a Christian liberal arts education. The program requires sixteen course units in the Department of Economics and Business and at least eighteen course units in other departments.

The program can be used to prepare graduates for the Certified Public Accounting (C.P.A.) examinations and can meet the Michigan requirements. Students preparing for the examinations in any other state should consult the department.

Students may also qualify themselves in accounting by completing the Bachelor of Arts program with a business major plus an accounting emphasis. Such programs should be worked out with a faculty advisor.

The Bachelor of Science in Accountancy program requires eight courses in accounting (Business 201, 202, 301, 302, 305, plus three from 306, 310, 311, and 315), eight courses providing a general background in business and economics (Business 350, 360, 370, 380, Economics 221, 222, plus two from designated courses), and three courses in mathematics and computer science.

In addition to the specified courses from the Department of Economics and Business, the student must complete eighteen courses in other departments. This requirement differs slightly from the liberal arts core described on pages 46-48. It must include one core course each in history, philosophy, and religion and theology, plus an additional course from these departments or Interdisciplinary W10, Christian Perspectives on Learning; a course in the natural sciences; a course in political science, psychology, or sociology; a course in English or American literature; a course in the fine arts or foreign culture and another course in the fine arts or literature (If a student has not completed a foreign language through the second year college level, one of the courses in the fine arts and literature must be a foreign culture course.); English 100, Communication 100 or 240, and a quarter course in basic physical education for each year in residence.

A model program for the Bachelor of Science in Accountancy is:

<i>First year</i>	COURSES
English 100	1
History	1
Mathematics 131-132 or alternative mathematics cognate	2
Philosophy core	1
Psychology, sociology or political science core	1
Religion and theology core	1
Fine arts or foreign culture course	1
Interim elective	1
Physical education	1/4

<i>Second year</i>	COURSES
Business 201, 202, 360	3
Economics 221, 222	2
Physical education	1/4
Communication 100 or 240	1/2
Computer science	1
Literature core	1
Natural science core	1
Interim elective	1
 <i>Third year</i>	 COURSES
Business 301, 302, 306, 350, 370	5
Economics 323, 324, 325, 326	1
Fine arts or foreign culture	1
History, philosophy, or religion and theology core	1
Interim elective	1
Physical education	1/4
 <i>Fourth year</i>	 COURSES
Business 310, 311, or 315 (all 3 for CPA candidates)	2
Business 305, 380	2
Economics 331-339, or a second course from 323-326	1
Electives (may include 319 for CPA candidates)	3
Physical education	1/4

Fine arts (B.F.A.)

Students who are interested in the Bachelor of Fine Arts degree (B.F.A.) program at Calvin should consult with Mr. Carl Huisman of the Department of Art, faculty advisor for the B.F.A. program.

A student wishing to obtain a Bachelor of Fine Arts degree in art must successfully complete thirty-six courses, including three interim courses, the liberal arts core courses designated below, and a prescribed program of concentration.

Before applying for admission to the program a student must have completed three studio art courses. Application forms and additional requirements for admission are available in the Art Department. Submit applications the first week in October or March.

The required eighteen-course program consists of three basic art courses (205, 209, 210), four from introductory courses to the various media (310, 311, 320, 325, 350, 360); four intermediate and advanced studio courses from 309, 312, 313, 314, 315, 321, 322, 326, 327, 351, 352, 361, and 362; four courses in history of art including 231 and 232 with two others from 233, 235, 237, 238, 240, 241, and Classics 221; two advanced art interims; and 395. No more than eighteen courses in art may be applied to the degree. This program is not appropriate for those seeking teacher certification.

The liberal arts core must include:

1. Six courses from the contextual disciplines (History 101 or 102, Philosophy 153 and 208, Religion and Theology 103 and 301, and an additional core course from history, religion and theology, or Interdisciplinary 100),

2. One core course from mathematics and the natural sciences,
3. One core course from economics, political science, psychology, and sociology,
4. Three course units from English and American literature, music, and speech with courses in at least two departments and at least one in literature,
5. The basic core requirements in English 100, speech, and physical education, and
6. A foreign language through the 202 level or two approved courses in foreign culture.

Engineering (B.S.E.)

Engineering is a design-oriented profession applying the principles of mathematics, science, economics, ethics, social sciences, and humanities with judgment to the utilization of energy and materials for the benefit of humanity. Within this context students are aided in the development of a thorough-going Christian perspective toward technology and its application. A primary goal of the department is to educate Christians to serve the Lord and others through technology.

To this end, students at Calvin College may prepare to be engineers by following a four-year program leading to a Bachelor of Science in Engineering (B.S.E.) degree with concentrations in civil, electrical, or mechanical engineering. (Students may complete three years at Calvin before transferring to another school to complete an engineering degree. This second option is recommended for students wishing to pursue areas not offered at Calvin. Students interested in Aerospace Engineering can pursue this area in graduate school following the completion of the B.S.E. with a mechanical concentration.) The B.S.E. degree is intended to prepare graduates for entry-level employment as engineers and for graduate study. Students interested in engineering should consult the department chair, Mr. Lambert Van Poolen.

Students in both tracks follow a common program for the first two years, at the end of which they apply for admission to the Department of Engineering. This common program requires twelve and one-half technical and basic science courses and seven and one-half (B.S.E.) or seven and one-quarter (three-year program) from the liberal arts core. The common model program is as follows:

<i>First year</i>	COURSES
Chemistry 103	1
Engineering 101, 102	1-1/2
Mathematics 161, 162	2
Physics 126, 186	1-1/4
Interdisciplinary W10, history, religion and theology core	1
Economics 151	1
English 100	1
Computer Science 141	1/2
Physical education, basic	1/2

<i>Second year</i>	COURSES
Engineering 202	1
Engineering 205	1
Engineering 204	1
Engineering 284	1/4
Mathematics 231, 261	2
Physics 225	1
Social science core	1
Philosophy 153	1
Literature core	1
Communication Arts and Sciences 100	1/2
Physical education	1/2 or 1/4

The above courses plus thermodynamics (310) and the senior design project courses (339, 340) provide a common core for the three concentrations in the B.S.E. program. Each concentration consists of six required engineering courses: Civil Engineering, 305, 309, 313, 320, 326, and 327; Electrical Engineering, 304, 307, 311, 325, 330, and 336; Mechanical Engineering, 305, 309, 316, 317, 324, and 329. Because all students take the same project courses there is opportunity for interdisciplinary projects. The electives available also provide opportunity for students to develop an interdisciplinary flavor in their programs. Hence, while the B.S.E. program requires some focus on a particular concentration there is opportunity for a broad education preparing students in the multi-faceted world of engineering design and professional practice.

Admission. The minimum requirements for admission are the completion of the model program with a minimum cumulative grade point average of 2.3; a minimum grade of C- (1.7) in Chemistry 103, Computer Science 141, Mathematics 161, 162, Physics 126, 186, and 225; and a minimum grade of C (2.0) in the engineering courses and in Mathematics 231 and 261.

Students wishing to transfer from another school should apply to the Office of Admissions. In general, transfer students must meet the same course requirements as students who begin their programs at Calvin, must have had a cumulative grade point average of at least 2.5 in their previous college education, and will receive credit for no course completed with a grade below C (2.0). In accord with Calvin's commitment to an integration of the Christian faith with professional engineering education, transfer students must take at least one liberal arts course for each semester they are at Calvin. Furthermore, if they are in the three-year program they must spend at least two semesters at Calvin as full-time students; if they are in the four-year program they must spend four semesters.

Students must apply for admission to the Department of Engineering during the semester in which they are completing the common first two years of the model program. At that time they must indicate if they wish to follow the three- or four-year program; those pursuing the four-year program must select a civil, electrical, or mechanical concentration. After a student is accepted, the chair of the department will prepare a counseling sheet with the student, indicating the remaining requirements. Probationary admission is available to assist certain students. Students who are ready to take 300-level courses but who have not

completed the required courses with the stipulated minimum grade or who have not achieved the minimum required cumulative grade point average may be given probationary admission to the program. Such students may not have more than three course deficiencies nor may their cumulative grade point average be lower than 2.2 and, furthermore, all deficiencies must be removed within a designated period of time, not to exceed one year. Students who fail to meet these conditions are not eligible to reapply for admission to the program at a later date. Students requesting probationary admission should complete the Form to Request Probationary Admission and submit it to the chair of the department. As an alternative to probationary admission, students may delay taking 300-level courses until they have met all requirements for regular admission to the program.

Third and Fourth B.S.E. Years. The final two years of the B.S.E. program require eighteen courses: seven required technical courses containing engineering science and/or engineering science with design content, the engineering special topics interim, one and one-half course units in senior design project, one basic science elective (such as an appropriate course from the major concentration in Chemistry, Geology or Physics; or Astronomy 201; or a 100-level Biology course), and one course as an engineering elective, one-half course unit in business, one advanced mathematics course, four liberal arts courses, and one technology/humanities interim course. The engineering special topics interim is designed by the department to have a content of half engineering science and half engineering design. The elective in engineering must include the minimum total of three-quarters course units in engineering science. Eligible courses having at least three-quarters engineering science content are 301, 304, 305, 306, 307, 309, 311, 314, 315, 324, 326, 328, 330.

Civil engineering concentration, third year

	COURSES
Engineering 305, Mechanics of Materials	1
Engineering 309, Fluid Mechanics	1
Engineering 320, Hydraulic Engineering	1
Engineering 326, Structural Analysis	1
Basic science elective	1
Engineering elective	1
Fine arts core	1
Religion and Theology core	1
Interim in the humanities and technology	1

Civil engineering concentration, fourth year

	COURSES
Engineering 310, Thermodynamics	1
Engineering 313, Soil Mechanics and Foundation Design	1
Engineering 327, Structural Design	1
Engineering 339, Senior Design Project	1/2
Engineering 340, Senior Design Project	1
Advanced mathematics elective	1
Business 357, Business Aspects for Engineers	1/2
Philosophy core	1
Literature core	1
Engineering Special Topic, interim	1

<i>Electrical engineering concentration, third year</i>	COURSES
Engineering 304, Fundamentals of Digital Systems	1
Engineering 307, Advanced Network Analysis	1
Engineering 311, Electronic Devices and Circuits	1
Engineering 330, Electronic Circuits, Analysis, and Design	1
Basic science elective	1
Advanced mathematics elective	1
Philosophy core	1
Religion and Theology core	1
Interim in the humanities and technology	1

<i>Electrical engineering concentration, fourth year</i>	COURSES
Engineering 325, Digital Circuits and Systems Design	1
Engineering 336, Advanced Circuit Design	1
Engineering 339, Senior Design Project	1/2
Engineering 340, Senior Design Project	1
Engineering 310, Thermodynamics	1
Engineering elective	1
Business 357, Business Aspects for Engineers	1/2
Literature core	1
Fine arts core	1
Engineering special topic, interim	1

<i>Mechanical engineering concentration, third year</i>	COURSES
Engineering 305, Mechanics of Materials	1
Engineering 309, Fluid Mechanics	1
Engineering 310, Thermodynamics	1
Engineering 316, Heat Transfer	1
Engineering 324, Materials and Processes in Manufacturing	1
Basic science	1
Fine arts elective	1
Religion and Theology core	1
Interim in the humanities and technology	1

<i>Mechanical engineering concentration, fourth year</i>	COURSES
Engineering 317, Engineering Instrumentation	1
Engineering 329, Machine Design	1
Engineering 339, Senior Design Project	1/2
Engineering 340, Senior Design Project	1
Engineering elective	1
Advanced mathematics elective	1
Business 357, Business Aspects for Engineers	1/2
Philosophy core	1
Literature core	1
Engineering special topic, interim	1

Third Year for Students Planning to Transfer. A typical third-year program for students planning to transfer to another school of engineering is given below. Students are advised to work out their own programs with the department chair to be certain that they meet the requirements of the other schools. Those who complete their degree at a recognized school of engineering after completing twenty-seven-and-one-half course units at Calvin may apply for a Bachelor of

Science in Letters and Engineering degree from Calvin. (For those going on in Chemical Engineering, the department has worked out a three-year program which, entailing some summer school, allows a student to take all six required chemistry courses at Calvin, if so desired.)

<i>Third year</i>	COURSES
Engineering electives	2
Technical electives from 200- and 300-level courses in biology, chemistry, engineering, mathematics, or physics	2
Philosophy core	1
Religion and Theology core	1
Literature core	1
Fine arts core	1
Elective	1

Nursing (B.S.N.)

Calvin College, in cooperation with Hope College of Holland, Michigan, offers a Bachelor of Science in Nursing (B.S.N.) degree which affirms the distinctive mission of both colleges. The program seeks to provide broad educational and professional nursing experience within the context of a Christian liberal arts education. Upon the completion of the degree, students are eligible to take state licensing examinations. Satisfactory scores enable a student to become a Registered Nurse (R.N.). Students should consult the chair of the department, Ms. Cynthia Kielinen, for further information.

Butterworth Hospital and the Holland Community Hospital serve as centers providing clinical opportunities for students to care for people who need the knowledge and skills of the nursing profession. Pine Rest Christian Hospital provides learning experiences in mental health nursing and other community agencies offer opportunities for students to care for clients outside of a hospital setting. Transportation to these agencies is the student's responsibility.

Students apply for admission to the department only after they have completed a two-year pre-nursing program. Those interested in nursing are asked to indicate their interest at the time they begin their studies at Calvin, so they will be counseled by advisors for the nursing program. A limited number of transfer students can be accepted.

The two-year pre-nursing program requires nine courses in the sciences and social sciences closely related to nursing (Biology 131, 205, 206, 207, Chemistry 113, 114, Psychology 151, 201, and Sociology 151) and nine additional liberal arts courses (history, philosophy, religion and theology, plus an additional course from these departments or Interdisciplinary W10; a course in literature taught in English; two courses in the fine arts, which include foreign language and literature; a course in written rhetoric; a half course in speech; and one course unit in basic physical education).

By January 15 of the sophomore year, students must apply for admission to the Hope-Calvin Department of Nursing. Application forms are available in the department and at the Office of the Registrar. To be eligible for admission to the nursing program, a student must have completed the eighteen courses in the pre-nursing program, nine of which must be the required courses in the natural

and social sciences. A minimum cumulative grade point average of C+ (2.3) is required and a minimum grade of C- (1.7) is required in each of the natural and social sciences courses. Since enrollment in the final two years—the clinical nursing years—is limited, admission is selective, and completion of the pre-nursing program does not assure acceptance.

The third and fourth years require fourteen and one-quarter professional courses and four liberal arts electives, one of which must be a course in mathematics unless the student has completed four years of college preparatory mathematics in high school. The required courses are: 301, 311, 321, 352, 373, and 375 in the junior year; and 401, 425, 472, 474, and 482 in the senior year.

The typical nursing program is as follows:

<i>First Year</i>	COURSES
Biology 131, 205	2
Chemistry 113, 114	2
Psychology 151	1
Sociology 151	1
English 100	1
Art, music, etc. core	1
Religion, history, philosophy or Interdisciplinary W10, core	1
Physical education	1/2
<i>Second Year</i>	COURSES
Biology 206, 207	2
Psychology 201	1
Religion core	1
History core	1
Literature core	1
Philosophy core	1
Art, music, etc. core	1
Communication 100	1/2
Physical education	1/2
<i>Third Year</i>	COURSES
Nursing 301, 311, 321, 373, 352, 375	7-1/4
Mathematics 100 or 131 (or elective)	1
Elective	1
<i>Fourth Year</i>	COURSES
Nursing 401, 425, 472, 474, 482	7
Electives	2

The nursing courses are described on pages 153–155 under the Department of Nursing. Other courses are described under the department indicated.

Recreation (B.S.R.)

Students who wish to enter the field of recreation services, which includes such specialty areas as therapeutic recreation (recreation therapy), recreation management, youth leadership, and commercial and outdoor recreation, should

complete the degree requirements for the Bachelor of Science in Recreation. The program requires eight and one-half course units in recreation (met by 201, 215, 303, 304, 305, 310, and 346) and four cognate courses (Psychology 201; Psychology or Sociology 310; Physical Education 220; and one unit from Physical Education 221, 230-243 or 380) plus the core requirements designated for professional programs. Students are advised to consult with Mr. Glen Van Andel of the Physical Education Department for more information about this program.

Professional combined-curriculum programs

Communication disorders

Students who wish to enter professions dealing with communication disorders, such as speech-language pathology, or audiology may qualify for the degree of Bachelor of Science in Communication Disorders from Calvin College. The advisor for the program is Mr. Marten Vande Guchte of the Department of Communication Arts and Sciences.

Students must complete a designated program of twenty-seven courses at Calvin and a year's work at Michigan State University. A three-year certificate is awarded after the satisfactory completion of the courses at Calvin, and the degree is granted after the successful completion of the courses at Michigan State University. The program is appropriate for students wishing to do graduate work in speech-language pathology or in audiology.

The liberal arts requirements include one core course each in history, philosophy, and religion with an additional course from one of these departments; Biology 115 or equivalent course; Physics 223; Mathematics 131; Psychology 151 and 204; a core course in either economics or political science; a core course in literature plus an additional course in literature, fine arts, or foreign culture; English 100 and 329; and a half course of credit in basic physical education.

The required courses in the Department of Communication Arts and Sciences are: 100 or 214, 110, 150, 203, 215, 216, 307, 308, and an approved interim.

Students wishing to practice speech therapy in the schools will also need to seek appropriate teacher certification. Those wishing to practice in a bilingual setting should study the appropriate second language while at Calvin.

Medical technology

To qualify for the degree of Bachelor of Science in Letters and Medical Technology on the combined curriculum plan a student must complete twenty-seven courses plus twelve months of successful work in an accredited school of medical technology. Students wishing to enter the medical technology program should consult Mr. Larry Louters of the Department of Chemistry. The following courses are prescribed: Biology 131, 205, 206, 207, 264, 307, and 334; Chemistry 103, 104, 253, 254, and one other; one mathematics course from 161 or 131; English 100; Physics 223; History 101 or 102; one course in philosophy; one course

in religion and theology; one additional course from history, philosophy, religion and theology, or Interdisciplinary W10; two courses in different departments from economics, political science, psychology, and sociology; three courses from art, literature, music, speech, and foreign culture including one from English, American, or world literature (one of these requirements may be fulfilled by two years of high school foreign language); the total of one-half course unit credit from the core courses in speech and three-fourths course unit credit in basic physical education.

Students should apply to accredited schools of medical technology during the fall semester of their junior year. Calvin College is affiliated with the schools of Medical Technology at Butterworth Hospital in Grand Rapids, and Borgess Medical Center in Kalamazoo, Michigan. Students may do their clinical internship at these or other approved institutions to which they are admitted.

A typical student program is as follows:

<i>First year</i>	COURSES
Biology 131, 205	2
Chemistry 103, 104	2
English 100	1
Foreign language (See paragraph above.)	2
History 101 or 102	1
Interim	1
Physical education	1/2

<i>Second year</i>	COURSES
Biology 206, 207	2
Chemistry 253-254 or 261-262	2
Other required courses	4
Interim	1
Physical education	1/2

<i>Third year</i>	COURSES
Biology 264, 307, 334	3
Chemistry 201, 304, or other chemistry course	1
Other required courses	4
Physics 223	1
Free elective	1
Interim, biology	1

Fourth year
Internship in an accredited school of medical technology.

Preprofessional Transfer Programs

Agriculture

Although Calvin College does not offer a degree in agriculture, Calvin does offer basic courses which can be applied toward a degree at such agriculture colleges as Michigan State University, the University of Guelph, or Dordt College. Calvin offers introductory courses in plant science and soil science. Stu-

dents interested in such programs should consult Mr. Uko Zylstra of the Department of Biology.

Students wishing to transfer after two years to the College of Agriculture and Natural Resources at Michigan State University are advised to follow its "non-preference" program, postponing until the third year selecting an area of special interest. Michigan State offers more than twenty such areas ranging from agricultural engineering, animal husbandry, horticulture, fisheries and wildlife management, to forestry. The science requirements of that "non-preference" program are met by Biology 113, 114 or 233, 131, 232, 234; Mathematics 131-132 or 161; and either Chemistry 103-104 plus a laboratory course in organic chemistry such as 253-254, or Physics 221-222 plus an additional course in physics. The liberal arts requirements are met by one course each in history, philosophy, religion and theology, with an additional course from one of the three; Economics 201-202 or 151 plus one additional course from economics, political science, psychology, or sociology; English 100 plus an additional course in English; Communication Arts and Sciences 100; and one additional course in the fine arts. A similar program is also possible at the Ontario Agricultural College of the University of Guelph. Students who enroll at Calvin College after Grade XII can apply to transfer after their sophomore year. The program at Guelph leads to a Bachelor of Science Degree in Agriculture after three additional years. The recommended program for such students is Biology 113, 114 or 233, 131, 232, 234; Mathematics 161, 162; Chemistry 103, 104, 253, 254; Physics 221, 222; English 100; Economics 151; and other courses chosen from those that meet core requirements.

Students who plan to transfer to the agriculture program at Dordt College are advised to complete the following courses at Calvin: Biology 113, 114 or 233, 131, 232, 234; Chemistry 103, 104; Economics 221, 222; English 100 plus a course in English literature; one fine arts course; one foreign language course at the 200 level; History 101 plus an additional history course; Philosophy 153; one course in political science, psychology, or sociology; and one course in religion and theology.

Architecture

The program leading to the Master of Architecture degree, the professional degree in the field, typically requires six years, two of which may be completed at Calvin College. Students interested in such a program should consult Mr. Edgar Boevé of the Department of Art. The program incorporates a significant portion of the basic core curriculum as well as of the professional requirements of the profession. A typical program would be:

<i>First year</i>	COURSES
Art 231, Art 205	2
English 100	1
Engineering 103	1
Computer Science 100 or 151	1
Mathematics 161, 162	1
Interdisciplinary W10, Christian Perspectives (interim)	1
Economics 151	1
Physical education	1/2

<i>Second year</i>	COURSES
Art 209, 240	2
Chemistry, if none in high school; biology; or psychology	1
Physics 221, 222	2-1/2
History, political science or sociology core	1
Literature core	1
Religion and theology core	1
Philosophy 153	1
Communication 100	1/2

Engineering

In addition to its four-year B.S.E. program, Calvin offers a three-year program for students who wish to transfer to another school of engineering. The requirements for both programs are described on pages 65-69.

Forestry and other natural resource programs

Natural Resource programs sort out into three main areas: Resource Ecology, Policy and Management, and Resource Institutions and Human Behavior. Because of the great variety of programs and differences in requirements, students interested in any of these areas should contact Mr. Al Bratt of the Biology Department early in their college careers. Because employment opportunities are limited with a Bachelor's degree, graduate work is strongly recommended.

Resource ecology is an area which requires intensive scientific training. A strong background in biology, physical sciences, mathematics, and computer science is required. Persons interested in research careers in fisheries, wildlife, and forestry should plan to complete a biology concentration at Calvin with special attention on the requirements of the graduate school selected.

Resource policy and management is an area which requires less intensive training in the sciences and more emphasis on economic theory, management skills, social sciences, communication skills, and political institutions. Careers in this area include management of resources (forestry, fisheries and wildlife management), planning (landscape architecture), or policy (resource economics, policy, advocacy, education, and communication). Landscape architecture requires courses in design, graphics, engineering, and planning.

Resource institutions and human behavior is an area of study for which preparation in the social and behavioral sciences is appropriate with minimal training in the sciences required. Competence in research methods is required. How individual, group, and institutional behavior affects use and allocation of natural resources is the focus of this area.

There are three main educational paths a student may follow to gain professional competence in these areas:

1. Completion of a Bachelor's degree at Calvin followed by graduate study. This is most appropriate in the area of resource ecology. A major at Calvin should be followed by graduate study.
2. Transfer after two years at Calvin to a professional program elsewhere. This is appropriate in the areas of resource ecology and resource management. Normally students should complete the first two years of the

Biology concentration, a year of mathematics, a year of chemistry, and courses in computer science and economics. The remaining courses should be selected with the requirements of the transfer school in mind.

3. Involvement in a combined curriculum program at Calvin for three years followed by two or three years at a school of natural resources. Graduates from these programs receive two degrees, a Bachelor of Science in Letters and Natural Resources from Calvin and a second degree, typically a Master's, from the co-operating university. The Calvin degree requires twenty-seven courses at Calvin. The Master's degree may involve research and a thesis, or a Master's project. Admission to the co-operative program requires a 3.0 G.P.A.

The field of natural resources is being restructured and many of the traditional programs are being phased out. A more interdisciplinary, problem-solving approach is being taken to manage natural resources. This requires broader training and may appeal to students with interests in fields other than the sciences. Two schools with which Calvin has had a working relationship, Michigan State University and the University of Michigan, are currently revising their curricula. Details of the transfer program with Michigan State University and the combined curriculum program with the University of Michigan are incomplete and students interested in these programs should see the advisor to plan the details of their college careers.

Students intending to transfer to Michigan State University in the forestry program should take the following courses at Calvin: Biology 113, 131, 232, 233, and 234; Chemistry 113-114; Mathematics 161; Computer Science 141; Physics 221; English 100 and 200; Communication Arts and Sciences 100; Economics 151; Psychology 151; Sociology 151; Philosophy 153; and Religion and Theology 103.

Students interested in the University of Michigan Co-operative program in resource policy and management should take the following courses at Calvin which are prerequisite: Biology 131, 232, 233, 234; Chemistry 113-114; Communication Arts and Sciences 100; English 100; Economics 151; Mathematics 131-132; Psychology 151 or Sociology 151. Students interested in resource ecology or resource policy and management should attend the University of Michigan summer camp at Camp Filibert Roth after their sophomore or junior years at Calvin.

Calvin College is also a participant in the Cooperative College Program of the School of Forestry and Environmental Studies of Duke University in Durham, North Carolina. The program is designed to coordinate the education of students from selected undergraduate schools with graduate programs in the broad area of resources and environment offered at Duke and leads to the Master of Forestry (MF) or the Master of Environmental Management (MEM). Appropriate undergraduate majors may be in one of the natural or social sciences, pre-engineering or business, natural resources, or environmental science. Students may enter after three years of undergraduate study or after graduation from Calvin, but in either case, certain courses must be completed.

The master's programs at Duke require sixty semester hours beyond the junior year and require an initial summer session plus four semesters of study. The requirements are reduced for students who complete the bachelor's degree with relevant undergraduate work of satisfactory quality.

Nursing

A Bachelor of Science in Nursing program may be begun at Calvin and completed at another college or university. Students interested in such programs involving a possible transfer to another school should work out their programs with the advisor for health science programs, Mr. Richard Nyhof of the Department of Biology.

Pharmacy

Students wishing to become pharmacists may complete two years at Calvin before transferring to a school of pharmacy for their final three years. A prepharmacy program which satisfies the requirements of the School of Pharmacy at Ferris State College in Big Rapids, Michigan, is given below. Students wishing to transfer to other schools should correspond with those schools and consult the pharmacy advisor, Mr. Richard Nyhof of the Department of Biology, to determine appropriate programs. Students following normal programs should apply for admission to a school of pharmacy midway through their second year.

<i>First year</i>	COURSES
Biology 131, 205	2
Chemistry 103, 104	2
Mathematics 110, 161 and 162, or 131 and 132	2
English 100 and 200, 235, or 332	2

<i>Second year</i>	COURSES
Biology 206 and 234	2
Chemistry 261, 262	2
Physics 223 or 221-222	1-2-1/2
Economics 151	1
Political Science 201	1
Psychology 151	1

Other professional programs

Students interested in preparing for any profession should see the registrar of the college. Curricula can usually be arranged to enable such students to remain at Calvin for one or two years.

GRADUATE PROGRAMS

Christian graduate education

THE GRADUATE PROGRAMS, as well as the undergraduate programs, at Calvin College are based on the foundation of the Christian faith as reflected in the Reformed standards. This finds its expression at the graduate level in the study of disciplines and professional fields where students are encouraged to develop value judgments which are grounded in the knowledge of their relationship to God, to themselves, to fellow human beings, and to the world; and which acknowledge the Lordship of Christ over all.

Calvin College offers two master's degree programs: a Master of Arts in Christian Studies and a Master of Arts in Teaching. In addition, post-baccalaureate non-degree programs are available for teacher certification (see page 58 for information).

Courses in this catalog numbered 500 and above and those marked with an asterisk (*) may be applied to graduate degree programs.

Master of Arts in Christian Studies Degree

Calvin's Master of Arts in Christian Studies is a one-year program of interdisciplinary graduate study, providing college graduates of any age and profession with a unique opportunity to integrate an authentic Christian perspective with a broad range of scholarly disciplines.

ADMISSION

The requirements for admission are: (1) an appropriate bachelor's degree from an accredited college or university with a grade point average of 2.8 or above, (2) Graduate Record Examination general test scores, (3) two letters of recommendation, at least one dealing with scholastic ability, (4) official transcripts, and (5) a completed application form, including an autobiographical essay of about five hundred words dealing with previous experience and future professional goals. Candidates with major deficiencies in their undergraduate programs or lacking preparation in areas critical to this program, such as biblical studies or introductory philosophy, may be required to complete prerequisite courses in addition to the minimum courses required for the degree. Normally course work done previously at other institutions may not be applied to degree requirements. Inquiries and applications for admission should be sent to the dean for academic administration. Deadlines for submitting applications and supporting materials are the following: May 1 for summer session, August 1 for fall semester, and January 1 for spring semester.

REQUIREMENTS FOR THE DEGREE

To be eligible for the degree a student must complete a nine-course-unit program with a cumulative average of B (3.0). Such programs normally require eleven or twelve months of full-time study and are worked out with an advisor. Only courses completed with grades of C+ (2.3) or higher may be applied to the degree. Half of the nine course units must be graduate-only courses, including a two-course interdisciplinary sequence on "Christianity, Learning, and Culture", and two units for a thesis. In addition, the student must complete at least five course units in a specific program area involving Christian perspectives on one of the following: the behavioral sciences, the fine arts, the humanities, the natural sciences, the social order, or theoretical thought.

Master of Arts in Teaching Degree

The Master of Arts in Teaching (MAT) program serves elementary and secondary teachers and administrators who wish further professional training and who need to satisfy the requirements for continuing certification.

Calvin's MAT is designed especially for teachers who are already provisionally certified and experienced in classroom teaching or administration, and who wish to attend a Christian college where academic excellence is pursued in the light of Christian commitment. The MAT provides college graduates with an opportunity to integrate an authentic Christian perspective with a broader or deeper range of knowledge and insight into the professional role of the teacher or administrator.

ADMISSION

The requirements for admission are the following: (1) an appropriate bachelor's degree from an accredited college or university with a grade point average of 2.8 or above; (2) Graduate Record Examination general test scores; (3) teacher certification, or eligibility for it; (4) normally one to two years of teaching experience; (5) two letters of recommendation, at least one dealing with teaching ability; (6) official transcripts, and (7) a completed application form, including autobiographical essay of about five hundred words dealing with previous experience and future professional goals. Inquiries and applications for admission should be sent to the dean for academic administration. Deadlines for submitting applications and supporting materials are the following: May 1 for summer session, August 1 for fall semester, and January 1 for spring semester.

REQUIREMENTS FOR THE DEGREE

After students are admitted to the program in their declared area of interest, an advisor works out an appropriate program. All programs must include a minimum of nine courses, half of which must be taken in courses numbered 500 or

above. The program must be completed within six years from the date of admission with a cumulative average of at least B (3.0 on a scale of 4.0) and only courses with grades of C+ (2.3) or higher will be applied to the requirement of the degree.

The minimum requirements are:

1. **Context of Education:** Two courses are required. At least one course must be from those approved in psychology or sociology and education (Education 501, 512, 535; Interdisciplinary 561; and Sociology 501) and one must be from approved courses in history or philosophy and education (Education 510, 581; Interdisciplinary 561; and Philosophy 501).
2. **Concentration:** At least three courses must be completed in an approved group or departmental concentration. Programs of concentration are available in art, biblical, and theological studies, English, fine arts, history, language arts, learning disabilities (leading to state teacher endorsement), mathematics, music, reading, school administration, science studies, and social studies.
3. **Methods and Materials:** A course in curriculum must be completed in an area appropriate to the student's need and concentration.
4. **Project:** Students must complete a graduate project which is planned to synthesize their graduate experiences. The project proposal and the final form of the project must be approved by the project supervisor, the student's MAT advisor, and the dean for academic administration.
5. **Electives:** Students must complete additional courses from the categories above or from elective courses to satisfy the nine-course requirement.

FREE COURSE

After completion of six course units, part-time graduate students who have not had the opportunity to take an interim course will be entitled to one free course per graduate degree. Such students should check with the dean for academic administration to see if they qualify. This policy is subject to revision when the fee schedule is revised.

ACADEMIC PROBATION AND DISMISSAL

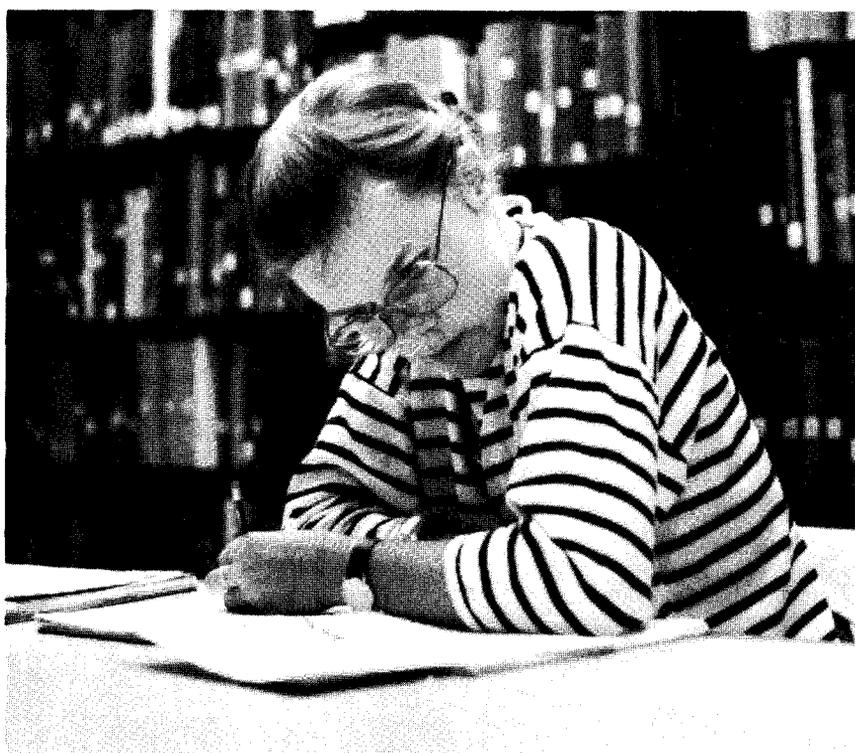
Graduate students will be placed on academic probation whenever their cumulative grade point average falls below 3.0. They will be advised in writing of their probationary status. They will be removed from probation if they raise their cumulative grade point average to 3.0. The Veterans Administration will be notified of any student receiving veteran's benefits who has not been removed from probation after taking five course units.

Graduate students are subject to dismissal, when after completing four course units, their cumulative grade point average falls below 2.7. Such students will be informed in writing of their dismissal. The Veterans Administration will be notified of any student receiving veteran's benefits who is subject to dismissal.

Graduate students who have been dismissed and who wish to be readmitted to one of the graduate programs must submit an application to the Graduate Studies Committee.

APPLICATION FOR DEGREES

In addition to the formal requirements for graduate degrees described above, students must work out an MACS or MAT Counseling Agreement with their graduate advisor and have it signed by this advisor and the dean for academic administration. The Counseling Agreement is normally completed before students begin taking courses. Graduate students must meet all of the conditions specified in that agreement within six years to be eligible for a degree. They must file a formal application for a degree at the Office of the Registrar at least six months before the expected date of graduation. If students are also fulfilling requirements for a continuing teacher certificate or an additional teaching endorsement, they must make formal application to the director of teacher certification not later than six months before they complete the certification requirements.



COURSES

Description of courses offered by the various departments

The symbols F (Fall), I (Interim), and S (Spring) indicate when each course is offered. The term core designates those courses in each department which meet the general graduation or core requirements of the discipline. The few courses which carry more or less than a single course credit are indicated; all others carry a single course credit. Interim courses numbered W10 through W49 have no prerequisites; those numbered W50 through W99 have either prerequisites or other conditions. (A catalog of interim courses is published separately.) Courses numbered 500 and above and those marked with an asterisk (*) may be applied to graduate degree programs.

Faculty members on leave of absence for the academic year are indicated by a (†), those on leave for the first semester by an asterisk (*), and those on leave the second semester by double asterisks (**).

Interdisciplinary¹

210 History of Science. S, natural science core. An examination of the emergence of modern science in the sixteenth and seventeenth centuries and of the major developments in the natural sciences since then. The focus is on physics, chemistry, natural history, and selected topics in biology. Particular attention is given to the philosophical and religious background of scientific ideas, to the concept of scientific revolution, and to the problems of periodization. Prerequisites: History 101 or 102 (preferred), one year of high school chemistry or physics, and one college science course, or consent of the instructor. Mr. A. Leegwater.

213 Teaching Science in the Elementary School. F and S, half course. The consideration of methods and materials and various teaching strategies for aiding the classroom teacher to teach science effectively in elementary school. Consideration of the relationship of Christian faith to the teaching of science in the classroom. Examination of various textbooks and supplementary materials for teaching science, with consideration of criteria for evaluation of those curricular materials. Includes laboratory activities. Prerequisites: Physics 111 or Chemistry 110 and a biological science core. Staff.

234 The Contemporary American Religious Situation.*S. A description and analysis of current American religious developments in historical, sociological, and theological perspective. Institutional and non-institutional developments, within and outside the Judeo-Christian tradition, will be examined. Satisfies as a *third* core

¹This section includes not only courses that are interdisciplinary but others as well that do not fit logically into any single department or which are in disciplines not otherwise offered at Calvin College.

course in religion and theology. *Mr. J. Primus, Mr. W. Smit.*

301 Introduction to Bilingual Education. *This course will prepare teachers to be qualified to teach in classrooms where English is the second language. Students will be concerned with both the theory and the skills necessary to teach speaking, reading, writing, and comprehension in a bilingual situation. The course includes such matters as linguistics, language interference, vocabulary, sentence structure, idioms, teaching English as a second language, placement of the newly-arrived student, choice of learning materials, and the use of specialized audio-visual aids. Each student will observe and then practice in local bilingual classrooms. Paper and an examination. Prerequisite: Spanish 202. *Ms. Y. Byam.*

385 CCCS Research. F, one or two course units. This course is designed specifically to cover the academic work of the student fellows chosen annually for participation in the Calvin Center for Christian Scholarship. This program of studies aims at involving student fellows directly in the stated purpose of the Center to promote rigorous, creative, and articulately Christian scholarship which is addressed to the solution of important theoretical and practical issues in contemporary society. The topic for research varies from year to year. Student fellows normally register for one-unit credit for each of the semesters and the interim. No student may receive more than three course units of credit. Work is done in cooperation with the faculty fellows and under the direction of the project coordinator. Prerequisite: appointment to the status of student fellow in the Calvin Center for Christian Scholarship. *Staff.*

386 CCCS Research. I, one course unit. Continuation of 385. *Staff.*

387 CCCS Research. S, one or two course units. Continuation of 386. *Staff.*

GRADUATE COURSES

561 Christianity, Learning, and Culture I. F. This course deals both critically and constructively with two broad areas, Christianity and learning and Christianity and culture. It introduces students to the variety of approaches to these questions in the Christian tradition with particular attention to

views in the Reformed tradition that have shaped the outlook at Calvin College. Prerequisite: admission to the Master of Arts in Christian Studies program. *Staff.*

562 Christianity, Learning, and Culture II. This course is a continuation of the fall course, concentrating on more specialized topics chosen after consultation of professors and students. Prerequisite: 561. *Staff.*

570 Workshop in Education. An intensive course for inservice teachers involving philosophy, theory, curriculum, and practice as they are brought to bear on an identified problem area of education. Although such courses may touch topics considered in regular courses, the primary focus of each workshop is on retraining teachers in newly recognized areas of need, in new materials, and in new approaches. Workshops may be offered by any department involved in teacher education. *Staff.*

590 Independent Study. F, I, S. *Staff.*

594 Thesis Prospectus. S. A course for reading, preliminary research, and writing, preparing students for 595. Supervised by the designated thesis advisor. Prerequisite: admission to the Master of Arts in Christian Studies program. *Staff.*

595 Thesis. S. Required by the Master of Arts in Christian Studies program and supervised by the designated thesis advisor. *Staff.*

JANUARY 1988 INTERIM

A catalog with the descriptions of all interim courses is available after October 1987.

W10 Christian Perspectives on Learning. *Staff.*

W11 Thinking About Thinking: Improving Your Style. *Ms. R. Stegeman.*

W14 Discovering Modern Israel. (Off-campus) *Mr. P. De Boer.*

W15 The Raj Quartet. *Mr. H. Slenk.*

W16 Business and Engineering Ethics. *Mr. R. De Jonge, Mr. G. Mellem.*

W17 Vergil's Aeneid: A Poem for Every Age. *Ms. K. Blok, Mr. K. Bratt, Mr. J. Breuker.*

W18 The Christian's Self-Image. *Mr. W. Joosse.*

- W19 **Mirror of the Soul: Stories and Films.** Ms. B. Carvill, Ms. M. Vander Goot.
- W20 **Nazi Germany.** Mr. C. Hegewald.
- W50 **Interdisciplinary Problem Solving.** Mr. R. Hoeksema, Mr. S. Vander Linde.
- W51 **Urban Education: Exploring Successful Programs in a Large Urban Setting.** (Off-campus) Mr. C. Mulder.
- W52 **Classical Arts in Italy.** (Off-campus) Ms. E. Boevé, Mr. E. Boevé.
- W53 **Russia and the Caucasus.** (Off-campus) Mr. C. Strikwerda.
- W54 **Cross-Cultural Teaching and Learning in the Dominican Republic.** (Off-campus) Ms. E. Greenway.
- W55 **Christianity and Sport.** Mr. M. Zuidema.
- W56 **Up From the Ashes: The German Church's Quest for Obedience After the Holocaust.** Ms. A. Smith-Von Osten.
- W57 **The Christian's Role in Development: Field Study in Haiti.** (Off-campus) Mr. G. Monsma.
- W58 **Wilderness Skiing in Yellowstone: A Geo-Thermal Experience.** (Off-campus) Mr. J. Clark, Mr. J. Gallagher.

Academic support

K. Blok (director), A. Emerson, J. Heerspink (tutor coordinator), E. Greydanus, B. Morrison, R. Stegeman, C. Van Eerden

ACADEMIC SUPPORT PROGRAM COURSES provide supplementary training and assistance in English, mathematics, and college-level study and reasoning skills. Class size and schedule are designed to give ample opportunity for individual instruction and personal conferences with instructors. All courses include training in study methods appropriate to the subject being studied.

Courses designed to review precollege work, designated with numbers below 010, do not carry credit for graduation. They are, however, recognized by the registrar and the Office of Financial Aid as registered units, which count toward full-time status and toward financial aid eligibility. Students normally register for a non-credit unit as one-fourth of their academic load, i.e., in addition to three credit courses. Students who do this as a condition of admission or probation are generally eligible for a fifth year of financial aid.

Interim courses carry credit and are graded. Non-credit courses appear on student transcripts with grades which do not carry honor points. However, failure to complete a prescribed ASP course with a passing grade may make a conditional or probational student subject to dismissal.

ASP courses are open to all students, with the permission of the instructor or the program director. Freshmen admitted on condition or returning on probation are normally required to enroll, so that instructors can provide academic counseling, course advising, and diagnostic testing. Other students can obtain any of these services or permission to take a review course by request at the ASP Office.

003 Review of Written English as Second Language. F, non-credit. This course provides extensive practice in written English for students whose native language is other than English. It includes study of grammar, vocabulary development, and instruction in writing. Students are assigned to this class on the basis of a placement test administered at the time of registration. *Staff.*

004 Precollege Mathematics for the Liberal Arts Student. F and S, non-credit. A review of high school mathematics, from fractions and decimals to basic algebra and geometry, with intensive practice in mechanics. Materials are taught with particular emphasis on development of mathematical thinking and problem solving. The course is designed to bring students whose mathematics background is weak to the level of competence needed for Mathematics 100, Economics 151, Astronomy 110, Biology 111, Chemistry 110, Physical Science 110, and other core courses. Not intended for students in mathematics-oriented majors. *Mr. A. Emerson, Ms. E. Greydanus.*

005 Precollege Mathematics for the Science Student. F and S, non-credit. This course is an intensive study in the mechanics of algebra, manipulation of algebraic expressions, and graphing. Materials are presented with an emphasis on development of problemsolving skills and mathematical reasoning. The course is intended as prepa-

ration for Mathematics 131 or 110 for students in mathematics-oriented majors whose previous experience in mathematics is inadequate. *Ms. C. Van Eerden.*

006 Methods and Motivation for College Study. F and S, non-credit, half course. This course presents methods of classroom and textbook study skills for college course work and considers problems of self-motivation and self-discipline, with reference both to principles of the Christian faith and to resources within the college community. Students are required to attend laboratory sessions for application of these principles to their other course work. Prerequisite: concurrent registration in a reading and lecture course such as a history, psychology, sociology, or religion course. *Ms. K. Blok, Ms. J. Heerspink, Ms. R. Stegeman.*

007 Precollege Grammar Review. F and S, non-credit, half course. This course, taught concurrently with certain sections of English 100, provides supplementary instruction and exercises in grammar and sentence writing. *Ms. B. Morrison.*

JANUARY 1988 INTERIM

A catalog with the descriptions of all interim courses is available after October 1987.

IDIS W11 Thinking About Thinking: Improving Your Style. *Ms. R. Stegeman.*

Art

Professors E. Boevé, H. Bonzelaar (chair), R. Jensen, C. S. Overvoorde
Associate Professors C. Huisman, C. Young

CALVIN'S ART OFFERINGS are within the framework of the liberal arts tradition. Four distinct programs of concentration are provided. Majors in studio art, art history, and art education lead to the Bachelors of Arts degree; a major earning the Bachelor of Fine Arts degree is also available. In addition the department offers minors in studio art, art education, and art history. Students must have earned a grade of at least C (2.0) in 205 before applying for admission to any concentration.

The ten-course major program in studio art is 205, 209, 210, 231, 232; 310 or 311; one from 320, 325, 350, or 360; and three intermediate or advanced studio courses. All studio art majors are required to participate in the senior exhibition during the spring semester of their senior year.

The nine-course major program in art history is 231, 232; six courses from 233, 235, 237, 238, 240, 241, and Classics 221; and an approved interim course in art history. Philosophy 208 is recommended. The six-course minor requires 231, 232, and four from 233, 235, 237, 238, 240, 241, or Classics 221.

The ten-and-a-half-course art education major for teachers, k-12, must include 205, 209, 215, 216, 231, 232, 310 or 311, 320 or 325, and 210 or 240. It is recommended that one of two remaining electives be an intermediate level media class. A second elective may be any art class except 151. The seven-course secondary teacher education minor is 205, 209, 215, 216, 231, 232, and one studio course from 310, 311, 320, 325, or 350. The elementary teacher education minor is 205, 209, 215, 231, 232, one course from 310, 311, 320 or 325, and one elective, which may be Philosophy 208. All art education majors are required to participate in the senior exhibition during the spring semester of their senior year. Directed teaching in art is available only during the spring semester. The advisor for this program is Ms. Helen Bonzelaar.

The Bachelor of Fine Arts (B.F.A.) program, which has a greater professional emphasis, is described on page 64. This program is not a preparation for teacher certification. The program advisor is Mr. Carl Huisman.

Both the B.A. and the B.F.A. programs can be planned to provide a graphic communications or photography emphasis.

The core requirements in the fine arts may be met by 151, any art history course, and, for students in elementary education programs, 215.

151 Introduction to Art. F and S, core. A survey of art, artists, and art criticism. Introductory studio activities are planned to acquaint the student with composition in art. Tests, papers, and audio-visual presentations, lectures, and readings related to the purpose and nature of art and art criticism. Not part of an art major program. *Staff.*

STUDIO COURSES

205 Design. F and S. A course that teaches two- and three-dimensional design through the use of basic art elements and principles. Materials fee. *Staff.*

209 Introduction to Drawing. F and S. Students are taught composition while being introduced to drawing media and to the basic proportions of the human figure. The course includes the historical development and terminology of drawing. Prerequisite: 205 or permission of the instructor. Materials fee. *Mr. C. S. Overvoorde.*

210 Intermediate Drawing.* F and S. A continuation of 209 further developing skills in the drawing media and the understanding of the proportion and volume of the human figure. Materials fee. Prerequisite: 209 or permission of the instructor. *Mr. R. Jensen, Mr. C. S. Overvoorde.*

215 Principles of Elementary Art Education. F and S, core for students in elementary education and recreation majors. The course introduces the nature of art and philosophy of art in education and includes methods and techniques for organizing and motivating art introduction on the elementary school level. The introduction to the art which man has produced illustrates the role of art over the ages. The course includes lectures, demonstrations, and art teaching experiences in the school. Research paper required. Not recommended for freshmen. *Ms. H. Bonzelaar.*

216 Principles of Secondary Art Education. F. The course focuses on the philoso-

phy and curriculum of art in education and on methods of teaching art in the secondary school. An exploration of media selected from enameling, jewelry-making, weaving, and batik. Prerequisites: 205 and 209. *Ms. H. Bonzelaar.*

309 Advanced Drawing.* F and S. A more advanced course in drawing providing an opportunity for students to search and experiment with new ideas and forms and to develop personal ideas and themes. Materials fee. Prerequisite: 210 or permission of the instructor. *Mr. C. Huisman, Mr. R. Jensen, Mr. C. S. Overvoorde.*

310 Introduction to Sculpture.* F and S. Students are introduced to the basic sculptural techniques of modeling, carving, mold-making, constructing, casting, and assembling through slide lectures and demonstrations. Each student selects one technique with its related materials for his primary concern during the semester. Assigned readings. Materials fee. Prerequisite: 209 or permission of the instructor.

311 Introduction to Ceramics.* F and S. An introduction to clay and glazes and their use. Emphasis is on hand-building techniques as a means of discovering the expressive and functional possibilities of the medium. Readings on the history of ceramics are required. Materials fee. Prerequisite: 209 or permission of the instructor. *Mr. C. Huisman.*

312 Intermediate Sculpture.* F and S. A continuation of 310 involving further study of sculptural techniques. Students execute a series of sculptures which are related in material or concept. They also study twentieth-century sculpture as it relates to their own productions. Materials fee. Prerequisite: 310 or permission of the instructor. *Staff.*

313 Intermediate Ceramics.* F and S. A continued exploration of the medium, including the use of the potter's wheel, emphasizing personal expression. Technical readings and batch formula testing of one or more glazes is required. Materials fee. Prerequisite: 311. *Mr. C. Huisman.*

314 Advanced Sculpture.* F and S. A continuation of 312 with a primary concern for developing each student's skills and individual expressive direction. Materials fee. Prerequisite: 312. *Staff.*

315 Advanced Ceramics.* F and S. A continuing study of the historical and technical aspects of ceramics and glazes allowing students to develop competency and personal expression through the study and use of stoneware and porcelain clay bodies. An historical or technical paper is required. Materials fee. Prerequisite: 313. *Mr. C. Huisman.*

320 Introduction to Printmaking.* F and S. An introduction to the four basic printmaking media—relief, intaglio, serigraphy, and lithography—through slide presentations, lectures, readings, and demonstrations. Each student chooses one basic medium to explore during the semester. Materials fee. Prerequisite: 210 or permission of the instructor. *Mr. C. S. Overvoorde.*

321 Intermediate Printmaking.* F and S. Continued exploration of the printmaking media with an emphasis on the development of visual ideas. The student may continue with the medium chosen during the first semester or experiment with another. Materials fee. Prerequisite: 320. *Mr. C. S. Overvoorde.*

322 Advanced Printmaking.* F and S. A further investigation of the printmaking media allowing students to develop the unique qualities of a particular medium or combination of media in relation to their own visual ideas. Materials fee. Prerequisite: 321. *Mr. C. S. Overvoorde.*

325 Introduction to Painting.* F and S. An introduction to the use of the paint medium, primarily using acrylic paints, emphasizing techniques, materials, and visual communication. The course includes a history of the media and of its technical development. Prerequisite: 210 or permission of the instructor. *Mr. C. S. Overvoorde.*

326 Intermediate Painting.* F and S. A further study of painting technique and its practice placing an emphasis on the relationship between concept and process. Students will study twentieth-century art in relation to their own production. Prerequisite: 325. *Mr. C. S. Overvoorde.*

327 Advanced Painting.* F and S. A continuation of 326 with a primary concern for developing each student's skills and individual approach to painting. Prerequisite: 326. *Mr. C. S. Overvoorde.*

350 Introduction to Graphics.* S. An introduction to graphic design and reproduction involving layout, typography, the use of photography, and illustration. The course introduces the student to the various printing processes. Projects include posters, brochures, pamphlets, and advertisements. Prerequisite: 210 or permission of the instructor. *Mr. R. Jensen.*

351 Intermediate Graphics.* S. A continuation of 350 with an emphasis on the production of illustrations and on the use of photography as they apply to specific problems of information and promotion. Prerequisite: 350. *Mr. R. Jensen.*

352 Advanced Graphics.* S. A continuation of 351 with a primary concern for developing each student's technical skills and individual approach in visual communication. Prerequisite: 351. *Mr. R. Jensen.*

360 Introduction to Photography.* F. An introduction to the basic techniques and processes of photography such as camera operation, black and white film processing, and printing. The history of photography and the various critical approaches to the medium form the context for the study of these techniques and processes. The medium is studied to discover individual development of expression and communication. Materials fee. Prerequisite: permission of the instructor; art majors must have completed 209. *Mr. R. Jensen.*

361 Intermediate Photography.* F. Continued exploration of the medium of photography in black and white with an emphasis on the development of an individual approach to photography. Basic color processes are introduced. Materials fee. Prerequisite: 360. *Mr. R. Jensen.*

362 Advanced Photography.* F. A continuation of 361 with a primary concern for developing each student's technical skills and individual approach in creative photography. Materials fee. Prerequisite: 361. *Mr. R. Jensen.*

390 Independent Study.* F, I, S. A student wishing to register for this course must have an introductory course in the medium and submit a written proposal to the chair for approval. *Staff.*

395 Seminar and Exhibition.* S. An opportunity from a Christian perspective to integrate the study of art history, aesthetics,

and the other liberal arts as well as the work in studio art. The seminar will include regular meetings with the faculty, writing a scholarly statement of the candidate's philosophy of art, a study of exhibitions in art galleries and museums, and the presentation of a one-man show. Prerequisite: senior status and a concentration in art. *Staff.*

The following art courses may be part of supplementary concentrations in journalism:

350 Introduction to Graphics.

351 Intermediate Graphics.

352 Advanced Graphics.

360 Introduction to Photography.

361 Intermediate Photography.

362 Advanced Photography.

ART HISTORY

231 An Introduction to the History of Art. F, core. A survey of the history of architecture, painting, and sculpture in Ancient, Medieval, and Renaissance times. A study of the character of Ancient art from Egypt through Rome is followed by a study of Medieval art from its beginning in the early days of the Christian era to its climax in the Gothic period of the thirteenth century. *Mr. E. Boevé, Ms. V. Bullock, Mr. C. Young.*

232 An Introduction to the History of Art. S, core. Continuation of 231. The study of painting from the fourteenth century to the present. *Mr. E. Boevé, Mr. C. Young.*

233 Medieval Art.* F, core. A study of the mosaics, frescoes, illuminated manuscripts, sculpture, and architecture of the Christian era from the Byzantine, Early Christian, Romanesque, and Gothic periods. Slide lectures and discussions; a research paper is required. Art history majors must complete 231 and 232 before taking this course. *Mr. E. Boevé.*

235 Renaissance Art.* F, core. A study of the painting, architecture, and sculpture of the fifteenth and sixteenth centuries, with a focus on the Renaissance of Italy. The course presents an historical survey of the art produced in the centers at Florence, Rome, and Venice from the late Gothic period to the High Renaissance, followed by a study of the Mannerism of the sixteenth century. Not offered 1987-88.

236 **History of Dutch Paintings.*** S, core. An historical survey of Dutch and Flemish painting. The art produced in Antwerp, Haarlem, Leiden, Utrecht, Amsterdam, Brussels, and Delft is studied, tracing the rise and development of specialists in genre, religious, still-life, portrait, and landscape painting. Emphasis is on the works of the major masters of the time. *Mr. C. S. Overvoorde.*

237 **Baroque Art History.*** S. A study of the stylistic variations of seventeenth- and eighteenth-century painting, sculpture, and architecture in Western Europe. The influence on the visual arts of cultural changes in national politics, philosophy, and art training following the Reformation and Counter-Reformation is addressed. Bernini, Caravaggio, Rubens, Velasquez, Rembrandt, Poussin, Watteau, Chardin, Reynolds, and Wren are among the major figures studied. A research paper is required. Not offered 1987-88.

238 **Origins of Modern Art: Nineteenth Century.*** F, core. A study of the sculpture, painting, and architecture of nineteenth-century Europe with an emphasis on the artistic developments of Northern Europe. The course traces the successive stylistic movements of Neo-Classicism, Romanticism, Realism, Impressionism, Symbolism, and Expressionism as they emerge against the background of the official Academy of Art. *Mr. C. Young.*

240 **History of Modern Painting and Architecture.*** S, core. A study of painting from Impressionism to the present with emphasis on Expressionism, Abstractionism, Non-Objectivism, and Abstract Expressionism. Architecture is studied in relation to programming, technology, materials, and site, beginning with Sullivan, Eiffel, and Gaudi, and continuing into the twentieth century with Wright, Le Corbusier, Mies van der Rohe, and Saarinen. Not offered 1987-88.

241 **Oriental Art.*** F, core. A study of the sculpture, painting, and architecture of Asia Minor, India, Indo-China, China, and Ja-

pan. Major Buddhist and Islamic periods and styles are covered. Slide lectures and discussions; a research paper is required. Art history majors must complete 231 and 232 before taking this course. Not offered 1987-88.

The following classics course may be included in art concentrations:

CLAS 221 **Graeco-Roman Art and Architecture.** *Mr. K. Bratt.*

GRADUATE COURSES

580 **Workshop in Methods, Materials, and Research in the Fine Arts.** The course will attempt to show the interrelationships of the fine arts—art, music, speech—and to establish a curricular basis for the teaching of the fine arts from a Christian perspective. *Staff.*

590 **Independent Study** (graduate). F, I, S. *Staff.*

595 **Graduate Project.** F, I, S, full or half course. The prospectus for each Master of Arts in Teaching project must be developed under the supervision of a faculty member and must be approved by the student's graduate advisor. *Staff.*

JANUARY 1988 INTERIM

A catalog with the descriptions of all interim courses is available after October 1987.

W10 **Art in Worship.** *Ms. H. Bonzelaar.*

W11 **Designing Space for Living.** *Mr. J. Szto.*

W50 **Watercolor Painting.** *Mr. C. S. Overvoorde.*

W52 **Artshapes: The Place of Art in Culture.** *Mr. C. Young.*

W53 **Ceramics: An Experience With Clay for the Non-Art Major.** *Mr. C. Huisman.*

W54 **An Adventure in Documentary Photography.** (Off-campus) *Mr. R. Jensen.*

IDIS W52 **Classical Arts in Italy.** (Off-campus) *Ms. E. Boevé, Mr. E. Boevé.*

Astronomy

Professors H. Van Till, J. Van Zytveld, (chair, Department of Physics)

STUDENTS INTERESTED in graduate work in astronomy should major in physics and should plan their program with the chair of the Physics Department. The sixteen-inch telescope in the observatory and portable telescopes are available for student use through the director of the observatory, Mr. Howard Van Till.

The physical science core requirement may be met by 110 or 201.

110 Planets, Stars, and Galaxies. F and S, core. A survey of the major astronomical objects, such as planets, stars, and galaxies; a study of their characteristics and their organization into a dynamic, structured universe; an investigation of the processes now occurring in the universe and the methods used to study them. The course includes a presentation of the evidence of the history and development of the universe, a description of cosmological models, and a discussion of possible Christian responses to them. Laboratory. Mr. H. Van Till.

201 Contemporary Astronomy. F, alternate years, core. An introduction to modern astronomy and astrophysics for students concentrating in the area of science and mathematics. Major topics include the na-

ture of stars and galaxies, the physical processes occurring in various celestial objects, and the current cosmological theories. Lectures, laboratory exercises, and observing projects. Prerequisites: Mathematics 161 and one course in college physics other than 110 or 111. Mr. H. Van Till.

390 Independent Study. F, I, S, half or full course. Independent readings and research in astronomy. Prerequisite: permission of the chair. Mr. H. Van Till.

JANUARY 1988 INTERIM

A catalog with the descriptions of all interim courses is available after October 1987.

W50 Creation and the Big-Bang. Mr. H. Van Till.

Biology

Professors J. Beebe (chair), H. Bouma, A. Bratt, A. Gebben, B. Klooster, B. Ten Broek, P. Tigchelaar, G. Van Harn, U. Zylstra
Associate Professors D. De Heer, R. Nyhof, R. Van Dragt

THE DEPARTMENT SERVES a number of functions—it provides several different courses which meet the college core requirement in natural science; it provides courses in several preprofessional programs; and it provides programs of concentration in areas of cell and molecular biology, organism biology, and environmental biology. A seminar program acquaints students with professionals working in a variety of areas in biology.

Students interested in a biology program of concentration with a particular emphasis should consult with appropriate advisors. A partial listing of staff interest areas includes: Mr. Beebe—plant molecular biology, plant development, and plant physiology; Mr. Bouma—animal cell and molecular biology, and human genetics; Mr. Bratt—entomology, animal diversity, marine biology, and environmental biology; Mr. De Heer—animal cell and molecular biology, and immunology; Mr. Gebben—plant ecology, plant taxonomy, and plant diversity; Ms. Klooster—microbiology, microbial genetics, and animal nutrition; Mr. Nyhof—animal physiology and pharmacology; Mr. Ten Broek—genetics, molecular genetics, and animal development; Mr. Tigchelaar—animal anatomy and neuro-anatomy and -physiology; Mr. Van Dragt—animal ecology, animal behavior, and evolutionary biology; Mr. Van Harn—animal physiology; Mr. Zylstra—cell biology and electron microscopy. Consult pages 60–76 for professional and preprofessional programs related to biology.

Prerequisite to a program of concentration in biology is a minimum average of C (2.0) in 131, 232, and 233 or approved equivalent courses.

The program of concentration is eight course units including 131, 232 (or 205–206), 233, 234, at least one investigative course, two additional 300-level courses, and 395. If 205–206 are included, 323 and 331 may not be included. Only one microbiology course may be counted in a program of concentration. Normally 131 and 232 are completed the first year, 233 and 234 the second year, and the 300-level courses during the third and fourth years. Biology 341 and 346 are offered in alternate years.

Required cognates include either one year of physics (221–222 or 126 and 225) or one year of mathematics (131–132 or 161–162), Chemistry 103–104 (or 113–114) plus a second year of chemistry (261–262 or 253–254) or a year of geology (151–152). Computer science is recommended. These cognates are minimum requirements. Students planning to do graduate work in cell and molecular biology are advised to complete both the physics and mathematics cognates and organic chemistry. Those planning careers in environmental biology should include the geology cognate and a course in statistics.

Prospective secondary teachers should complete the normal program of concentration with the addition of 361. Furthermore, one of the 300-level courses must be 311S, 341, 346, or 352. A minor in physical science is recommended and may be constituted of the cognates plus Geology 313. Education students are advised to complete the investigations course requirements (352, 353 or 354) during their junior year.

A secondary education teaching minor in biology consists of six course units of which 131, 232, 233, 234, and 361 are required.

Directed teaching in biology is available only during the spring semester. The advisor for biology teaching major and minor programs and for the MAT programs in science studies is Mr. Bernard Ten Broek. The elementary teacher education minor is 111 or 131, 114 or 233, 115 or 232, 116 or 234, and two approved interim or semester courses.

A group major in science and mathematics meets the needs of some students, particularly those in professional programs. These majors, however, normally are not appropriate for students planning to attend medical school or graduate school in biology. Group majors require a minimum of twelve courses in natural science

and mathematics, ten of which must be from two disciplines with no fewer than four from either, with the remaining two cognates chosen from a third discipline. At least two 300-level courses in one discipline must be included in the ten-course component of this group. The chairs of the departments involved must approve each program.

The core requirement in biology is met normally by 111, 114, 115, or 116. In some cases 131 may be appropriate for the core.

GENERAL COLLEGE COURSES

111 Biological Science. F and S. An introduction to the principles and concepts of biology, and the history and philosophy of biological thought for the general college student. Ecology, evolution, gene, and cell concepts are emphasized. Lectures and laboratories. Prerequisites: none, but Mathematics 100 and Physics 110 or equivalents are recommended. *Staff.*

113 Fundamentals of Soil Science. F. An introduction to soils from agricultural and ecological perspectives. Soil characteristics (texture, genesis, colloids, and plant nutrient composition) and soil classification information are presented as a basis for management and stewardship of soils. Lectures and laboratories. Prerequisites: one year of high school chemistry or equivalent. *Mr. A. Gebben.* Not offered in 1987-88.

114 Plant Science. S. An introduction to the principles and concepts of plant science for the general college student who has an interest in agriculture. Topics include crop plant structure and function, the effects of environmental factors on growth development and reproduction, crop production, crop management, and plant propagation. Representatives of the major crop groups in world agriculture are surveyed including those of the tropics. Lectures and laboratories. Prerequisites: none, but Mathematics 100 and Physics 110 or equivalents are recommended. *Mr. J. Beebe.*

115 Human Biology. F and S. A study of topics selected from human physiology, anatomy, development, genetics, and evolution. The topics are presented so the student learns the current concepts and parts of their historical development, develops an understanding of the nature of biological science, and relates the information to health and other disciplines. The laboratory emphasizes human anatomy, but also includes some physiology exercises. Lectures

and one three-hour laboratory each week. *Staff.*

116 Field Biology. F. The study of organisms in their natural environment. Emphasis is on concepts of ecology relevant to field biology, field and laboratory examination and identification of organisms, and the study of major ecosystems. Lectures and laboratory. Prerequisites: Mathematics 100 and Physics 110 or equivalents. *Mr. A. Bratt.*

205 Mammalian Anatomy. S. A study of the structure of mammalian organ systems, including some developmental anatomy and histology. The laboratory will include a dissection of a cat as a representative mammal and some study of histology. There will be special emphasis on human anatomy. Prerequisite: 131 or equivalent. *Staff.*

206 Mammalian Physiology. F. An introduction to the physiology of mammalian organisms. The function of the major systems is studied including circulation, respiration, excretion, muscle, nervous, and endocrine systems. The laboratory introduces basic physiological techniques. Prerequisites: 205 or 232, Chemistry 114, 253, or 261. *Mr. R. Nyhof.*

207 Introductory Microbiology. S. A study of the structure and function of microorganisms with emphasis on the bacteria. Three hours of lecture and two laboratory periods per week. Prerequisite: 131 and Chemistry 114 or 253 or equivalent. *Ms. B. Klooster.*

264 Hematology. S, half course. A study of the components of blood and the blood-forming tissues. Course topics include blood cell morphology, development, hemostasis, plasma composition, and methods of blood analysis. Prerequisites: 206 or 232, Chemistry 114, 253, or 261. *Staff.*

307 Microbiology of Infectious Diseases. F. A study of infectious diseases of human beings, including the biology of the micro-

organisms and methods of isolation and identification. This course consists of two three-hour lecture-laboratory periods per week. Only one microbiology course, either 307 or 336, can be included as part of a biology program of concentration. Prerequisites: One course in microbiology with lab. Ms. B. Klooster.

311S Field Botany. Summer only. Taxonomy and ecology of vascular plants as components of natural communities. On site examination of plants in bogs, dunes, marshes, meadows, forests, and swamps. Assigned readings, field trips, and laboratory. Offered as a summer course at Au Sable Trails Institute of Environmental Studies located near Mancelona, Michigan. Prerequisite: 114, 233, or an introductory botany course. Mr. A. Gebben.

The following interdisciplinary course may be included in concentrations in this department:

IDIS 210 **History of Science.** Staff.

PROGRAM OF CONCENTRATION COURSES

Basic Courses

131 Cell Biology and Genetics. F. The structure and function of prokaryotic and eukaryotic cells are examined at the molecular, subcellular, and cellular levels. Fundamental concepts of genetics are studied including Mendelian genetics and some molecular genetics. The laboratory consists of basic techniques in cell and molecular biology plus some genetic exercises. Staff.

232 Introduction to Zoology. S. A study of the diversity, structure, and function of selected animals. Organism and organ-tissue levels of organization are emphasized. Lectures and laboratory. Prerequisite: 131. Staff.

233 Introduction to Botany. F. An introductory course in the structure and function of vascular plants and the diversity of plants. Topics include photosynthesis, movement of water and solutes, mineral nutrition, anatomy, and development of roots, stems, leaves, flowers, seeds, and diversity in the fungi, algae, bryophytes, ferns, fern allies, and seed plants. Lectures and laboratory. Prerequisite: 131. Mr. J. Beebe.

234 Population and Community Biology. S. An introduction to the study of biological populations and communities and contemporary concepts of organic evolution. Lec-

tures and laboratories. Prerequisites: 232 and 233, Chemistry 113 or 104. Staff.

Advanced Courses

Prerequisites for all advanced courses include at least three basic courses in the program of concentration.

321 Genetics and Development.* F. A study of modern concepts of the gene and the analysis of progressive acquisition of specialized structures and functions by organisms and their components. The laboratory includes study of genetic and developmental phenomena of selected organisms. Lectures and laboratory. Prerequisites: 232 and Chemistry 114, 253, or 261. Mr. B. Ten Broek.

323 Comparative Vertebrate Anatomy.* F. A study of the comparative anatomy of vertebrates. Credit cannot be applied toward a biology major for both 205 and 323. Lectures and laboratory. Prerequisite: 232. Mr. P. Tigchelaar.

331 Comparative Animal Physiology.* S. A comparative study of basic functional mechanisms of animals. Credit cannot be applied toward a biology major for both 206 and 331. Lectures and laboratory. Prerequisites: 205 or 232; Chemistry 114, 253, or 261. Mr. R. Nyhof.

334 Immunology.* S, half course. An introduction to the study of immunology and serology. Course topics include innate, cellular, and humoral immunity, theories on the origin of antibody diversity, and the application of antigen-antibody specificity to serological assays. Prerequisites: 206 or 232; Chemistry 114, 253, or 261. Mr. D. De Heer.

336 General Microbiology.* F. A study of the structure and function of microorganisms with emphasis on the bacteria. Lecture and laboratory. Prerequisites: 206, 232, or 233; Chemistry 114, 253, or 261. Ms. B. Klooster.

341 Entomology.* F. Study of the biology of insects with emphasis on systematics. Lectures, laboratory, and field trips. Prerequisite: 234. Mr. A. Bratt. Not offered 1988-89.

346 Plant Taxonomy.* F. Identification, nomenclature, and classification of vascular plants. Lectures, laboratories, and field

trips. Prerequisite: 234. *Mr. A. Gebben*. Not offered in 1987-88.

Investigative Courses

Prerequisites for all investigative courses include at least three basic courses in the program of concentration.

352 Investigations in Physiological Ecology.* S. Laboratory, greenhouse, and field studies in physiological ecology of plants and animals. Experiment design as well as the collection, analysis, and presentation of data is emphasized. Topics include temperature regulation, energy exchange, water balance, and circadian rhythms. Prerequisites: 234 and Chemistry 113 or 104. *Mr. J. Beebe, Mr. R. Van Dragt*.

353 Investigations in Cell Biology.* S. Laboratory studies with discussions of cellular, organelle, and molecular topics in cell biology including the techniques for preparing and observing materials for studies of structure and function. Prerequisites: 232 and 233, Chemistry 114, 253 or 261. *Mr. D. De Heer, Mr. U. Zylstra*.

354 Investigations in Biology: Recombinant DNA Technology.* I. Laboratory investigations in a variety of techniques used in molecular genetics to study the composition and expression of DNA molecules under experimental conditions. Lectures and discussions are used to present the theoretical bases of these techniques and to describe uses of them in many other areas of basic and applied biology. Prerequisites: Biology 131 or equivalent (e.g. Biology W10 of Interim 1985), Chemistry 262, and permission of instructor. *Mr. B. Ten Broek*.

354 Investigations in Biology: The Physiology of Vascular Smooth Muscle.* F. The smooth muscle within the walls of blood vessels displays some unique functional characteristics. The function of this vascular smooth muscle is studied in lecture-seminar format and through laboratory investigations. Students will conduct individual research projects, write a paper and give an oral presentation of those projects, and discuss papers from the literature. Prerequisites: 206 or 232 and permission of the instructor. *Mr. R. Nyhof*. Offered only in 1987-88.

Seminar and Research Courses

361 Teaching Investigation in Biology.* F, half course. This course, intended for biolo-

gy majors and for minors in the secondary education program, is designed to train students in the teaching of laboratory experiences in biology. The student intern will be involved in the observation, preparation, writing, and teaching of laboratory exercises. Prerequisites: 234 or permission of the instructor. *Mr. B. Ten Broek*.

390 Independent Study. F, I, S. Prerequisite: approval of chair.

395 Biological Perspectives.* F. A study of the history of biology and its major ideas and concepts, a study of the biological literature, and a critical analysis of various philosophies of science. Prerequisite: senior status in biology program of concentration. *Staff*.

396 Perspectives in Medical Science. S. One course unit. A critical study of the historical and philosophical perspectives pertaining to the science and practice of medicine with particular emphasis on the methodology and results of medical research; study of the medical literature; and a critical analysis of selected representative ethical issues in medicine. Prerequisite: senior status in biology program of concentration or permission of the instructor. *Staff*.

GRADUATE COURSES

510 Basic Ideas in Contemporary Biology. A study of contemporary ideas in biology involving all of the organizational levels (the molecular, cellular, organ, organism, population, species, community, ecosystem). The laboratory work emphasizes the methods of inquiry of biology especially as they pertain to the concepts of biology which are being taught in the elementary and junior high schools. Prerequisites: at least three courses in biology including 111 or 131. *Staff*.

590 Independent Study (graduate). F, I, S. *Staff*.

595 Graduate Project. F, I, S, full or half course. The prospectus for each Master of Arts in Teaching project must be developed under the supervision of a faculty member and must be approved by the student's graduate advisor. *Staff*.

JANUARY 1988 INTERIM

A catalog with the descriptions of all interim courses is available after October 1987.

- W10 **Chemistry in the Kitchen.** Ms. B. Klooster.
- W11 **Plants and Civilization.** Mr. A. Gebben.
- W50 **Galapagos: World's End.** (Off-campus) Ms. C. Breuker, Mr. R. Van Dragt.
- W51 **Mammalian Histology.** Mr. R. Nyhof.
- W52 **The Biology of Health.** Mr. P. Tigchelaar.
- W53 **From Bloodstains to Tissue Typing: The Science of Personal Identification.** Mr. D. De Heer.
- W54 **Introduction to Parasitology.** Mr. A. Bratt.
- W55 **Plant Tissue Culture.** Mr. J. Beebe.
- W56 **Electron Microscopy Techniques.** Mr. H. Bouma.
- 354 **Investigations in Biology: Recombinant DNA Technology.** Mr. B. Ten Broek.

Business

THE BUSINESS ADMINISTRATION PROGRAM AT CALVIN COLLEGE is intended to prepare students for careers in business by balancing its business courses with the college's strong liberal arts core curriculum. Preparation for a business career is provided by meeting the general degree requirements and the business concentration in the Department of Economics and Business. This program requires a minimum of thirteen courses—the equivalent of forty-five semester hours in business, economics, and related mathematics and computer science courses. A full description of business major and cognate requirements is found on pages 108–113. This concentration along with the general graduation requirements acquaints students with the functions of the business firm and provides an understanding of the environment of business and human behavior, as well as an opportunity to develop one's personal Christian commitment and ethical sensitivity. After completion of the program students are prepared for entry-level positions in a variety of business occupations as well as a foundation for graduate study in business.

See the Department of Economics and Business for descriptions of course offerings.

Chemistry

Professors R. Blankespoor, R. De Kock, A. Leegwater, K. Piers (chair), †W. Van Doorne
 Associate Professors L. Louters, T. Zwiier
 Assistant Professor T. Gray

THE DEPARTMENT OFFERS programs of concentration for students interested in continuing their studies in graduate school, for those interested in a career as a chemist in private industry, and for those interested in teaching chemistry at the secondary school level. The requirements of these programs are described below.

Prerequisite to a concentration in chemistry is a minimum average of C (2.0) in 104 and in one course from 201, 253, or 261.

The major program for students who do not plan to pursue graduate study in chemistry is 103, 104, 261, 262, 317, 318, 396, and one course from 201, 323, or 330. Required cognates are Mathematics 161, 162, and a year of college physics.

For students preparing for graduate study in chemistry, the certification requirements of the American Chemical Society for professional training in chemistry may be met by completing 103, 104, 201, 261, 262, 317, 318, 329, 330, 395, 396, and two from 323, 325, or 326; Mathematics 161, 162, 261, and 231 or 255; Physics 126 and 225 or 123, 124, and 225. A reading knowledge of German or French is recommended. Computer Science 141 or 151 is recommended.

The nine-course chemistry major for teacher education students includes 103, 104, 201, 253-254 or 261-262, 304 or 317, 396, two courses in physics other than 110 or 112, and one chemistry course chosen from 318, 323, 325, 332, Interdisciplinary 210, or an approved interim course. The teaching minor is 103, 104, 253-254 or 261-262, 304 or 317, 396, and either a chemistry elective or an approved interim course.

The teaching group major in chemistry and physics consists of Chemistry 103-104 and 253-254 or 261-262; Physics 123, 124, 181, 182, 225, and 226; and two and a half courses in chemistry and/or physics which are approved by the chairs of the two departments. Recommended courses include Chemistry 201, 304 or 317, 396, Physics 280 and 382.

Students planning secondary majors or minors in chemistry should consult the department chair. Directed teaching in chemistry is available only during the spring semester.

The six-course minor concentration consists of 103, 104, 201, 253 or 261, 304 or 317, and one course from 254, 262, 318, 329, or an approved interim course.

A group major in science and mathematics meets the needs of some students, particularly those in professional programs. These majors are not appropriate for students who anticipate attending graduate school or who are in teacher education programs. Such group majors require twelve courses in the sciences and mathematics, ten of which must be from two departments with no fewer than four from either, with the remaining two courses chosen from a third department. At least two 300-level courses in one discipline must be included in the ten-course component of this group. The chairs of the three departments involved must approve each program of this type.

The physical science core may be met by 110.

100 Preliminary College Chemistry. F. A special course in the introductory concepts of chemistry that is open only to students who have not studied chemistry previously or who have departmental permission. Students who successfully complete this course and 102, Introductory Chemistry,

during the Interim may register for 104 during the spring semester. Laboratory. *Mr. L. Louters.*

102 Introductory Chemistry. I. A continuation of 100, including additional material needed to make the combination of 100

and this course equivalent to Chemistry 103. Laboratory. Prerequisite: successful completion of 100 or permission of the department. *Mr. L. Louters.*

103 General Chemistry. F. A study of the basic principles of chemistry, with emphasis on the laws of chemical combination, descriptive inorganic chemistry, thermochemistry, the gas, liquid, and solid states of matter, the periodic law, atomic structure and chemical bonding, and the physical properties of aqueous solutions. Laboratory. Prerequisite: one year of high school chemistry or permission of the department. *Staff.*

104 General Chemistry. S, core. A continuation of 103 with emphasis on kinetics, chemical equilibria involving gases, weak acids and bases, and slightly soluble solids, free energy changes, electrochemistry, transition metal chemistry, descriptive chemistry, and nuclear chemistry. Laboratory. Prerequisite: 103 or the equivalent. *Staff.*

110 Chemical Science. S, physical science core. A general course designed for the non-science major and the elementary education student. The course explores the role of chemistry and its resulting technologies in contemporary society. It emphasizes the nature of scientific investigation, some historical developments in chemical theory, chemical periodicity and reactivity, and our daily interaction with synthetic materials and chemicals. Laboratory. Prerequisite: Mathematics 100 or 121 or the equivalent, or passing the mathematics competency test. *Mr. L. Louters.*

113 Fundamentals of Chemistry. F. This course is the first of two required for the B.S.N. program. It also serves students in elementary education and certain paramedical programs needing a course in general chemistry. The fundamental concepts of chemical science are presented together with selected topics in descriptive chemistry. Emphasis is placed on the language of chemistry, the mole concept, chemical bonding, stoichiometry equilibrium processes, and periodicity. Laboratory. Prerequisite: one year of high school chemistry or permission of the department. *Mr. T. Gray.*

114 Introduction to Organic and Biochemistry. S, core. A study of the fundamental classes of organic compounds, their syntheses and reactions, followed by an in-

roduction to several biochemical topics including carbohydrates, lipids, proteins, enzymes, and nucleic acids. Laboratory. Prerequisite: 113. *Staff.*

201 Quantitative Analysis. F. A study of the theory and practice of commonly used chemical analytical techniques. Lecture material includes: the choice of analytical method, statistics and evaluation of analytical data, theory of simple and complex equilibria; theory of acid-base, precipitation, redox, and complexation reactions; titration curves; electrochemistry and cell potentials; and photometric analysis. Laboratory. Prerequisite: 104. *Mr. W. Van Doorne.*

253 Organo-Biochemistry. F. A study of organic compounds, reactions, and reaction mechanisms, emphasizing their biochemical significance. Laboratory. Prerequisite: 104. *Mr. A. Leegwater.*

254 Organo-Biochemistry. S. A continuation of 253, including a study of the structure and chemistry of biochemical macromolecules and intermediate metabolism. Laboratory. Prerequisite: 253. *Staff.*

261 Organic Chemistry. F. A detailed study of organic compounds, their synthesis and reactions, presented within the framework of modern physico-chemical theory, together with an introduction to modern methods of analysis and identification. Laboratory. Prerequisite: 104. *Mr. R. Blankespoor, Mr. K. Piers.*

262 Organic Chemistry. S. A continuation of 261. Laboratory. Prerequisite: 261. *Staff.*

295 Chemistry Seminar. F and S, no credit. A seminar devoted to an exploration of topics in current chemical research in both academic and industrial laboratories. Junior and senior chemistry majors must attend each semester; freshmen and sophomores intending to major in chemistry are encouraged to attend. *Staff.*

304 Physical Chemistry for the Biological Sciences. S. A survey of physical chemistry with emphasis on the laws of thermodynamics, physical equilibria, transport phenomena, and enzyme kinetics. Topics are treated with life science applications. A one-semester college level calculus course is recommended but not required. Laboratory. Prerequisite: 104. Offered alternate years. *Staff.*

317 Physical Chemistry. F. A study of chemical thermodynamics including a detailed look at the first, second, and third laws of thermodynamics, ideal and real gases, kinetic molecular theory and intermolecular forces, phase and reaction equilibria, and thermodynamics of solutions and mixtures. Laboratory. Prerequisites: 104, Mathematics 162, and a college physics course. *Mr. R. De Kock.*

318 Physical Chemistry. S. An introduction to quantum mechanics, statistical mechanics, reaction kinetics, and molecular reaction dynamics. Laboratory work includes a six-week project on a topic proposed by the instructor. Prerequisite: 317. *Staff.*

323 Biochemistry.* F. A study of proteins, carbohydrates, lipids, enzymes, co-enzymes, hormones, vitamins, metabolism, biosynthesis, and bioenergetics. Prerequisite: 254 or 262. *Mr. L. Louters.*

325 Advanced Organic Chemistry.* F. A study of selected topics in organic synthesis or physical organic chemistry. In the laboratory individual projects involving multi-step syntheses are carried out based upon procedures found in the literature. All compounds prepared are fully characterized using spectroscopic methods and other instrumental techniques. Prerequisites: 262 and 317. Offered alternate years. *Mr. K. Piers.*

326 Quantum Chemistry.* S. An introduction to the principles of quantum mechanics, with special emphasis on their application to a variety of problems in atomic and molecular structure and reaction mechanisms. Prerequisites: 317, Physics 225, and one course in mathematics beyond 162. Computer Science 141 or 151 is recommended. Offered alternate years. *Mr. R. De Kock.*

329 Spectroscopy and Instrumental Methods of Analysis.* S. A study of modern experimental methods with particular emphases on spectroscopic techniques. Methods covered include microwave, infrared, and visible spectroscopies, laser techniques, electron spectroscopies, NMR, mass spectroscopy, diffraction methods, and chromatography. The course emphasizes both the theoretical aspects and their application to fundamental physical measurements and to analytical procedures.

Prerequisite: 318 or concurrent registration. Laboratory. *Staff.*

330 Advanced Inorganic Chemistry.* S. A study in the chemistry of metals and non-metals with emphasis on symmetry, structure-property correlations, and periodicity. Types of compounds discussed are ionic solids, cluster and cage compounds, and organometallics. For coordination compounds the stereochemistry, reaction mechanisms, spectra, and magnetism are treated in detail. Laboratory. Prerequisite: 317. Not offered 1987-88.

390 Independent Study. F, I, S. Directed readings or projects. Admission by permission of the chair and instructor under whom the work will be done. *Staff.*

395 Research-Seminar. F, I, S, full or half course. Library and laboratory research on an assigned problem. In addition, each student will be required to present a seminar in the departmental seminar series. Open to juniors and seniors by permission of the chair and instructor under whom the work will be done. *Staff.*

396 Perspectives in Chemistry. S, quarter course. Reflections on the discipline of chemistry: its history, methodology, philosophy, curricular structure, key ideas, and concepts; its role as a central science in technology and society; the responsibilities of its practitioners in industry and in academic and research institutions. Prerequisite: junior or senior status in a chemistry program of concentration. *Staff.*

OFF-CAMPUS OFFERING

332 Environmental Chemistry. Principles and analysis of chemical movement and distribution in natural environments. Sampling and analytical methods are included for water, soil, and air. Work conducted both in natural habitats and the laboratory. Prerequisites: one year of general chemistry and one semester of either biochemistry or organic chemistry. Offered in conjunction with the Au Sable Institute. See page 157.

GRADUATE COURSES

590 Independent Study. F, I, S. *Staff.*

595 Graduate Project. F, I, S, full or half course. The prospectus for each Master of Arts in Teaching project must be developed under the supervision of a faculty member

and must be approved by the student's graduate advisor. *Staff.*

JANUARY 1988 INTERIM

A catalog with the descriptions of all interim courses is available after October 1987.

W50 An Introduction to Meteorology.
Mr. R. Blankespoor.

W51 Quantum Chemistry by Microcomputer. *Mr. R. De Kock.*

W52 Principles of Protein Structure (Tinkertoys for Biochemists). *Mr. T. Gray.*

102 Introductory Chemistry. *Mr. L. Louters.*

Classical languages

Professors K. Bratt, G. Harris (chair), R. Wevers, M. Williams

THE DEPARTMENT OFFERS FOUR PROGRAMS OF CONCENTRATION: in Classical Civilization, in Classical Languages, in the Greek language, and in the Latin language. The program in Classical Civilization or Classical Studies combines some study of one of the languages with a broad study in the culture and civilization of the Greeks and Romans and of the later influence of that culture. The Classical Languages program is designed for graduate studies, the Greek language program is for preseminarians and for any others wishing to concentrate in Greek language and literature, and the Latin language program is for those intending to teach the language at the secondary school level and for any others wishing to concentrate in Latin language and literature. Modified concentrations are available to other students.

Courses not normally scheduled may be offered to qualified students on an individual basis so that specific concentrations may be completed.

The Classical Civilization program consists of ten courses and one interim, all selected in consultation with a member of the department. The course requirements, besides the approved interim course, include: two courses, at the 200 level or above, in Greek language (one of which may be in New Testament Greek) or in Latin language; Classics 211, 221, 231; Philosophy 251; either Classics 311 and 312 or History 301 and 302; and two courses selected from: Art 231, History 201, History 302 (if not elected above), History 303, Philosophy 312, Political Science 305, Religion 302, Religion 312, Communication Arts and Sciences 325, Communication Arts and Sciences 317, or additional courses (at 200 level or above) in the selected language.

The Classical Languages program requires fourteen courses and one interim, including six elementary or intermediate courses chosen from: Latin 201-202, Greek 101-102, 201-202, 203-204; six intermediate or advanced courses selected from: Latin 205-206, 301-302, 303-304; Greek 201-202, 203-204, 301-302; and two culture and civilization courses selected from: Classics 211, 221, 231, 311, 312, or History 301. Reading competence in French and German is strongly recommended.

The Greek language program requires six courses selected from: Greek 101–102, 201–202, 203–204, 205, 206, 301 or 302; and two additional courses selected either from this group or from Classics 211, 221, 231, 311, 312, or History 301. At least one course must be a 300-level Greek language course. The recommended preseminarian program is: Greek 101–102, 201–202 or 203–204, 205–206, History 301 or Classics 211, and a 300-level Greek language course.

The recommended Latin program, which prepares for a secondary teaching certificate, may include Latin 101–102, 201–202, 205–206, 301–302, 303–304 and three Classics courses or approved interim courses. The specific nine-course program depends on the student's high school preparation. Directed teaching is available only during the spring semester.

The Greek minor requires five language courses and one Classics course. Not more than one language course may be in New Testament Greek. The Latin minor, which also fulfills the minimum requirements for state teacher certification, requires five language courses beyond the 100 level and one Classics course. The specific courses for either the Greek or Latin minor should be chosen in consultation with a department member.

Students who have completed one year of high school Latin should enroll in Latin 101; two years in 201 (except that the unusually well qualified student, even with only two years of high school Latin, may with department approval enroll directly in Latin 205 and so meet the graduation requirement for language with one college course); those with three years, in either 202 or 205; more than three years, in 205 or 206. Those who have completed one year of college Latin should enroll in 201.

The core requirements in the fine arts may be met by Greek 202, 204, 301, 302, any Latin course numbered 202 through 304, Classics 221, 231, and designated interims. The "foreign culture" requirement of certain designated professional degree programs may be met by Classics 211. Classics 231, Classical Mythology, may be part of the teaching minor in the academic study of religions.

CLASSICS

211 Graeco-Roman Culture. S. A survey of Graeco-Roman culture as reflected in various art forms, but with the main emphasis upon works of literature which express distinctive features of the mind of the Greeks and Romans. Slides, films, and other illustrative materials will be used, and students will be expected to read extensively in anthologies of Greek and Roman literature. No knowledge of Greek or Latin will be required. Satisfies the "foreign culture" option of certain preprofessional programs, and can be a substitute for ancient history in the seminary entrance requirements. *Mr. K. Bratt.*

221 Graeco-Roman Art and Architecture. F, core. A study of the major monuments and sites of ancient Greek and Roman civilization from the Bronze Age to the late Empire. Primary attention is devoted to the

origins and development of Greek sculpture, painting, and architecture, and to their transformation in the arts of Rome. Ancient literary sources supplement the study of physical remains in this investigation of Graeco-Roman culture. Slide lectures, written reports. *Mr. K. Bratt.*

231 Classical Mythology. F, core. A study of the major themes in Classical mythology via the literature and art of Greece and Rome. Major literary sources are read in translation and supplemented by slides of Greek and Roman mythological art. Attention is given to various interpretations of the myths and their influence on Western culture. Lectures, discussions, and written reports. *Mr. M. Williams.*

311 Greek History.* F. The political, social, and cultural history of Ancient Greece from the Bronze Age to the beginnings of Christianity. Special attention is given to

such problems as the emergence of the city-state, the civilization of the Periclean period, the great intellectual movements of the fourth century B.C., and the features of Hellenistic civilization which exerted a shaping influence on Roman society and early Christianity. This course may substitute for History 301. *Mr. G. Harris*. Not offered 1987-88.

312 **Roman History.*** S. The history of Rome from the foundation of the city to A.D. 565, the death of Justinian. The emphasis is on the development of the constitution and its effect upon, and how in turn it was affected by, the expansion of Rome over the Mediterranean. Economic, social, and literary history are studied in their relation to the political. The decline of paganism and the rise of Christianity are viewed in their relation to each other. This course may substitute for History 301 in history concentrations. *Staff*. Not offered 1987-88.

GREEK

101 **Elementary Greek.** F. A beginning study of classical Greek using Groten and Finn, *A Basic Course in Reading Attic Greek*. *Mr. G. Harris*.

102 **Elementary Greek.** S. Continuation of 101. Completion of the text and the reading of selected prose passages. *Staff*.

201 **Intermediate Greek A.** F. Readings in the early dialogues of Plato. Special emphasis is put on gaining reading proficiency in Greek prose. Prerequisite: 102. *Staff*. Not offered 1987-88.

202 **Intermediate Greek A.** S, core. Readings in Homer's *Iliad*. Attention is given to the characteristics of Homer's world. Prerequisite: 201 or 203. *Staff*. Not offered 1987-88.

203 **Intermediate Greek B.** F. Readings in Herodotus. Special emphasis is put on gaining reading proficiency in Greek prose, with some attention to the characteristics of Herodotus as historian in relation to Thucydides. Prerequisite: 102. *Mr. R. Wevers*.

204 **Intermediate Greek B.** S, core. Readings in the Attic orators and Plato's *Apology*. Attention is given to certain matters of style. The readings are viewed in relation to, and as documentation for, the history of

fourth-century Athens. Prerequisite: 201 or 203. *Mr. R. Wevers*.

205 **New Testament Greek: The Gospels.** F. The Gospel according to St. Mark is read with some notice of the parallel passages in the other Gospels. A study is made of the special features of Hellenistic Greek. The significance of lexical and syntactical detail for the interpretation of the text is emphasized. Prerequisite: 102. *Mr. K. Bratt*.

206 **New Testament Greek: The Epistles.** S. A study is made of some of the Pauline Epistles. Prerequisite: 205. *Staff*.

301 **Plato's Republic.*** S, core. The Greek text is studied. This course aims at an understanding and evaluation of Plato's views especially as presented in the *Republic*. Prerequisite: four courses in Greek or permission of instructor. *Mr. G. Harris*.

302 **Greek Drama.*** S, core. A reading of selected Greek tragedies with attention given to their poetic and dramatic qualities. Those matters of Greek culture, literary tradition, and history which help to understand the plays are noted. Assigned outside reading in other Greek plays. Prerequisite: 301. *Mr. G. Harris*. Not offered 1987-88.

LATIN

101 **Elementary Latin.** F. For students who had only one unit of high school Latin or who have had no Latin. Emphasis is placed on the essentials of grammar and a basic vocabulary with constant comparison to English. *Sententiae* from the principal Latin authors will be read. *Mr. K. Bratt*.

102 **Elementary Latin.** S. A continuation of 101. Emphasis is placed on grammar and the early reading of longer selections of authentic Latin dealing with Roman history and culture. Prerequisite: 101 or its equivalent. *Staff*.

201 **Intermediate Latin.** F. A thorough review of the essentials of grammar will accompany the reading of selected Latin prose. Prerequisite: two years of high school Latin or two courses of college Latin. *Mr. M. Williams*.

202 **Intermediate Latin.** S, core. A study of the *Aeneid* and of selected poetry and prose in Latin. Prerequisite: three years of high school Latin or three courses of college Latin. *Staff*.

205 **Latin of the Late Republic and Early Empire.** F, core. Readings in the prose and poetry of the major writers, selected to survey the development of classical Latin literature and to serve as an introduction to the advanced genre courses. Prerequisite: 202, three years of high school Latin, or permission of the instructor. *Mr. G. Harris.*

206 **Late Latin Literature.** S, core. Readings in the prose and poetry of Latin literature from the Late Empire to the early Medieval period in both Christian and non-Christian authors. Prerequisite: 202, 205, or permission of the instructor. *Mr. R. Wevers.*

301 **Latin Epistolary Literature.** F, core. Readings from the letters of Cicero and Pliny. The letters are read as social and political documentation for issues, movements, and conditions of the Late Republic and Early Empire and as commentaries on the careers and personalities of their authors. Prerequisite: 205 or 206. Offered in alternate years. *Mr. R. Wevers.*

302 **Latin Philosophical Literature.** S, core. Texts selected from such authors as Lucretius, Cicero, Seneca, Lactantius, and St. Augustine to illustrate the Latin contribution to Western culture, particularly in ethical and social thought. Prerequisite: 205 or 206. Offered in alternate years. *Staff.*

303 **Latin Epic and Lyric Poetry.** S, core. Selected readings from such authors as Vergil, Catullus, Horace, and from the elegiac poets, with some attention to metrics and the Greek heritage in epic and lyric. Prerequisite: 205 or 206. Offered in alternate years. *Mr. K. Bratt.* Not offered 1987-88.

304 **Latin Historical Literature.** S, core. Intensive reading in the major Roman historians of the Late Republic and Early Empire. Emphasis is placed upon the proper interpretation of these writers as sources for our understanding of the political movements of the period. Collateral reading and reports. Prerequisite: 205 or 206. Offered in alternate years. *Staff.* Not offered 1987-88.

JANUARY 1988 INTERIM

A catalog with the descriptions of all interim courses is available after October 1987.

W50 **Review Greek.** *Mr. R. Wevers.*

W51 **The Idolatry of the State: Ancient and Modern.** *Mr. G. Harris.*

IDIS W17 **Vergil's Aeneid: A Poem for Every Age.** *Ms. K. Blok, Mr. K. Bratt, Mr. J. Breuker.*

Communication arts and sciences

Professors *E. Boevé, R. Bytwerk, A. Davis, Q. Schultze, M. Vande Guchte
Associate Professors P. Blom, D. Holquist (chair), J. Korf

PREREQUISITE TO A MAJOR is completion of two regular courses, one of which must be 100, 200, 203, 214, or 240; and a minimum average of C (2.0) in all departmental courses completed. In addition to a general major, the department offers majors with emphases in theater, telecommunications, and teacher education. Not more than one course unit of 220 may be applied to a major.

The general major requires 200, 203, 217, 230 or 253, 305 or 325, and four

other CAS courses, one of which must be an interim. A general CAS minor consists of 200, 203 or 217, 230 or 253, 305 or 325, and two other CAS courses. Recommended cognates for students interested in oral interpretation and drama include aesthetics, history of art, introduction to musical literature, Shakespeare, and non-Shakespearean drama of the Renaissance; for those interested in communications and rhetoric, cognate courses are chosen with the student's advisor.

Students wishing an emphasis in the theater program should take 200, 203, 217, 219; 317, an approved interim course, and three courses from 304, 318, 319, and 220. An approved independent study is also advised.

Students wishing an emphasis in telecommunications—broadcasting, cable, and satellites—should take 150, 200 (or 100 and 110), 203 or 219, 230, 251, 252, at least two of the following: 253, 305, 325, an approved interim course, and an elective approved by the advisor. A joint theater/telecommunications emphasis consists of 200 (or 100 and 110), 203, 217, 219, 230, 251, 253 or 305, 317 or 318 (with the permission of the instructor), 319 or 325, and an approved interim.

The secondary school teaching major consists of 200, 203, 211, 217, 219, 230, 253, plus two other courses. Directed teaching in communication arts and sciences is available only in the spring semester. The elementary school teaching major includes 203, 214, 215, 217, 219, 253, plus three other courses. The six-and-one-half course secondary school teaching minor includes 200, 203, 211, 217, 219, 253, plus a half-course elective. The elementary teacher education minor requires 214 instead of 100 for the core, 203, 215, 217, 253, and one elective. Only one course credit of 220 may be counted toward a concentration.

Students wishing an emphasis in communications disorders should take: 100 or 214, 110, 150, 203, 215, 216, 307, 308, and an approved CAS interim. The requirements for a Bachelor of Science in Communication Disorders are given on page 71.

The group minor in journalism, a program involving the department, is described under the Department of English and may supplement majors in the department.

The core requirements in spoken rhetoric may be met by 100; 200; 214, if the student is in an elementary education program; 240; or by an examination, which presupposes formal and practical speech training in high school. The fine arts core requirement may be met by 203, 217, 253, 304, 317, 318, and 325.

COMMUNICATION AND RHETORIC

100 Fundamentals of Oral Rhetoric. F and S, half course, core. The primary aim of this course is to increase competence in oral communication. The major emphasis is on the composition and delivery of speeches. Students in elementary teacher education programs should take 214. *Staff.*

150 Introduction to Communication Theory. F. A survey of the ways human communication is understood. Theories from the humanities and social sciences are compared and evaluated. Topics considered in-

clude the ways in which communication, primarily language, influences our views of ourselves, others, the larger world, and God. *Mr. R. Bytwerk.*

200 Advanced Oral Rhetoric. F and S, core. Composition and presentation of types of speeches, participation in various types of discussion, readings in rhetorical theory, and criticism of selected contemporary speeches. Prerequisite: 100 or equivalent. *Mr. A. Davis.*

211 Debate. F, half course. The forms and procedures of academic debate. Knowledge

and competence in debating, judging, and coaching are course goals. Designed for debaters and prospective coaches. *Staff.*

240 Group Communication. F and S, core. Small group communication theory and practice. Students analyze case studies and participate in group projects leading to class presentations. Topics include listening, discussion, argumentation, consensus, organization, decision-making, leadership, and persuasion. Standards for ethical conduct are considered throughout the course. *Mr. R. Bytwerk, Mr. Q. Schultze.*

325 Rhetorical Theory and Criticism. S, core. The theory and criticism of rhetoric from antiquity to the present. Classical and modern theorists are studied. Methods of rhetorical criticism are discussed and applied. Prerequisite: 200, or permission of the instructor. *Mr. R. Bytwerk.* Not offered 1987-88.

TELECOMMUNICATIONS

230 Mass Communication. F and S. An analysis of the major mass media institutions, including magazines, newspapers, radio, television, cable, and satellites. Topics include regulation, the economics of the media, social and cultural impacts, the role of advertising and public relations, and future developments. The media in the United States are compared with those of other nations, including Canada. This course is both for students interested in media-related professions and for students wishing to deepen their understanding of the operation and effects of the media. *Ms. P. Blom.*

251 Technical Aspects of Video. F and S. An introduction to the theory and practice of video program composition and production. Various program formats are discussed and evaluated in light of particular communication principles and needs. Students gain extensive experience with portable and stationary video cameras, recorders, switchers, and related technologies. Lighting, audio recording, and mixing principles are analyzed and demonstrated. *Mr. J. Korf.*

252 Communication Ethics. S. The moral and ethical dimensions of human communication with special reference to mass communication. Comparisons are made of the major standards of conduct used to make judgments about appropriate communication behavior. Public vs. private

communication dilemmas are discussed. The various kinds of lies and rationalizations are analyzed. Responsibilities in mass communication practice, including public relations, reporting, advertising, and editorializing are discussed in the context of case studies. Prerequisites: Philosophy 205 or Religion 311, or consent of the instructor. *Mr. Q. Schultze.*

253 Television and the Contemporary Mind.* F and S, core. The study of various important cultural and artistic forms in television drama. The first section of the course is a critical study of selected examples of the finest drama produced for public and commercial television in Britain and the U.S. Students use traditional and contemporary criteria to interpret, examine, and evaluate programs. The second section of the course is an examination from a Christian perspective of the dominant myths and themes in popular drama, including soap operas, detective shows, westerns, situation comedies, and adventure series. Topics include: the relationship between program content and social values, assumptions about human nature, and television's treatment of God and religion. *Mr. Q. Schultze.*

305 Persuasion and Propaganda.* S. The theory and practice of persuasive communication. Topics include theory and research in persuasion, improving personal persuasive abilities, recognizing and resisting persuasive strategies, and the role of propaganda in modern society. Examples for analysis are taken from advertising, religion, sales, political campaigns, and democratic and totalitarian propaganda. *Mr. R. Bytwerk.*

346 Internship in Communication. Summer. Students work twenty hours per week for two summer sessions under an employer supervisor and participate in a series of internship seminars on campus. Students must apply theoretical, ethical, and technical aspects of their college education to specific communication situations. Personal journals, a research paper, and seminar participation are required. Prerequisite: permission of the instructor. *Staff.*

SPEECH EDUCATION AND DISORDERS

110 Voice and Articulation. F, half course. The study and improvement of

voice usage and articulation. The students are assisted in developing effective use of voice and articulation through evaluation, study, and practice. *Mr. M. Vande Guchte.*

214 Speech for the Elementary Teacher. F and S, core. Designed to familiarize the prospective teacher with the speech arts used in the elementary classroom and to increase competence in oral communication. Student presentations. *Mr. J. Korf.*

215 Introduction to Communication Disorders. F. A study of the child's speech development and the types of speech defects that may occur. The course is designed to help the classroom teacher understand and correct minor defects and to handle speech improvement in the classroom. The course will also serve to introduce the student to the profession of speech pathology and audiology. *Mr. M. Vande Guchte.*

216 Phonetics. S, half course. A study of phonetic theories and the use of International Phonetic Alphabet symbols in analyzing, categorizing, and transcribing the sounds of American English. The course emphasizes understanding of the processes involved in the production of specific phonemes. *Mr. M. Vande Guchte.*

307 Structures and Functions of the Speech Mechanisms. S. A study of the anatomy and physiology of the speech mechanisms, the involvement of the nervous system in the control of speech, and the acoustic characteristics of speech production. Prerequisite: 215 or permission of the instructor. *Mr. M. Vande Guchte.*

308 Basic Audiology and Audiometry. S. A study of the fundamental aspects of hearing: the physics of sound, the anatomy of the ear, the nature of hearing and hearing impairment, and the testing of hearing. Prerequisite: permission of instructor. *Mr. M. Vande Guchte.* Not offered 1987-88.

THEATER AND ORAL INTERPRETATION

203 Interpretive Reading. F and S, core. A study of the history, principles, and techniques of interpretation. Analysis and oral interpretation of prose and poetry. *Mr. D. Holquist.*

217 An Introduction to the Theater. F, core. An introduction to the study of theater. Lectures focus on forms, genres, per-

formance space, and the artistic principles of production. Selected readings, discussions, attendance at plays, and critiques of performances are required. *Ms. E. Boevé.*

219 Principles of Dramatic Productions. S. A study of the theories and principles of acting and directing. Students will read plays, attend lectures and demonstrations, and be required to demonstrate their competence in acting and directing. Prerequisite: 217 or permission of the instructor. *Mr. J. Korf.*

220 Thespian Productions. Quarter course. Membership in the Thespian group is limited and is determined annually by tryout. The members will be given training in the various practical aspects of the production of drama. Students may participate more than one year but not more than two course units of credit in Thespians and applied music may be applied to the minimum requirements for graduation. *Ms. P. Blom, Ms. E. Boevé.*

304 Advanced Interpretation. S, core. Continuation of 203. Application of its principles to the novel and drama. Intensive study in preparation for a reading program. Prerequisite: 203. *Staff.*

317 History of Theater and Drama.* S, core. A historical and analytical study of theater and drama from its origins to the nineteenth century. *Ms. E. Boevé.* Not offered 1987-88.

318 History of Theater and Drama.* F, core. A continuation of 317. A historical and analytical study of theater and drama from the nineteenth century to the present. *Ms. E. Boevé.*

319 Design for Theater. F. A study of the theories and principles of theater design. This course builds on the principles taught in 219 and includes lectures, demonstrations, reading of plays, and the development of competence in set, light, costume, make-up, property, and publicity design. Prerequisites: 217, 219, or permission of the instructor. *Mr. J. Korf.*

390 Independent Study. F, I, S. Independent study of topics of interest to particular students, under the supervision of a member of the department. Prerequisite: permission of the department. *Staff.*

395 Seminar: Tennessee Williams in Performance. S. A study of the plays of Ten-

nessee Williams including such elements as themes, language, structure, and characterization. Student research will culminate in Lab Theatre productions of Williams' work. Prerequisite: permission of the department. Ms. P. Blom.

JANUARY 1988 INTERIM

A catalog with the descriptions of all interim courses is available after October 1987.

W10 **Readers Theatre.** Mr. D. Holquist.

W11 **Make-up for Theatre and Television.** Mr. J. Korf.

W12 **The News of the World.** Mr. R. Bytwerk.

W13 **The Media Elite.** Ms. P. Blom, Mr. Q. Schultze.

IDIS W52 **Classical Arts in Italy.** (Off-campus) Ms. E. Boevé, Mr. E. Boevé.

Computer science

Professors J. Bradley, D. Brink, T. Jager (chair, Department of Mathematics and Computer Science), D. Laverell, S. Leestma, L. Nyhoff
Assistant Professor V. Nyhoff
Instructor P. Prins

A MAJOR PROGRAM OF CONCENTRATION in computer science consists of 151, 152, 245, 253, 392, and four additional courses selected from 283, 335, 353, 355, 363, 373, 375, 383, or an approved interim. The four additional courses must include a pair from the following areas of emphasis: computer science theory—353 and 355, databases—353 and 363, hardware—283 and 383, or systems programming—373 and 375. The required mathematics cognate for the major program is 155, 161, 162, and 255. Computer Science 141 and Mathematics 261 are recommended. A minimum grade of C (2.0) in a 200-level computer science course is required for admission to a major program of concentration. A computer science minor consists of 151, 152, 245, 253, 392, and two additional courses selected from 283, 335, 353, 355, 363, 373, 375, 383, or an approved interim. Mathematics 155 is a required cognate. A secondary education major and minor are also available. The advisor for these programs is Mr. Paul Boonstra. Group concentrations involving mathematics, physics, business, and other disciplines are available.

100 Introduction to Computing. F and S. Intended for the student with no computer experience who desires to obtain a general knowledge of computers. An overview of what computers are, how they are used, and the role of computers in modern society. Students will learn elementary programming using BASIC. *Staff.*

121 Introduction to Business Computing. F and S. An overview of computer informa-

tion systems. This survey course introduces computer hardware, software, procedures, and systems and their applications in business. The fundamentals of computer problem solving and programming in a high level language (BASIC) are discussed and applied. *Staff.*

131 COBOL Programming with Business Applications. S. An introduction to problem-solving methods and algorithm devel-

opment, the design, coding, debugging, testing, and documentation of programs using techniques of good programming style. Structured programming using COBOL is emphasized. Applications are taken from business data processing. Prerequisite: two years of high school mathematics. *Staff.*

141 Introduction to Computing with FORTRAN. F and S, half course. An introduction to computer programming using FORTRAN-77. Emphasis is on learning the language with consideration of problem-solving methods and algorithm development as time permits. Prerequisite: Mathematics 132 or 161, which may be taken concurrently. *Staff.*

151 Computer Programming I. F and S. An introduction to problem-solving methods and algorithm development, the design, coding, debugging, testing, and documentation of programs using techniques of good programming style. Structured programming using the Pascal language will be emphasized. Prerequisites: two years of high school algebra, or permission of the instructor. *Staff.*

152 Computer Programming II. F and S. Continuation of 151. Advanced programming features and their implementation in Pascal. Introduction to elementary data structures. Continued emphasis on good programming style. Prerequisites: 151 and Mathematics 155 (previously 151) or permission of the instructor. *Staff.*

245 Computer Organization and Assembly Language Programming. F. A study of the structure and organization of the basic components of a computer system. Topics covered include binary representation of data, arithmetic and logical operations, principal machine instruction types and their addressing schemes, formats, and assembly language programming. Prerequisite: Mathematics 132 or 161. *Mr. D. Laverell.*

253 Programming Language Concepts. S. Principles and programming styles that govern the design and implementation of contemporary programming languages. Topics covered include language syntax, processors, representations, and styles. Several different languages will be introduced and examined in the light of the above principles. Prerequisite: 152. *Mr. J. Bradley.*

283 Introduction to Digital Electronics. F. An introduction to digital electronics for students with little or no background in physics or electronics. Topics include: basic circuit elements and laboratory instruments, discrete circuits for digital functions, Boolean algebra for circuit design, logic circuit analysis and design, and integrated circuits. Not intended for students who have taken or plan to take Physics 280 or Engineering 204 and 284. Laboratory. (Also listed as Physics 285.) Prerequisite: Mathematics 132 or 161. *Staff.*

335 Numerical Analysis.* S. Analysis of errors in numerical methods, real roots of equations, approximations using polynomials, numerical integration, applications to differential equations, Lagrange and spline interpolation, least squares approximations, orthogonal polynomials and applications. (Also listed as Mathematics 335.) Prerequisites: 141 or 151 and Mathematics 255, or permission of the instructor. *Staff.*

353 Data Structures and Algorithms. F. This course is a systematic study of algorithms, their complexity, and their application to fundamental data structures such as graphs and trees. The limitations of algorithms are also treated. Prerequisites: 152 and completion of or concurrent registration in Mathematics 255. *Mr. J. Bradley.*

355 Theory of Computation. S. Topics from the theory of computation including finite state concepts, formal languages and grammars, computability, computational complexity. Prerequisite: 353 or Mathematics 351. *Staff.*

363 Database Management Systems.* S. An introduction to the structures necessary to implement a database management system. Topics include data models (including hierarchical, network, and relational data models), normal forms for data relations, data description languages, query facilities. An introduction to existing data base management systems is given. Prerequisite: 253. *Mr. P. Prins.*

373 Operating Systems.* F. An introduction to the major concepts of operating systems. Topics covered include dynamic procedure activation, system structure, memory management, correctness, timing, and process management, including concurrent programming constructs. Prerequisite:

sites: 245 (previously 243) and 253. *Mr. L. Nyhoff.*

375 Language Structures and Compiler Design.* S. An introduction to the basic constructs of modern programming languages and to the techniques for implementing these in the machine language of a typical computer. Topics include grammatical structure, syntax, semantics, parsing, storage allocation, error detection, and object code generation. Prerequisites: 245 (previously 243) and 253. *Staff.*

383 Introduction to Microprocessors.* S. An introduction to microprocessors, including the following topics: technology of microprocessor development, microprocessor architecture, programming, systems design, interfacing, and peripherals. Laboratory. (Also listed as Physics 385.) Prerequisites: 283 (previously 285) or its equivalent and programming experience. *Staff.*

390 Independent Study. F, I, S. *Staff.*

392 Perspectives on Computing.* F and S, half course. A senior-level seminar

course. Discussion of special topics in computer science. Special emphasis on computer applications, social implications, ethical and legal issues, future social impact. Prerequisite: senior status in computer science program of concentration. *Mr. S. Leestma.*

395 Senior Thesis in Computer Science. F, I, S. The course requirements include an expository or research paper and an oral presentation on a selected topic in computer science. Open to qualified students with the permission of the chair. *Staff.*

JANUARY 1988 INTERIM

A catalog with the descriptions of all interim courses is available after October 1987.

W50 UNIX AND C. *Mr. S. Leestma, Mr. L. Nyhoff.*

W51 Artificial Intelligence. *Mr. P. Van Arragon.*

MATH W53 Graph Theory and Its Applications. *Mr. J. Bradley, Mr. P. Prins.*

Dutch

Professor B. Carvill (chair, Department of Germanic Languages), M. Bakker (program coordinator)

PREREQUISITE TO A CONCENTRATION IN DUTCH is a minimum average of C (2.0) in 101, 102, 201, and 202 for students without a background in the language, or in 203 and 204 for those with one. In addition to this basic language foundation a student must complete at least three courses from the 300 level and one interim approved by the department.

101 Elementary Dutch. F. An introductory course in the comprehension and use of spoken and written Dutch. *Staff.*

102 Elementary Dutch. S. Continuation of 101. *Staff.*

201 Intermediate Dutch. F. Selected readings of modern Dutch prose and poetry. Review of grammar and syntax. *Mr. M. Bakker.*

202 Intermediate Dutch. S. Continuation of 201. *Mr. M. Bakker.*

203 Intermediate Dutch. F. A course intended to serve students who already have some knowledge of the Dutch language but who are deficient in the ability to comprehend and write the language. *Mr. M. Bakker.*

204 Intermediate Dutch. S. A continuation of 203. *Mr. M. Bakker.*

305 Dutch Classics.* Core. Study and discussion of several Dutch literary texts representative of the classical and modern pe-

riods of Dutch literature. Because the literature studied is varied from year to year, the course may be repeated for credit. This course is normally conducted in Dutch. *Mr. M. Bakker.*

306 Dutch Classics.* Core. A continuation of 305. *Mr. M. Bakker.*

307 Readings in Dutch Church History.* F. A study in the Dutch language of source documents pertaining to the history of the Reformed churches in the Netherlands during the period 1450–1700. *Mr. M. Bakker.*

308 Readings in Dutch Church History.* S. A continuation of 307 for the period 1700–1945. *Mr. M. Bakker.*

309 Netherlandic Civilization.* A study conducted in the English or Dutch language of several important aspects of Netherlandic civilization: language, literature, history, religion, art, architecture, social structure, and education. Students reading in Dutch may apply this course to a Dutch concentration. *Mr. M. Bakker.*

390 Independent Study. F, I, S. *Staff.*

JANUARY 1988 INTERIM

A catalog with the descriptions of all interim courses is available after October 1987.

W50 Getting to Know the Dutch. *Mr. M. Bakker.*

Economics and business

*Professors E. Dykema (chair), G. Monsma, D. Pruis, S. Simpson, J. Tiemstra
Associate Professors J. Brothers, J. Dodge, R. Karppinen, K. Kuipers, R. Slager, E. Van Der Heide
Assistant Professors D. Cook, †R. Hoksbergen, S. Roels, K. Schaefer
Instructors M. Anderson, S. Vander Linde*

THE DEPARTMENT HAS STRUCTURED its major areas of study so that students may design programs to best prepare themselves for their chosen career fields, or to help them make those choices. It offers four majors leading to a Bachelor of Arts degree—business, economics, a group concentration in the social sciences, and a group concentration involving mathematics and economics or business—as well as a program leading to a Bachelor of Science in Accountancy. The department also offers minors in business and in economics, as well as teacher education majors and minors. Prerequisite to admission to any major concentration is a minimum grade of C (2.0) in Economics 221. Students who, before deciding on a major, complete 151 can be admitted to a major with a minimum grade of B- in that course.

The business major requires Business 201, 202, 360, 370, 380, four courses in economics, one departmental elective, the mathematics cognate, and a cognate in computer science.

The B.S. in Accountancy requires Business 201, 202, 301, 302, 305, 350, 360, 370, 380, three courses from Business 306, 310, 311, and 315, four courses in economics, the mathematics cognate, and the computer science cognate. Business 319 is a recommended elective. Students wishing to meet CPA requirements should consult with an accounting faculty member.

For both the business major and the B.S. in Accountancy, the four-course requirement in economics is met by completing Economics 221, 222; one course from Economics 323–324 or Business 325–326; and one additional course from Economics 323–326, 331–339 or a designated interim course. Students who began by taking Economics 151 may, with permission of the department, continue with two courses from the 323–326 group and one additional course from Economics 331–339. Economics 151 is not recommended for departmental majors.

The economics major requires Economics 221, 222, 323, 324, 395, three from 331–345, two other departmental courses, and the mathematics cognate. Students who have taken Economics 151 may, with permission of the department, continue with 323, 324, four from 331–345, 395, two other departmental courses, and the mathematics cognate. Teacher certification in economics requires one less departmental elective.

The social science group major may have either a business or an economics emphasis. The business emphasis requires Business 201, 360, Economics 221, 222, three additional departmental courses, and four courses from one of the other social sciences. Students who begin with 151 must take one additional economics course from 323–326. The economics emphasis requires Economics 221, 222, 323 or 324, two more from 323–345, two additional departmental courses, and four courses from another social science. Students who take 151 must continue with both 323 and 324 and with two from 331–345. The four social science courses must be in history, political science, psychology, or sociology in a coordinated program approved by the department.

The mathematics and economics or business group major may have either a business or economics emphasis. The business emphasis requires Business 201, 202, Economics 221, 222, two additional departmental courses, Mathematics 161, 162, 255, 261, 343, and 344, and the computer science cognate. The economics emphasis requires Economics 221, 222, one from 323–326, three other departmental courses, Mathematics 161, 162, 255, 261, 343, 344, and the computer science cognate. Variations should be approved by a departmental advisor.

The business minor requires Business 201, 360, Economics 221, 222, and two other business courses (or Economics 151 plus two business courses and one other course in either business or economics). The economics minor requires Economics 221, 222, either 323 or 324 (or Economics 151 and both 323 and 324), and three courses from Business 201 and Economics 331–345. Teacher certification in an economics minor requires Economics 221, 222 (or Economics 151 and 323 or 324), and four courses from Business 201 and Economics 323–345, including up to two approved interims.

The minimum mathematics cognate for business and economics majors and for the Bachelor of Science in Accountancy is 131 and 132; an alternative is 161, 162, and 243. However 161, 162, 255, 261, 343, and 344 are recommended mathematics courses. Although the computer science cognate can be met by any course in computer science, Computer Science 121 is recommended. One approved interim course may be included in any program of concentration. The core requirement in the social sciences is met by Economics 151 or, normally for students majoring or minoring in economics or business, 221. However, only one of these courses may be counted toward a departmental major or minor.

BUSINESS

201 Introduction to Financial Accounting.

F. An introduction to accounting with emphasis on principles of asset valuation and income determination. Prerequisite: completion of or concurrent registration in Economics 151 or 221. Not open to freshmen. (Previously 207) *Mr. D. Cook, Mr. L. De Lange, Mr. R. Karppinen, Mr. D. Pruis, Mr. R. Slager.*

202 Financial and Managerial Accounting.

S. A continuation of 201 emphasizing consolidated financial statements. The course provides an introduction to cost accounting, budgeting, the development of controls, and the use of financial analysis for managerial decision-making. Prerequisite: 201. (Previously 212) *Mr. D. Cook, Mr. D. Pruis, Mr. R. Slager.*

301 Intermediate Accounting I.*

F. A study of financial accounting theory and generally accepted accounting principles as applied to the measurement and valuation of assets and liabilities. Prerequisite: 202. (Previously 307) *Mr. K. Kuipers.*

302 Intermediate Accounting II.*

S. Continuation of 301. A study of financial accounting theory and generally accepted accounting principles as applied to the measurement and valuation of stockholders' equity, issues related to income determination, and preparation and analysis of corporate financial statements. Prerequisite: 301. (Previously 308) *Mr. K. Kuipers.*

305 Cost Accounting.*

F. Principles and methods of accounting for manufacturing and operating costs with emphasis on analysis and reporting to management to facilitate planning, control, and decision-making. Prerequisite: 202. (Previously 312) *Mr. D. Pruis.*

306 Income Tax.*

F and S. A study of Federal income tax law and of tax cases to provide a basis for an understanding and evaluation of that law and of the rate structure. Includes the implications of income taxation for business decisions. Emphasis on taxation of individuals with limited coverage of partnerships and corporations. Prerequisite: 201. (Previously 209) *Mr. L. De Lange.*

310 Advanced Accounting.*

F. Preparation of consolidated financial statements, accounting for partnerships, and accounting for installment and consignment sales.

Introduction to governmental and fund accounting. Prerequisite: completion of or concurrent registration in 301. *Mr. R. Slager.*

311 Auditing.*

F. The theory and philosophy of auditing, including an examination of the ethical and other professional standards required of the Certified Public Accountant. Prerequisite: completion of or concurrent registration in 301. *Mr. K. Kuipers.*

315 Accounting Systems.*

S. A study of accounting systems and their design including procedures, cycle flow, internal controls, and tools of systems analysis. Emphasis is placed on systems analysis techniques and design for manual and computerized systems. Prerequisites: 202 and one course in computer science. *Mr. R. Slager.*

319 Topics in Public Accounting.*

S. Studies in selected areas of CPA practice which are often covered in the Uniform CPA Examination: fund accounting for governmental and not-for-profit entities; advanced taxation including taxation of corporations, partnerships, estates, trusts, and gifts; law of accountancy and other selected business law topics. Prerequisites: 306, 310, 350. *Mr. D. Pruis.*

325 Managerial Economics.*

S. An intermediate level course in microeconomic theory emphasizing applications to managerial decision-making in the areas of production, marketing, and hiring of resources. Goals of firms and the use of economic theory in achieving them will be examined and evaluated. Also listed as Economics 325. Students may not receive credit for both this course and Economics 323. Prerequisites: Economics 151 or 221, Mathematics 132 or 161, and completion of or concurrent registration in Mathematics 131, 243, or 343. *Mr. J. Dodge.*

326 Business Cycles and Forecasting.*

F. An intermediate-level course in macroeconomic theory emphasizing analysis of general business activity and the implications of changing business conditions for business and public policy. Basic forecasting techniques are explained and the use of forecast information in firm and individual decision-making is evaluated. Also listed as Economics 326. Students may not receive credit for both this course and Economics 324. Prerequisites: Economics 151 or 222 and completion of or concurrent registration in Mathematics 131, 243, or 343. *Mr. E. Van Der Heide.*

350 Law in Business.* F and S. An introduction to American business law: origins, development, legal institutions, and processes. The legal environment of business; Uniform Commercial Code and case law of business transactions; other topics selected from agency, property, partnership, corporation, regulatory, and administrative law. (Previously 309) *Mr. D. Buter, Mr. T. Waalkes.*

358 Business Aspects for Engineers. F. An overview of the aspects of business important to engineering. Selected topics from economics, accounting, finance, marketing, management, and business law are included. Prerequisite: 151 and junior or senior standing in the engineering program. *Ms. S. Roels.*

359 Internship in Business. F and S. These internships involve ten to fifteen hours of work a week under an employer-supervisor and a series of internship seminars on campus. Placements may be in businesses or in not-for-profit organizations. Each intern, after consultation with the internship coordinator, will submit either an analytical journal or a research paper and a short personal evaluation of the internship. Prerequisites: three courses in business or economics, junior or senior standing, and permission of the internship coordinator. *Mr. S. Simpson.*

360 Business Organization and Management.* F and S. A study of the principles and problems of organizing and managing the firm, with emphasis on organization goals, structure, and the effective use of human resources. Not open to freshmen. (Previously 313) *Mr. M. McGervey, Mr. R. Karpinen, Ms. S. Roels, Mr. S. Simpson.*

363 Production and Operations Management.* S. An extension of principles of management into topics dealing with the design, control, and evaluation of production and operation functions of the business firm. Emphasis is placed on the application of quantitative techniques to business decisions. Prerequisites: 360 and Mathematics 131 or its equivalent. *Mr. E. Van Der Heide.*

365 Personnel Management.* F. A study of the principles and problems involved in personnel management in an organization, including recruitment, selection, training, evaluation, motivation, compensation, human resource planning, career development, and collective bargaining. Prerequisite:

360 or permission of the instructor. (Previously 314) *Ms. S. Roels.*

370 Financial Principles.* F and S. A study of the principles and problems of the financial management of the firm, including such topics as stock and bond valuation, working capital management, cost of capital and capital budgeting, capital structure, and dividend policy. Prerequisites: Economics 151 or 221, and Business 202. (Previously 316) *Mr. D. Cook, Mr. J. Mellema, Mr. R. Vander Weele.*

371 Financial Instruments and Markets.* F. An extension of 370 into topics such as leasing, mergers, and multinational finance; application of the theory of finance to investment instruments, including stocks, bonds, options, futures markets, and commodities, and to financial markets and institutions, including investment companies and the stock exchanges. Prerequisite: 370. (Previously 317) *Mr. D. Cook.*

380 Marketing.* F and S. A study of the process of planning and executing the conception, pricing, promotion, and distribution of ideas, goods, and services that satisfy individual and organizational needs and objectives. Prerequisite: Economics 151 or 221. Not open to freshmen. (Previously 318) *Mr. J. Brothers, Mr. M. McGervey.*

381 Advanced Topics in Marketing.* S. This course deals with topics involving consumer behavior, the market research process, sales management, advertising, and marketing strategy. Students will work on the marketing problems of local organizations as a practicum. Prerequisite: 380. *Mr. J. Brothers.*

390 Independent Study. F, I, S. Prerequisite: permission of the department chair.

396 Business Policy Seminar.* S. An integrative study of business goals, strategies, and administration. Case studies, readings, reports, and a management simulation. Open to senior business majors. *Mr. S. Simpson.*

590 Independent Study. F, I, S. Prerequisite: permission of the department chair. *Staff.*

ECONOMICS

151 Principles of Economics. F and S, core. A study of the principles of resource allocation, income distribution, prices, produc-

tion, income and employment levels, and economic growth with an emphasis on the market system. The course is planned to help students understand basic domestic and international economic problems. Not recommended for majors or minors. *Mr. J. Dodge, Mr. E. Dykema, Mr. G. Monsma, Mr. K. Schaefer, Mr. S. Vander Linde.*

221 Principles of Microeconomics. F and S, core. A study of the behavior of consumers and firms and their effects on prices, production of goods and services, use of resources, and the distribution of income; with an evaluation of the equity and efficiency of private sector and governmental activity in a market system. *Mr. M. Anderson, Mr. G. Monsma, Mr. K. Schaefer, Mr. J. Tiemstra, Mr. S. Vander Linde.*

222 Principles of Macroeconomics. F and S. A continuation of 221. A study and evaluation of the determination of national income including analysis of consumer spending and saving patterns; business investment; government spending, taxation, and monetary policy; unemployment; and inflation. Prerequisite: 221. *Mr. M. Anderson, Mr. K. Schaefer, Mr. J. Tiemstra, Mr. E. Van Der Heide.*

323 Intermediate Microeconomics.* F and S. An intermediate course in microeconomic theory, emphasizing the role of the price system in organizing economic activity and an evaluation of its efficiency and equity. Students may not receive credit for both this course and Economics or Business 325. Prerequisite: 151 or 221. (Previously 322) *Mr. G. Monsma.*

324 Intermediate Macroeconomics.* S. An intermediate course in macroeconomic theory which studies the theory of aggregate demand, the level of employment, the general level of prices, and economic growth. Students may not receive credit for both this course and Economics or Business 326. Prerequisite: 151 or 222. (Previously 321) *Mr. S. Vander Linde.*

325 Managerial Economics.* S. An intermediate-level course in microeconomic theory emphasizing applications to managerial decision-making in the areas of production, marketing, and hiring of resources. Goals of firms and the use of economic theory in achieving them are examined and evaluated. Also listed as Business 325. Students may not receive credit for both this course and Economics 323. Prerequisites: Econom-

ics 151 or 221, Mathematics 132 or 161, and completion of or concurrent registration in Mathematics 131, 243, or 343. *Mr. J. Dodge.*

326 Business Cycles and Forecasting.* F. An intermediate-level course in macroeconomic theory emphasizing analysis of general business activity and the implications of changing business conditions for business and public policy. Basic forecasting techniques are explained and the use of forecast information in firm and individual decision-making are evaluated. Also listed as Business 326. Students may not receive credit for both this course and Economics 324. Prerequisites: Economics 151 or 222, and completion of or concurrent registration in Mathematics 131, 243, or 343. *Mr. E. Van Der Heide.*

331 Money and Banking.* F and S. A study of the principles of money, banking, and credit with emphasis on monetary theory and policy and their role in domestic and international economics. Prerequisite: 151 or 222. *Mr. J. Dodge, Mr. J. Tiemstra.*

332 Environmental Economics and Public Policy.* S. An introduction to the theory and practice of environmental policy. The course provides a survey of the problems considered by environmental economics and an evaluation of the policies that have been developed—problems related to pollution and other forms of environmental deterioration, to the use of energy and other resources, and to related issues. Prerequisite: 151 or 221, or permission of the instructor. (Previously 232) *Mr. J. Tiemstra.*

334 Industrial Markets and Public Control.* F. A study of the structure, control, and market behavior of American industry, and the public policies for the control of economic power. Prerequisite: 151 or 221. *Mr. J. Dodge.*

335 Labor Economics.* A study of labor markets and their relationship to the economy as a whole, with an emphasis on wage theory, the impact of trade unions, unemployment, income distribution, human capital formation, labor force participation, and public policies concerning such topics. Prerequisite: 151 or 221. Not offered 1987–88.

336 Comparative Economic Systems.* A comparison of various forms of economic organization, such as capitalist and socialist types, and an evaluation of their performance in theory and practice. Prerequisite: 151 or 221. Not offered 1987–88.

337 **World Poverty and Economic Development.*** F. A study of the causes of widespread poverty in many nations and regions of the world, and a study and evaluation of policies designed for its alleviation. Prerequisite: 151 or 221. *Mr. K. Schaefer.*

338 **International Economics.*** F. A study of international economic relations, stressing the fundamentals of trade theory, the balance of payments, problems of international disequilibrium, trade barriers, and efforts to promote international economic stability and growth. Prerequisite: 151 or 222. *Mr. M. Anderson.*

339 **Public Finance.*** S. The effects of government spending and taxation on resource allocation and on the distribution of income. Students will consider current policy issues and will analyze major programs at the national, state, and local level. Prerequisite: 151 or 221. *Mr. S. Vander Linde.*

345 **History of Economic Thought.*** S. An examination of the development of economic ideas with an emphasis on the emergence of main historical themes, issues, and controversies. Prerequisite: 151, 222, or permission of the instructor. *Mr. E. Dykema.*

349 **Internship in Economics.** S. These internships which will require the student to use the tools of economic analysis involve ten to fifteen hours of work a week under an employer supervisor and a series of internship seminars on campus. Each intern, after consultation with the internship coordinator, will submit a research paper and a short personal evaluation of the internship. Prerequisites: appropriate courses in economics, completion of the mathematics cognate

requirements, junior or senior standing, and permission of the internship coordinator. *Staff.*

390 **Independent Study.*** F, I, S. Prerequisite: permission of the department chair.

395 **Economics Seminar.*** S. A study of the methodology of economics, and of one or more of the significant problems in economics. Emphasis on oral and written reports and on extensive reading in current economics journals. Prerequisites: senior economics major status. *Mr. E. Dykema.*

JANUARY 1988 INTERIM

A catalog with the descriptions of all interim courses is available after October 1987.

Business

W50 **Statistical Applications in Business and Economics: Fun with Numbers.** *Mr. E. Van Der Heide.*

W51 **The Changing Financial Services Industry.** (Off-campus) *Mr. K. Kuipers.*

W52 **Advanced Managerial Finance.** *Mr. D. Cook, Mr. R. Slager.*

W53 **Is Advertising an Appropriate Career for a Christian?** *Mr. J. Brothers.*

Economics

IDIS W50 **Interdisciplinary Problem Solving.** *Mr. R. Hoeksema, Mr. S. Vander Linde.*

IDIS W57 **The Christian's Role in Development: Field Study in Haiti.** (Off-campus) *Mr. G. Monsma.*

Education

Professors B. Bosma, P. De Boer, T. Hoeksema, C. Kass, P. Lucasse, C. Mulder, D. Oppewal, L. Stegink (chair), G. Stronks, J. Wiersma
Associate Professors M. Kraker, A. Post

THE VARIOUS TEACHER EDUCATION PROGRAMS are described in detail on pages 51-59. Prospective elementary and secondary teachers should initially consult the

the teacher education advisor of the department in which they expect to major. Students intending to enter special education should consult either Mr. Thomas Hoeksema, coordinator of special education: mentally impaired, or Ms. Myra Kraker, coordinator of special education: learning disabilities.

The elementary teacher education program requires nine professional education course units: 301, 303, 304, 305, 322, 324, 325, and 345. The secondary teacher education program requires eight course units: 301, 303, 304, 307, 308, 346, and 356. Students in special education must also complete the elementary education requirements.

Students seeking certification must be admitted to the teacher education program and be in good standing when enrolling in any course in the department.

301 Psychology of Education. F and S, core. Orientation to the field of psychology. A study of the learner, the learning process, and the kinds of learning. Should be taken during the junior or senior year. *Staff.*

303 Introduction to Teaching. F and S. An analysis of the teaching-learning process in the classroom. Includes observation and participation in school activities and a laboratory experience to develop competence in the classroom use of audio-visual equipment. Prerequisite: concurrent registration in 301. *Staff.*

304 Philosophy of Education. F and S, core. An analysis of the assumptions, aims, and practices of two major educational philosophies—experimentalism and essentialism—followed by an analysis of the theory and practice of Christian education. Readings in typical writers from all three perspectives. Study of how educational changes tend to reflect changed social and philosophical climates and of how to evaluate these changes in the light of a biblical perspective of man, society, and human calling in the world. Students will work out a biblical approach to the theory and practice of Christian education. Prerequisites: 301, 303, and Philosophy 153. *Mr. P. De Boer, Mr. D. Oppewal.*

305 Elementary Teaching Methods. F and S. A study of various generic methods of teaching such as exposition, demonstration, activity, and guided inquiry, with particular application to mathematics, religion studies, and social studies and to multicultural instruction. (Application to other subjects is taught in later courses.) The course also focuses on the perspective of each subject,

the curriculum content and goals that are appropriate to the elementary school, the teaching and learning materials that are available, and the techniques for motivating students to understand the subject and to learn its basic content. Prerequisite: 301, 303, or permission of the instructor. *Mr. C. Mulder.*

307 Reading in Content Areas: Secondary.* F, half course. A study of the reading process as it relates to the secondary school curriculum; an analysis of the factors which enhance or impede comprehension of content area reading materials; a presentation of reading and study skills common to all content areas; an analysis of reading and study skills required in specific content areas. *Mr. L. Stegink, Ms. G. Stronks.*

308 Reading Strategies: Secondary.* F and S, half course. A study of the types and functions of reading programs in secondary schools; a presentation of the responsibilities and qualifications of secondary teachers for applying principles of reading in daily assignments; demonstrations of techniques for meeting the wide range of reading levels found in the average secondary classroom; a review of formal and informal tests of pupil reading levels; and introduction to interpretation of test scores for screening and determining pupil reading needs. Prerequisite: 307. *Mr. L. Stegink, Ms. G. Stronks.*

322 Introduction to Methods of Teaching Reading: Elementary.* F and S. A study of the nature of the reading process; an introduction to the various approaches to the teaching of reading with an emphasis on the basal approach; a presentation of instructional strategies appropriate to a developmental reading program; an analysis of the organization and management of a classroom reading program. *Ms. B. Bosma, Ms. G. Stronks.*

SPECIAL EDUCATION

324 Reading Problems in the Elementary Curriculum.* F and S, half course. A study of the various kinds of problems children encounter when learning to read; an analysis of the strengths and weaknesses of common diagnostic instruments; an introduction to testing terminology and interpretation of test results; and a presentation of approaches, techniques, and devices for differentiating instruction to fit individual needs. A field experience is included. Prerequisite: 322. Ms. B. Bosma, Ms. A. Post.

325 Reading and Language Arts in the Elementary School.* F and S, half course. A study of reading as a language art and its relationship to the various subjects in the elementary school. Prerequisite: 322. Ms. B. Bosma, Ms. A. Post.

345 Directed Teaching: Elementary. F and S, one to three course units. Students participate in full-time supervised practice teaching. Those in regular elementary education programs teach in two different schools and may, if their certification program requires it, have one experience in their major field. Prerequisites: good standing in the teacher education program and appropriate recommendations. Staff.

346 Directed Teaching: Secondary. F and S, one to three course units. Students participate in a full-time supervised practice-teaching experience in their major or minor field. Each course unit of 346 involves at least ninety clock hours of actual teaching. All students except those majoring in mathematics should expect to do their directed teaching during the second semester. Some students in economics, history, physical education, and political science as well as those in mathematics may apply for directed teaching assignments in the fall semester. Prerequisites: good standing in the teacher education program and appropriate recommendations. Staff.

356 Seminar in Secondary Teaching Methods.* F and S. A seminar taught in conjunction with 346 by the supervisors of secondary directed teaching involving general problems of pedagogy at the secondary level as well as of the methods of teaching the specific subject of the student's classroom. The seminar provides a forum for the discussion of problems that develop during directed teaching. Staff.

390 Independent Study. F, I, S. Staff.

216 Education of Exceptional Children. F. An orientation to all disability areas included within the field of special education. The course acquaints the students with the basic information and the specialized vocabulary needed for dealing with handicapping conditions. Consideration of the major issues in special education as well as of contemporary educational practices. Mr. T. Hoeksema.

306 Mental Retardation.* F. Study of cognitive, affective, and social characteristics of the mentally impaired, with attention given to several common etiologies. Examination of issues involved in defining mental retardation. Investigation of diagnostic treatment and preventive techniques. Differentiation of mental retardation from related conditions. Discussion of research and emerging concepts within the field. Prerequisite: 216. Mr. T. Hoeksema.

310 Diagnosis and Prescription: Mental Impairment.* S. This course is designed to acquaint students with the basic terminology and theory of assessing specific learning problems. Skill will be developed in the selection, administration, and interpretation of formal and informal, standardized and non-standardized assessment devices for the purpose of determining educational prescriptions. Prerequisites: 216 and 306. Mr. T. Hoeksema.

330 Curriculum and Instruction: Mentally Impaired.* F. A study of the curricula, materials, and methods appropriate to the instruction of the mentally impaired. Attention is given to the problems of organizing classes, making curricular decisions, and selecting methods and materials. A field experience with mentally impaired students is an integral part of this course. Prerequisites: 301, 303, 306, 310; 305 is recommended. Mr. T. Hoeksema.

347 Directed Teaching: Mentally Impaired.* S, two course units. Mr. T. Hoeksema.

357 Directed Teaching Seminar: Mentally Impaired.* Half course unit. Mr. T. Hoeksema.

GRADUATE COURSES

501 Advanced Educational Psychology. An examination of psychoeducational theories of development from the perspective of selected theorists. Consideration is given to

the application of these theories to the educational environment and the implications of these theories with regard to intellectual development. Aspects of faith and moral development are considered. *Ms. C. Kass, Ms. M. Kraker, Ms. B. Stronks.*

510 History of American Education. A study of the American school systems in their historical setting from colonial times to the present. Special attention is given to the ways in which social and intellectual movements affect educational theory and practice. *Mr. P. De Boer.*

512 Theories of Schooling. This course examines psychological, socio-psychological, and educational concepts relevant to an analysis and evaluation of the schooling process. Intellectual skills required for the construction of micro-theory and the interpretation and implementation of research will also be stressed. *Mr. J. Wiersma.*

513 Psychology and the Teaching of Reading. A study of the dynamics of learning to read, including research from child psychology, psycholinguistics, educational psychology, and learning theory. Readings, lectures, and analysis of reading practices and materials from the psychological point of view will be used to improve reading instruction in all grades. Prerequisites: at least one course in reading and one in psychology. *Ms. M. Kraker.*

515 Moral Education. The study of a number of theories of moral education, some of which stress the cognitive approach and others the affective. The theories of Kohlberg and of Raths and Simon are studied. Individual projects and construction of teaching units. *Mr. D. Oppewal.*

530 Education of the Gifted. This course focuses on several manifestations of intellectual, social, and artistic giftedness. Several aspects of the educational and guidance process are studied, such as identification of talent and giftedness, curriculum considerations, teaching methods, role models, and guidance procedures. Prerequisites: graduate standing and teaching experience. *Staff.*

531 Teaching Children with Learning Problems. An orientation to the variety of handicapping conditions which affect school-age children. This course for regular classroom teachers acquaints them with the basic information and specialized vocabu-

lary needed for dealing with handicapping conditions in the typical classroom. It will include consideration of major issues and contemporary practices in the education of exceptional learners. *Mr. T. Hoeksema, Ms. M. Kraker.*

532 Instructional Gaming. Introduction to the theory and practice of simulation and non-simulation gaming for instructional purposes. Both commercially available games and games developed in class will be used and evaluated in terms of their instructional and motivational value at various grade levels and in various subject fields. *Mr. P. Lucasse.*

533 Motivating the Under-Achieving Student. A diagnosis of the learning climate of the classroom as it is affected by the socio-cultural environment of the community and an assessment of the individual factors that affect each student's readiness to learn. Compensatory and motivational teaching materials and styles will be evaluated for their relevance to the under-achieving student. Students will relate this content to a specific classroom situation and to the broader problems of motivation and under-achievement. *Mr. P. Lucasse.*

534 School Administration. A study of the role and responsibilities of school administrators, preschool through grade 12. The course includes a consideration of the educational leadership and management function of principals; the biblical perspectives on leadership; the theories and perspectives relevant to organizing, planning, controlling, and decision-making; and the major administrative concerns of school principals. *Mr. C. Mulder.*

535 The School as a Social Organization. A study of the religious premises and theoretical bases of organizations, with special emphasis on school systems. Particular attention is paid to the teacher functioning in a school organization. A major goal of the course is an attempt to formulate a Reformed Christian theory of organizations. *Mr. L. Stegink.*

536 The Young Child in a Preschool Setting. A review and critique of the basic theories of child development. Observation and intensive analysis of the behavior of a particular child in a preschool setting as related to the major theories. Prerequisite: Psychology 204. *Staff.*

537 Curriculum for Early Childhood Education. An evaluation of the major approaches to building a curriculum for early childhood education (up to age eight), the underlying assumptions of each approach, and the effects of each approach on the children. Prerequisites: one course in education and one in psychology. *Staff.*

538 Staff Supervision and Development. An examination of the supervisory responsibilities and functions of school administrators with an emphasis on staff evaluation and staff development. Units of study include: a survey of the research on teacher effectiveness; models of supervision; peer, student, supervisor, and self-evaluation; models and methods for analyzing teaching; pre- and post-conferences; and the creation and implementation of staff development programs. Prerequisite: 534 or permission of the instructor. *Mr. C. Mulder.*

540 Reading Problems in the Elementary Classroom. This course is designed to enable experienced elementary teachers to work with problem readers in their own classrooms. The course includes: a study of the various kinds of reading problems encountered at the elementary level and their causes; the use of the most common formal and informal diagnostic tests with an emphasis on the strengths and weaknesses of each; a critical introduction to the reading materials available for the classroom; and a field experience involving both the diagnosis of reading problems and the use of appropriate corrective measures. Prerequisite: 322 or the permission of the instructor. *Ms. G. Stronks.*

541 Reading Problems in the Secondary Classroom. Half or whole course. This course is designed to help secondary-level teachers recognize the reading problems they are most likely to find in their classrooms and to understand what is needed to correct the problems—including the development of separate reading programs. The course includes: a study of the nature of the reading process, a survey of basic reading and study skills, an examination of the reading problems students face when they read typical high school textbooks, a consideration of alternative ways of working with problem readers, a survey of the reading and study skills materials that are appropriate at this level, the use of the most common formal and informal diagnostic tests with an

emphasis on the strengths and weaknesses of each, and the development of a model program for use in a particular high school class. Prerequisite: 307, 322, a year's teaching experience on the secondary level, or the permission of the instructor. *Ms. G. Stronks.*

542 Diagnosis and Remediation of Reading Disabilities. An advanced course for the training of reading specialists who may serve as consultants to classroom teachers and may work individually with severely disabled readers. The course includes a discussion of reading theory, a study of the specialized and general testing tools emphasizing validity and interpretation, the development of prescriptive programs for remediating the problems identified, and the consideration of how to work with regular classroom teachers to implement such programs in a normal classroom. A field experience with a severely disabled reader will involve the development and administration of an appropriate battery of tests, the designing of a remedial program, and creation of an evaluation procedure. Prerequisite: 513, 540, 541, or permission of the instructor. *Ms. B. Bosma, Ms. A. Post.*

543 Teaching Reading Through Literature. An investigation of the development of reading skills in elementary school children through the use of literary materials. The course includes an analysis of literal and critical comprehension skills, the development of teaching strategies appropriate to the reading levels of pupils, and the building of a reading program that fosters pleasure in reading and promotes reading of library materials. *Ms. B. Bosma.*

548 Directed Teaching: Learning Disabilities. F and S, half to two course units. *Staff.*

550 Theories of Learning Disabilities. F. As an introduction to the field, this course seeks to acquaint students with the major theoretical models of learning disabilities and with the academic, social, and motor characteristics of learning-disabled children. Approaches to the education of learning-disabled children which have been based on the theoretical models examined are also studied. Prerequisite: 216. *Ms. M. Kraker.*

551 Diagnosis and Prescription: Learning Disabilities. S. A study of the basic terminology and ethical considerations involved

in assessing learning disabilities. Skills are developed in the selection, administration, and interpretation of appropriate psychological and educational tests for the purpose of determining educational prescriptions. Prerequisite: 550. Ms. M. Kraker.

580 Curriculum Theory and Development. S. A study of conflicting and complementary curriculum theories for elementary and secondary schools and how these theories ought to be conceived and practiced. A project in designing curriculum is required at the appropriate level and in the student's area of concentration. Prerequisite: teaching experience. *Staff.*

581 Educational Philosophy and Curriculum Decisions. F. The course examines the philosophical views of selected thinkers on curriculum. The course focuses on the differences among the best of secular and of Christian curriculum theories, with special emphasis on the way curriculum theory is related to the religious vision and the major learning goals of education. Prerequisite: at least one course in philosophy and one in philosophy of education. *Mr. D. Oppewal.*

582 Curriculum and Instruction: Learning Disabilities. F. A study of the curricula, methods, and materials appropriate to the education of learning-disabled children. Attention is given to the problems of organizing classes, adapting learning environments, making curricular decisions, and selecting materials and instructional methods. Special emphasis is on the development of language. A field experience with learning-disabled students is an integral part of this course. Prerequisite: 550. Ms. M. Kraker.

590 Independent Study. F, I, S. *Staff.*

595 Graduate Project. F, I, S, full or half course. The prospectus for each Master of Arts in Teaching project must be developed under the supervision of a faculty member

and must be approved by the student's graduate advisor. *Staff.*

JANUARY 1988 INTERIM

A catalog with the descriptions of all interim courses is available after October 1987.

W10 Teaching the Teenager: The American Adolescent in the Secondary School. Ms. A. Post.

W12 Writing to Grow. Ms. P. Oostenink.

W50 Writing: From the Pen of a Child. Ms. M. Kraker.

W51 Effective Use of Computers in K-12 Teaching. Mr. P. Lucasse.

W52 Multicultural, Alternative School Experience. (Off-campus) Mr. P. Lucasse.

W53 Curriculum and Methods for Multi-Grade Classrooms. (Off-campus) Mr. P. Lucasse.

W56 International Education. (Off-campus) Ms. G. Stronks.

W57 Teaching Reading in Multicultural Settings at Lake Worth, Florida. (Off-campus) Ms. B. Bosma.

W59 Mainstreaming Children With Disabilities. Mr. T. Hoeksema.

IDIS W13 Images as Ideas and Information. Mr. J. Wiersma.

IDIS W14 Discovering Modern Israel. (Off-campus) Mr. P. De Boer.

IDIS W17 Vergil's Aeneid: A Poem for Every Age. Ms. K. Blok, Mr. K. Bratt, Mr. J. Breuker.

IDIS W51 Urban Education: Exploring Successful Programs in a Large Urban Setting. (Off-campus) Mr. C. Mulder.

IDIS W54 Cross-Cultural Teaching and Learning in the Dominican Republic. (Off-campus) Ms. E. Greenway.

Engineering

Professor **L. Van Poolen (chair)

Associate Professors R. De Jong, R. Hoeksema (acting chair, second semester), M. Vander Wal

Assistant Professors D. Medema, K. Peterson

Instructors B. Post, R. Van Andel

CALVIN COLLEGE offers a four-year program leading to a Bachelor of Science in Engineering degree (B.S.E.) with concentrations in civil, electrical, and mechanical engineering as well as a three-year program for students wishing to transfer to another engineering school. For details of both programs see pages 65-69.

A group major in engineering and physics or geology may be appropriate for some students. The group major in engineering and geology consists of Engineering 101, 202, 205, and 305; Geology 151, 152, 201, and 212; plus four approved electives, two of which must be from engineering or geology and two approved cognates. At least two of the geology and/or engineering courses must be at the 300 level. The group major in engineering and physics consists of twelve courses. Ten of these must be from the engineering and physics departments, with no fewer than four from either. The remaining two cognate courses must be chosen from a third department.

The Engineering Department is served by an advisory council. Current members are Mr. Ned Nielsen of Laser Alignment (chair), Mr. Larry Aldrink of Steelcase, Inc., Mr. Paul Newhof of Newhof and Winer, Mr. Robert Poel of Lear Siegler, Inc., Mr. Gary Post of Owen-Ames-Kimball Company, Mr. Charles Spoelhof of Eastman Kodak, Inc., and Mr. Lambert Vander Kooi of Western Michigan University. Calvin College is an affiliate member of the American Society for Engineering Education (ASEE) and the Junior Engineering Technical Society (JETS).

101 Graphical Communication and Concept Design. F. Graphical techniques for spatial analysis; a study of basic topics in engineering drawing to provide facility in the transmission of ideas through accepted graphical means. Areas covered include orthographic projection, free-hand sketching, pictorial representation, auxiliary views, sections and conventions, basic dimensioning, and tolerancing; an introduction to the design process by means of lectures and assigned design projects. Readings are assigned in design-related areas of creative thinking, aesthetics, models, economics, and human satisfaction. *Staff.*

102 Engineering Communication, Analysis, and Design. S, half course. A continua-

tion of 101 in which the graphical presentation culminates in the working drawing. Analysis tools such as graphical mathematics and data presentation including graphical algebra and calculus, the determination of empirical equations from experimental data, functional scales, and basic nomography are presented. An introduction to computer graphics is given. An engineering project is assigned to further enhance creative skills in design. Prerequisites: 101, Mathematics 161, and enrollment in Computer Science 141. *Staff.*

103 Architectural Communication and Concept Design. F. Graphical techniques for spatial analysis; a study of basic topics in architectural drawing to provide facility in the transmission of ideas through accepted

graphical means. Areas covered include orthographic projection, free-hand sketching, pictorial representation (including perspective), sections and conventions, basic dimensioning, shade and shadows, and charts and graphs. The student is introduced to the design process by means of lectures and assigned architectural projects. Readings are also assigned in design-related areas of creative thinking, aesthetics, economics, and human satisfaction. *Mr. L. Van Poolen.*

202 Statics and Dynamics. S. A study of fundamental principles of mechanics and their application to the problems of engineering. Vector algebra, forces, moments, couples, friction, virtual work, kinematics of a particle, kinematics of a rigid body, dynamics of particles and rigid bodies, impulse, momentum, work and energy are presented in two and three dimensions. Prerequisites: Physics 126, 186, and concurrent registration in Mathematics 261. *Staff.*

204 Circuit Analysis and Electronics. S. An introduction to the theory of electronic circuits and devices and their applications. The following topics are included: basic linear circuits including passive circuit elements and analysis of linear circuits; semiconductor devices (diodes, JFETs, MOSFETs, and BJTs); electric power and machines including dc and synchronous ac machines; and digital electronics (Boolean algebra, logic devices, D/A and A/D converters, and microprocessors). Prerequisites: Physics 126, 186, Mathematics 261, and concurrent registration in Mathematics 231. (Replaces 206 and 208) *Staff.*

205 Principles of Materials Science. F. An introductory course in the science of engineering materials. Engineering properties are correlated with internal structures; atomic, crystal, micro, macro, and service environments; mechanical, electrical, thermal, chemical, magnetic, and radiation. Prerequisite: Chemistry 103. *Staff.*

284 Circuit Analysis and Electronics Laboratory. S, quarter course. Laboratory course which uses lecture and laboratory exercises to illustrate the material covered in 204. Measurements of voltage, current, resistance, power, transient response, transistor characteristics, and amplifier performance will be made. Operational amplifiers and their applications, digital logic circuits, and ac and dc machines will be examined.

Prerequisites: Previous or concurrent registration in 204. (Replaces 206 laboratory) *Staff.*

Prerequisite to all courses numbered 300 or higher is formal admission to the department.

301 Engineering Electromagnetics. F. A study of the laws and engineering applications of electric and magnetic fields in various conductive, dielectric, and magnetic materials and under various boundary conditions. Emphasis is on the analysis and design aspects of transmission lines, waveguides, antennas, high frequency solid state circuits, and optical fiber systems. Prerequisites: Mathematics 261, 231, and Physics 225. *Mr. B. Post.*

304 Fundamentals of Digital Systems. S. An introduction to the fundamental principles of logic design in digital systems. Topics include: Boolean algebra, analysis and synthesis of combinational and sequential networks, register transfer language, micro-operational description and applications to computer design, computer organization and programming, and an introduction to microprocessors. Laboratory work will include logic design, programming, and interfacing of a micro-computer as an example of a complete digital system. Prerequisites: 204 and Computer Science 141. *Mr. D. Medema.*

305 Mechanics of Materials. F. Application of principles of mechanics to the solution of problems in stress and strain of engineering materials, including resistance to force, bending, torque, shear, eccentric load, deflection of beams, buckling of columns, compounding of simple stresses, introduction to theory of failure and energy methods. Laboratory experiments are used to emphasize principles. Prerequisite: 202. *Mr. M. Vander Wal.*

306 Principles of Environmental Engineering. S. Decision-making in the selection of environmental control measures and equipment. The emphasis is on water supply and wastewater system design. Topics include the following: water treatment systems, water quality management, wastewater treatment, solid waste management, and hazardous waste disposal. Prerequisite: junior or senior standing in the Engineering Department or approval of the instructor. *Staff.*

307 Advanced Network Analysis. F. Advanced techniques for the analysis of analog

electrical networks. Topics include: sinusoidal steady-state power calculations (including three phase), mutual inductance, parallel and series resonance, s-domain analysis (using Laplace transforms, Fourier series, and Fourier transforms), and an introduction to two port parameters. Frequency response is determined using transfer functions, Bode plots, and pole/zero plots. Prerequisites: 204 and Mathematics 231. (Previously 322) *Mr. K. Peterson.*

309 Fluid Mechanics. F. Basic properties of real and ideal fluids; fluid statics; Lagrangian and Eulerian descriptions of flow; continuity, energy, and linear momentum equations in differential and integral forms for incompressible flows; one-dimensional flow analysis; introduction to boundary layer theory. Dimensional analysis and laboratory experiments are utilized to determine significant flow parameters. Computer analysis is utilized. Prerequisites: 202 and Mathematics 231. *Mr. R. De Jong.*

310 Thermodynamics. S. An introduction to concepts of work and heat, properties of a pure substance, first law, second law, entropy, thermodynamic relations. Prerequisites: Mathematics 231 and Physics 126 and 186. *Mr. M. Vander Wal.*

311 Electronic Devices and Circuits. F. A study of the characteristics and qualitative internal action of commonly used micro-electronic devices for discrete and integrated circuits, such as diodes, junction field-effect transistors (JFETs), metal-oxide semi-conductors FETs (MOSFETs), and bipolar junction transistors (BJTs). Application of these devices in a variety of circuits, operational amplifiers, non-linear circuit applications of diodes, basic digital logic gates, basic amplifier circuits. Laboratory exercises are used to illustrate concepts. Prerequisite: 204. *Mr. D. Medema.*

312 Principles of Analog Computation. S, half course. An introduction to the theory and techniques of analog computation, including computer solutions for representative forms of linear and non-linear differential equations. Prerequisite: Mathematics 231 or permission of the instructor. Not offered 1987-88.

313 Soil Mechanics and Foundation Design. F. Soils studied as engineering materials whose behavior is dependent upon soil types, index properties, and soil moisture conditions. The scope of the course in-

cludes soil structures, index properties, soil identification, permeability, compressibility and consolidation, soil testing, static and dynamic pressures, effective pressures, and foundation design. Laboratory experiments are used to emphasize principles. Prerequisite: 305. *Mr. R. Hoeksema.*

314 Vibration Analysis. S. Analysis of mechanical vibration in both transient and steady state regimes, employing analytical and computer techniques for solution. Linear and non-linear problems are investigated with original inquiry suggested and encouraged. Prerequisites: Mathematics 231 and Physics 126 and 186. *Mr. R. De Jong.*

315 Control Systems. F. An introduction to linear feedback control theory, including transient and frequency response; stability; systems performance; control modes and compensation methods. Hydraulic, electrical, pneumatic, and inertial components and systems are investigated and employed. Prerequisite: 204 and Mathematics 231. (Previously 318) *Mr. K. Peterson.*

316 Heat Transfer. S. An introduction to the analysis of steady and unsteady conduction, of free and forced convection, and of radiation modes of heat transfer. Laboratory experiments and design projects are used to emphasize principles. Computer analysis is utilized. Prerequisites: 309, Mathematics 231, and Physics 126. *Mr. R. De Jong.*

317 Engineering Instrumentation. F. An introductory study of engineering measurement and instrumentation theory and technique. Types of systems and their response in the time and frequency domains are studied. The characteristics and uses of transducers to measure pressure, acceleration, strain, voltage, and other physical quantities are emphasized with attention on the usefulness, accuracy, and reliability of physical measurements. Electronic signal conditioning and digital techniques are covered. Laboratory work and instrumentation design project emphasize actual applications. Prerequisite: 204 and 284. *Mr. R. De Jong.*

320 Hydraulic Engineering. S. Application of the basic principles of fluid mechanics to practical problems in hydraulic analysis and design. Topics include steady open channel flow, flow measurement, turbomachinery, closed conduit flow, pipe networks, unsteady flow, hydraulic struc-

tures, and groundwater flow. Computer techniques are frequently used. Design problems and laboratory exercises are utilized to emphasize principles. Prerequisite: 309. *Mr. R. Hoeksema.*

324 Materials and Processes in Manufacturing. S. Application of scientific and engineering principles to fabricating processes such as casting, welding, forming, machining, and computer-aided manufacturing (CAM) so as to determine the relation of process to material properties, economics, dimensional accuracy, and energy requirements. Prerequisites: 205 and 305. *Mr. R. Van Andel.*

325 Digital Circuits and Systems Design F. A study of the techniques for analysis and synthesis of combinational, iterative, and synchronous sequential logic circuits. The student is introduced to digital logic families (TTL, ECL, ILL, MOSFET, MOS logic), electrical characteristics of combinational and sequential integrated logic packages, A/D and D/A conversion, control units, bus standards, microprocessors, static/dynamic memory units (RAM, ROM, PROM, EPROM), asynchronous logic, and interfacing. Laboratory experiences emphasize principles and design of digital systems. Prerequisites: 304 and 311. *Mr. D. Medema.*

326 Structural Analysis. S. A study of beams, two-dimensional trusses, and rigid frames. Course work includes calculation of shear forces and bending moments due to fixed and moving loads, calculation of deflection, analysis of moving loads using influence lines, and the analysis of statically indeterminate structures. The course also includes an introduction to matrix methods in structural analysis. Prerequisite: 305. *Mr. M. Vander Wal.*

327 Structural Design. F. Application of principles of mechanics of solids and structural analysis to the design of structural members made of steel or reinforced concrete. Allowable stress and ultimate strength design procedures are studied along with the AISC specification for the design, fabrication, and erection of structural steel for buildings and the ACI building code requirements for reinforced concrete. Computer techniques are used as aids to analysis and design. Prerequisite: 326. *Mr. M. Vander Wal.*

328 Applied Thermodynamics. S. Application of basic thermodynamic principles to the analysis of power and refrigeration cycles, air conditioning processes, chemical equilibrium, combustion, and compressible flow of fluids. Laboratory exercises are utilized to emphasize principles. Prerequisites: 309 and 310. *Mr. L. Van Poolen.* Not offered 1987-88.

329 Machine Design. F. Application of engineering mechanics, materials, and manufacturing concepts to the analysis and design of mechanical elements and systems. Computer techniques are used as aids to analysis and design. Prerequisites: 305 and 324. *Mr. L. Van Poolen.*

330 Electronic Circuits Analysis and Design. S. A study of electronic devices in analog and digital circuits. Topics include: device modeling, biasing, frequency response, feedback principles, Bode plots, operational amplifier, oscillators, single and multistage amplifiers, analog integrated circuits and filters. SPICE and other computer-aided design tools are used in the course. Students will assemble and test circuits in a laboratory. Prerequisites: 307 and 311. *Mr. D. Medema.*

336 Advanced Circuit Design. S. Analysis and design of integrated electronic circuits. A study of untuned and tuned voltage and power amplifiers, operational amplifiers used in a variety of applications, analog filter design, an introduction to digital filtering, modulators/demodulators, phase-locked loops, IC power management circuits, microprocessors as components in programmed logic, control systems, and filters. Emphasis is on realization of design specifications using commercially available integrated-circuit packages. Laboratory work in design. Prerequisites: 325 and 330. *Mr. K. Peterson.*

339 Senior Design Project. F, half course. The first course in the senior design project sequence. Introduction to various computer-related design tools including spread sheet analysis, linear and non-linear optimization, and computer-aided graphics and design. Emphasis is on design team formation, project identification, and completion of a feasibility study submitted in written/graphical report form. Prerequisite: concurrent registration in the seventh se-

semester of the model program of a particular concentration or permission of the instructor. *Staff.*

340 Senior Design Project. S. A study of topics related to the practice of engineering design as well as the completion of a major design project initiated in 339. Topics are the engineering enterprise, the design process, socio-economic evaluation of projects, the role of values in design, communication of the design. The focus of the course is the design prototype form where appropriate. Prerequisite: 339. *Staff.*

390 Independent Study. F, I, S. Independent readings and research. Prerequisite: permission of the chair. *Staff.*

JANUARY 1988 INTERIM

A catalog with the descriptions of all interim courses is available after October 1987.

W50 Intermediate Mechanics of Solids. *Staff.*

W51 Software Engineering. Mr. D. Medema.

W52 Analysis and Design Using Finite Elements. Mr. M. Vander Wal.

W53 Design Analysis of Thermal Systems. Mr. L. Van Poolen.

W55 VLSI Circuit Design. Mr. K. Peterson.

IDIS W50 Interdisciplinary Problem Solving. Mr. R. Hoeksema, Mr. S. Vander Linde.

English

Professors H. Baron, L. Basney, E. Ericson (chair), G. Harper, K. Kuiper, *C. Otten, **J. H. Timmerman, *C. Walhout, M. A. Walters
Associate Professors S. Gallagher, D. Hettinga, G. Schmidt, W. Vande Kopple, J. Vanden Bosch
Assistant Professors W. D. Brown, L. De Vries, B. Fisher, D. Ward, C. Winters

THE ENGLISH DEPARTMENT offers a major in English and majors and minors in secondary and elementary English education. Prerequisite to any of these concentrations is a minimum grade of C (2.0) in English 100. Normally, English 100 is the first course taken in the department.

The recommended program for the general English major requires one course from each of the following groupings:

1. 202, 304, 305, 306, 307;
2. 203, 308, 309;
3. 304-309, 313-316;
4. 302, 329, 330, 331;
5. 303;
6. 310;
7. 311.

It also requires three additional courses, which may include any of the above-listed courses or any others offered by the department, with the exception of 100,

212, 235, 251, 260, 325, 326, 336, and 360. Only one interim course may count towards the major. No course may fulfill more than one of the ten requirements.

The recommended program for the secondary-education English major is: 202; 203; 303; 310; 311; 220, 240, 251, or 326; 329 or 330; 313, 315, 319, or 321; 336. In this major, students must pass a screening test, which is given in September, November, and April; seniors must take 336 in the fall and Education 346 and 356 in the spring.

The six-course recommended program for the secondary-education English minor is: 202; 203; 310; 311; a course in writing (235, 260, 332, or 333), in teaching writing (336), or in language (329 or 330); an elective (excluding 100 and 212).

The recommended program for the elementary-education English major is: 200 or 220; 202; 203; 212, 310, or 311; 325 or 326; 329 or 330; 335; 313, 315, 319, or 321; an elective (excluding 100).

The recommended program for the elementary-education English minor is: 200, 220, or 240; 202 or 303; 203, 313, 314, 315, or 321; 212, 310 or 311; 325 or 326; 335, 329, or 330.

A student may alter any of the recommended programs with the permission of an academic advisor. The advisors are Mr. Kenneth Kuiper, Mr. William Vande Kopple, and Mr. James Vanden Bosch for the secondary-education programs; Mr. Henry Baron, Mr. Gary Schmidt, and Ms. Carol Winters for the elementary-education programs; and all professors in the department for the general-major program.

A group minor in journalism requires Communication Arts and Sciences 230, English 260, English 360 (or 332). In addition, the student must choose three courses from the following: Art 350, 351, or 360; Communication Arts and Sciences 251, 252, or 305; English 332; Political Science 318; an internship; and such interim courses as *The Media Elite* or *The News of the World*. The advisor for this program is Mr. Donald Hettinga.

A group minor in linguistics requires English 329, 330, Communication Arts and Sciences 150, and 307. In addition, the student must choose two electives, to be selected in consultation with the advisor for this program. The advisor is Mr. William Vande Kopple.

The core requirement in written rhetoric is met by 100 or by examination. The first literature core requirement is typically 200, 202, 203, 212, 220, or 240; but any course in literature (as distinguished from language, composition, and film) except 325 and 326 may fulfill this requirement. Any literature course other than those offered during the interim will satisfy additional core requirements in the fine arts.

100 Written Rhetoric. F and S, core. A study of written English rhetoric, including a review of grammar, extensive practice in writing expository essays, and the preparation of a research paper. *Staff.*

200 Understanding Literature. F and S. A study of selected literary works with an emphasis on their formal qualities and cultural significance. The course aims to enhance

the student's understanding of fiction, poetry, and drama. *Staff.*

202 Survey of English Literature I. F and S. A survey of major works of English literature from its beginnings to the late eighteenth century. *Mr. E. Ericson, Mr. G. Harper, Mr. J. Vanden Bosch.*

203 Survey of English Literature II. F and S. A survey of major works of English liter-

ature from the late eighteenth century into the twentieth century. *Mr. E. Ericson, Mr. G. Harper, Mr. J. Vanden Bosch.*

212 **American Literary Classics.** F and S. A critical study of American masterpieces as the literary embodiment of the evolving American mind, culture and values. At least eight American authors will be studied. The course is not open to students who have taken 310 or 311 or to English majors. *Staff.*

220 **World Literature.*** F and S. A course of selected readings and lectures in the literature of the European continent, ancient and modern, with special emphasis on the period from Dante to Solzhenitsyn and with particular attention to significant forms and themes. *Mr. L. Basney, Mr. J. Vanden Bosch.*

235 **Practice in Composition.** S. A second course in rhetoric and composition designed for students who wish additional practice in basic writing skills but who do not qualify for 332. Includes readings, a review of basic principles of rhetoric, and extensive practice in writing a variety of short papers. *Staff.*

240 **Modern Canadian Literature.** F. A study of selected works, principally twentieth-century fiction from English Canada, with some attention to major poets and French-Canadian writers in translation. Emphasis is placed on the social and historical context of Canadian literature. *Mr. H. Baron.*

251 **Introduction to Cinema.** S. A study of the development and structure of cinema as an art form and as a cultural medium. The course aims to develop the student's understanding of cinematic language and to guide him in assessing films and film values. Course work includes readings in film history and criticism as well as the viewing and analysis of movies. *Mr. G. Schmidt.*

260 **Basic Journalism.** F. A study of the principles and techniques of journalism—especially newspaper journalism—specifically, the definition of news and the varying policies governing the selection and presentation of local, national, and international stories. Against the background of a critical appraisal of current practices, students write, edit, and evaluate news reports and feature stories. *Mr. D. Hettinga.*

295 **Studies in Literature.** S. Not offered 1987–88.

302 **Chaucer.*** F. A study of Chaucer's *Canterbury Tales* and other selections from his work which reflect his literary genius and the major cultural phenomena of his time. Supplementary study of other works and literary movements related to the period are included. *Mr. J. H. Timmerman.*

303 **Shakespeare.*** F and S. A study of the major works of William Shakespeare. *Mr. L. Basney, Ms. C. Otten, Ms. M. A. Walters.*

304 **Literature of the English Renaissance.*** F. A study of the poetry and of some prose of the sixteenth century and of the drama of the sixteenth and early seventeenth centuries exclusive of Shakespeare. *Mr. G. Schmidt.* Not offered 1987–88.

305 **English Literature of the Seventeenth Century.*** F. A study of poetry and prose in England from 1600 to 1660 with emphasis on the religious lyric, especially the poetry of Donne and Herbert. *Mr. E. Ericson.*

306 **Milton.*** S. An intensive study of the poetry and prose of John Milton. *Mr. E. Ericson.*

307 **English Literature of the Eighteenth Century.*** S. A study of writing and its cultural contexts, with detailed attention to the works and careers of Dryden, Swift, Addison, Pope, Johnson, and Boswell. *Mr. L. Basney.* Not offered 1987–88.

308 **English Literature of the Early Nineteenth Century.*** F. A study of the Romantic writers of England in both poetry and prose with intensive critical work on Blake, Wordsworth, Coleridge, Byron, Shelley, and Keats. *Mr. J. Vanden Bosch.*

309 **English Literature of the Middle and Later Nineteenth Century.*** S. A study of the Victorian writers of England in both poetry and prose, with intensive critical work on Tennyson, Browning, and Arnold among the poets, and Arnold, Newman, Huxley, and Ruskin among the prose writers. *Mr. G. Harper.*

310 **Literature of the United States I.*** F. A survey of the literary works of the colonial and revolutionary periods. Intensive studies of the major romantic writers from 1820 to the Civil War. *Ms. S. Gallagher, Mr. K. Kuiper.*

311 **Literature of the United States II.* S.** A study of the important writings of the post-Civil-War period, including the realistic and naturalistic movements, the development of modernism in poetry and fiction, and the achievements of the post-World-War-I generation in the 1920s and 1930s. *Ms. S. Gallagher, Mr. K. Kuiper.*

313 **Modern English and American Poetry.* S.** A study of the lyric and dramatic poetry of England and America from 1890 to the present. *Mr. C. Walhout.*

314 **The English Novel.* S.** A survey of the English novel from its beginnings through Conrad, with emphasis upon the art and thought of the major novelists. Special attention is paid to the development of realistic, romantic, epic, and symbolic strains in modern fiction. The course includes the reading of at least twelve novels. *Mr. D. Ward.*

315 **Modern British and American Fiction.* F and S.** Intensive reading of selected works of major twentieth-century British and American novelists. *Mr. D. Hettinga, Staff.*

316 **Modern Drama.* F.** Plays by the following authors are read and discussed in relation to the major movements in modern drama: Ibsen, Chekhov, Shaw, Brecht, Pirandello, Beckett, O'Neill, Miller, Williams, Albee, and Pinter. (Formerly 321) *Ms. M. A. Walters.*

319 **Literature Since 1945.* S.** A study of the fiction and poetry of America and England since World War II. *Staff.* Not offered 1987-88.

325 **Children's Literature.* F and S.** A study of children's literature, including intensive reading of the best of this literature and the application of literary standards to what is read. *Ms. C. Otten, Mr. G. Schmidt.*

326 **Adolescent Literature.* F.** A study of adolescent literature, including intensive reading in the best of this literature and application of literary standards to the reading. *Mr. H. Baron.* Not offered 1987-88.

329 **Linguistics.* F and S.** A study of some of the more interesting and important characteristics of language, with particular attention given to the assumptions informing the nomenclature, methodology, and scope of traditional, structural, transformational, generative-semantic, and text gram-

mars. The course incidentally considers the relationship of these grammars to the study of reading, composition, and literature. *Mr. W. Vande Kopple.*

330 **History of the English Language.* S.** An analysis of the changes that have occurred throughout the history of the English language, based on an intensive study of selected portions of the *Oxford English Dictionary* and passages from Chaucer, Shakespeare, and various English translations of the Bible. *Mr. G. Schmidt.*

331 **Literary Criticism.* S.** An introduction to contemporary theories and methodologies of literary criticism with investigations into their historical origins and development. The course includes illustrations of the various methods as well as some practical criticism. *Mr. C. Walhout.*

332 **Advanced Composition.* S.** A course in advanced expository writing. Readings in the formal essay, together with writing in such types of composition as the formal and informal essay, the opinion editorial, the informative and feature article, and the book review. Open to students who have earned at least a B (3.0) in 100. *Mr. L. Basney.*

333 **The Writing of Poems, Stories, and Plays.* S.** A course in the principles of composition of poems, stories, and plays. Works by contemporary authors are analyzed in the light of these principles. Students will practice writing in all three forms. Prerequisite: a grade of B (3.0) in 100. *Staff.*

335 **Language, Grammar, and Writing for the Elementary Classroom.* S.** An introduction to several significant and practical aspects of the nature of language, a review of the nature of traditional grammar, including some comparisons of traditional grammar with more recently developed grammars, and an exploration of the relationships between these grammars and composition instruction and practice. *Mr. W. Vande Kopple.* Not offered 1987-88.

336 **Teaching of Writing.* F.** A course in the principles, practice, and pedagogy of composition, especially as these apply to junior high and high school writing programs. Extensive reading and frequent exercises in composition, revision, and evaluation. Senior majors in teacher education programs must take this course in the fall

and Education 346 and 356 in the spring semester. *Mr. H. Baron.*

360 Investigative Reporting and Feature Journalism. S. A course in the ethics and methods of investigative reporting and in the art of writing feature stories. The course pays particular attention to the process by which specialized information from various fields—government, science, engineering, medicine, law, religion, and business—is prepared for public comprehension. Students write, edit, and evaluate feature stories designed for weekly and monthly periodicals. English 260 is recommended as a prerequisite but not required. *Mr. D. Hettinga.*

390 Independent Study. F, I, S. Prerequisite: permission of the department chair.

395 Seminar: James Joyce.* F. A seminar in the life and works of James Joyce (1888–1941), Irish writer of prose and poetry, author of *Ulysses*, and still-controversial figure in the rise of Modernism. Students will read all of Joyce's works, will present seminar papers, and will be expected to critique each other's papers with a view to aiding their authors to refine the provisional papers into term essays. *Mr. G. Harper.*

GRADUATE COURSES

510 Literature for the Adolescent. A survey and evaluation of adolescent literature, an examination of reference tools and approaches to the teaching of adolescent literature, a consideration of criteria for selection, and a critical study of several representative works. *Mr. H. Baron.*

511 Studies in Analytical Approaches to the Teaching of Literature. An examination of the theoretical considerations underlying various approaches to teaching literature at the secondary level and application of critical approaches to selected literary works. The specific subject matter will be defined each time the course is offered. *Staff.*

526 Recent Literature for Children. F. A survey and evaluation of children's literature, with emphasis on the more recent literature; consideration of criteria for selecting children's literature; examination of reference tools, recent trends, issues, and approaches to the teaching of children's literature; and critical study of several representative works. *Mr. G. Schmiadt.*

531 Language and the Elementary Classroom. A study of some aspects of traditional grammar and an introduction to the history of English and current linguistic theory and concerns. Special emphasis is placed on the implications of this knowledge for classroom teaching. *Staff.*

537 Teaching of Writing in Elementary and Middle Schools. A course in the principles and practice of writing, including the study of techniques appropriate for teaching elementary and middle school students to write well. *Staff.*

580 Principles, Practices, and Programs in Secondary English Education. An advanced methods course for those teachers working at the junior high school or high school level. It involves general principles, materials, and pedagogical practices with emphasis on current trends and developing problems. Each student will make a special study of a given area of language, composition, or literature. *Mr. H. Baron.*

581 Methods and Materials in the Language Arts. A study of programs and techniques of effective teaching of language arts in the elementary school plus a review of current materials in relationship to improvement of instruction. *Staff.*

590 Independent Study. F, I, S. *Staff.*

595 Graduate Project. F, I, S, full or half course. The prospectus for each Master of Arts in Teaching project must be developed under the supervision of a faculty member and must be approved by the student's graduate advisor. *Staff.*

JANUARY 1988 INTERIM

A catalog with the descriptions of all interim courses is available after October 1987.

W10 Literature and Injustice: Three South African Authors. *Ms. S. Gallagher.*

W11 The Butler Did It: English Detective Fiction. *Mr. G. Harper.*

W12 Christian Fiction. *Mr. H. Baron.*

W13 Thoreau and the Image of Nature. *Mr. L. Basney.*

W14 King Arthur and the Middle Ages. *Mr. G. Schmiadt.*

W15 C. S. Lewis, Apologist in Fiction. *Mr. G. Musacchio.*

W16 **Religious Themes in the Modern Short Story.** *Mr. W. Brown.*

W17 **T. S. Eliot: The Poet, the Man, and the Critic.** *Ms. C. Winters.*

W18 **The Influence of Science in Literature.** *Mr. D. Ward.*

W50 **Dostoevsky: The Major Novels.** *Mr. E. Ericson.*

W51 **The Life and Literary Achievement of Ernest Hemingway.** *Mr. K. Kuiper.*

W52 **Shakespeare on the Page and on the Stage.** *Ms. M. A. Walters.*

W53 **Grammar for Teachers and Others.** *Mr. W. Vande Kopple, Mr. J. Vanden Bosch.*

W54 **Dante: A Study of The Divine Comedy.** *Mr. S. Van Der Weele.*

Environmental studies

SEE THE DEPARTMENT OF GEOLOGY, GEOGRAPHY, AND ENVIRONMENTAL STUDIES for a description of courses and programs of study in environmental studies.

French

Professors C.-M. Baldwin (chair), A. Otten
Assistant Professors C. De Jong, G. Fetzer

PROGRAMS FOR STUDENTS wishing to major in French are worked out for them individually by the department chair. To be eligible a student must have completed at least two courses in French with a minimum grade of C (2.0) and must have completed 101-102, 121-122, or the equivalent.

The program of concentration includes 201-202 or the equivalent, 215, 216, 217, 218, and four additional 300-level courses. If approved in advance, one French interim course will count toward the major. Approved courses completed in a junior year program in France may be applied to the program of concentration. The six-course minor program must include 215, 216, 217, and 218. Nine college-level courses in French are required for a teacher education major and six for a teacher education minor. The elementary teacher education minor is 215, 216, 217, 218, and two electives, one of which may be the French interim abroad. In order to qualify for the spring semester teaching internship, students must pass the qualifying French language test before the end of the junior year. Students beginning their study of French in college should consult the department chair early in their college career. Cognates in a second language, art (231, 232), English or American literature (202, 203, 212, 303), and history (220) are recommended.

All courses above 102 meet core requirements; 217, 218, 311, 312, 313, 371, and 372 meet core requirements in the fine arts.

LANGUAGE

101 **Elementary French.** F. An introductory course in the comprehension and use of spoken and written French. Ms. C. De Jong, Mr. A. Otten.

102 **Elementary French.** S. Continuation of 101. Mr. A. Otten, Staff.

121-122-123 **Introductory and Intermediate French.** F, I, S. A closely integrated sequence involving two semesters and the interim for students who have completed two years of high school French but who, on the basis of a placement test, are not prepared for 201. Students are assigned to this class on the basis of a placement test administered at the time of fall registration. Ms. C. De Jong, Ms. L. Mathews, Mr. A. Otten.

201 **Intermediate French.** F. Further training in spoken and written French, study of the structure of the language, and practice in listening and reading. Mr. G. Fetzer, Ms. L. Mathews.

202 **Intermediate French.** S. Continuation of French 201. Mr. G. Fetzer, Ms. L. Mathews.

215 **Advanced Conversation.** F. This course is designed to develop advanced oral comprehension skills as well as advanced competence in spoken French through exercises, drills, conversation in class and in small groups. Prerequisite: 123, 202, or the equivalent. Ms. C.-M. Baldwin.

216 **Advanced Grammar and Composition.** S. Systematic study of advanced grammar and composition. Conversation in small groups. Prerequisite: 123, 202, or the equivalent. Ms. C. De Jong.

315 **French Phonetics and Oral Communication.** F, half course. This course is for the advanced student who wishes to improve fluency in and knowledge of the language, who wants to prepare for the teaching of French or for graduate study. Major emphasis: descriptive and corrective phonetics, dictation, and conversation. Prospective teachers should take this course in their junior or senior year. Prerequisite: 216 or permission of the instructor. Not offered 1987-88.

316 **French Composition and Oral Comprehension.** S, half course. This course is for

the advanced student who wishes to improve fluency in and knowledge of the language. Major emphasis: oral comprehension, advanced grammar, stylistics, and *la dissertation*. Prospective teachers should take this course in their junior or senior year. Prerequisite: 216 or permission of the instructor. Not offered 1987-88.

LITERATURE

French 217 and 218 are normally prerequisite to all other courses in literature and civilization.

217 **Introduction to French Literature.** F. An introduction to the major writers and movements in French literature from the Middle Ages to the eighteenth century. Conducted in French. Mr. G. Fetzer.

218 **Introduction to French Literature.** S. An introduction to the major writers and movements in French literature from the nineteenth century to the present. Conducted in French. Mr. G. Fetzer.

311 **French Drama.*** S. A study of dramatic literature from the Middle Ages to the present day, with emphasis on classical and contemporary drama. Conducted in French. Not offered 1987-88.

312 **The French Novel.*** F. A study of fiction from the Middle Ages to the present day with special emphasis on the nineteenth and twentieth centuries. Conducted in French. Ms. C.-M. Baldwin.

313 **French Poetry.*** S. A study of the history and nature of French poetry by means of extensive reading and intensive examination of major poets with special attention to the poets of the modern period, beginning with Baudelaire. Conducted in French. Not offered 1987-88.

314 **French Prose.*** F. A study of major writers expressing French thought, spirit, and sensibility in nonfiction from Calvin to the present. Conducted in French. Not offered 1987-88.

371 **Literary Doctrines and Problems.*** S. A study of major literary texts as well as concurrent theoretical statements representing three basic orientations within the French tradition: the neo-classical, the romantic, and the modern. The examination

of each of these areas will be followed by the application to them of current literary standards and criteria. Conducted in French. Mr. A. Otten.

390 **Independent Study.** Introduction to the materials and methods of research. In consultation with the instructor, the student will define a problem in literary history, criticism, or theory, will do research in it, and present the results of his study in an organized *dissertation*, written in French. Limited to the senior prospective graduate student. Staff.

395 **Seminar.***

CIVILIZATION

272 **Introduction to French Culture and Civilization.** An introduction to the cultural traditions of France and to the way these are reflected in its social, political, and religious institutions and in its literature, art, and music. The course is taught in English; no knowledge of French is required. Satisfies

the foreign culture option for students in designated programs. Not offered 1987-88.

372 **French Civilization.** S. A study of France's history, geography, and its cultural traditions as they are expressed in French social customs and institutions, religious and political life and the fine arts. Major issues of contemporary French life will also be featured. Lectures and discussions conducted in French. Ms. L. Mathews.

JANUARY 1988 INTERIM

A catalog with the descriptions of all interim courses is available after October 1987.

W50 **Québec Live! Interim in "La belle province."** (Off-campus) Ms. C.-M. Baldwin.

W51 **Paris and the Arts.** Mr. A. Otten.

W52 **"Made in France"—Introduction to Business French.** Mr. G. Fetzer.

122 **Intermediate French.** Ms. C. De Jong, Ms. L. Mathews.

Geology, geography, environmental studies

Professors H. Aay, J. Clark, †C. Menninga, D. Young (acting chair)
Assistant Professor N. Perrin

PROGRAMS IN THE DEPARTMENT include major and minor concentrations in geology, a group minor in environmental studies, a minor in geography, as well as majors and minors for teacher education programs.

Programs in geology. The major program of concentration in geology consists of 151 or 105, 152, 201, 202, 212, and four additional courses approved by the advisor. Field camp is recommended. Required cognate is Chemistry 103. Recommended cognates include Chemistry 104, Physics 123, 124, 181, 182, and Mathematics 161 and 162.

The recommended program for students who wish to pursue a career or graduate study in geology consists of 151 or 105, 152, 201, 202, 212, 301, 302, 311, 313,

either 395 or 396, and field camp, with cognates including Chemistry 103 and 104, Physics 123, 124, 181, 182, and Mathematics 161 and 162.

Teacher education programs in geology. The geology–earth science major for teacher education consists of 151 or 105; 152; 201; 202; 212; and four and $\frac{1}{4}$ course units chosen from among 301, 302, 304, 311, 313, 314, 321, 331, Environmental Studies 202, and an approved elective. The education minor consists of 151 or 105; 152; 201; 212; and two course units chosen from among those listed for the major.

Students must have completed at least two courses in geology with a minimum average grade of C (2.0) before they may be formally admitted to the major program in geology.

The minor concentration in geology consists of 151 or 105, 152, 201, 212, and two additional courses approved by the advisor.

Group majors consisting of geology and chemistry, engineering, or physics are also available.

Programs in geography. Programs and courses in geography are offered as electives for students who wish to broaden their social science knowledge through the study of human ecology and locational analysis. A minor concentration in geography requires Geography 100, 101, 201, 210, 220, plus an additional course approved by the advisor. This is the appropriate minor for secondary teacher education.

Programs in environmental studies. Courses in environmental studies are offered to those students interested in studying a broad range of environmental problems and issues at the local, national, and global levels. Because the study of such issues is truly interdisciplinary in scope, environmental studies courses are suitable for students from the humanities, the social sciences, and the natural sciences. They may be taken singly as electives to enrich a program of study or as a supplementary concentration to a major. The group minor consists of three required courses, Environmental Studies 201, 202, and 395; two courses chosen with the approval of the program advisor from among: Biology 113, 114, 116, 234, 311S, 352, Chemistry 110, Environmental Studies 385, Economics 332, Geography 101, 210, Geology 100 or 103, 151, 311, Sociology 308, or approved interim courses; and one additional elective approved by the advisor, Mr. Henry Aay. Many courses offered at Au Sable Trails Institute of Environmental Studies may also serve as electives in the program.

Teacher education programs in geography and environmental studies. Prospective secondary teachers wishing to teach subjects taught in this department should consult the department chair.

Prospective elementary teachers may choose concentrations including courses in geology, geography, and environmental studies. All those enrolled in the elementary education program must take Geography 101. Social studies group majors may take a three-course sequence consisting of Geography 100 or Geology 103, Geography 101, 210 or 220. The elementary teacher education minor is 101, 210, 220, Environmental Studies 201, and two approved interim or semester courses.

The elementary teacher education minor in environmental studies is 201; 202; 395; two courses from Biology 116 or 234, 311S, Chemistry 110, Environmen-

tal Studies 385, Economics 332, Geography 101, 210, Geology 100 or 103, 105 or 151, 311, Sociology 308, or an approved interim course; and one approved elective. The teacher education advisor is Mr. Stanley Haan of the Physics Department.

General regulations. The core requirement in the physical sciences may be met by Geology 103. The core requirement in the natural sciences may be met by Geology 151-152 or 105-152.

A group major in science and mathematics meets the needs of some students, particularly those in professional programs. Such group majors require twelve courses in the sciences and mathematics, ten of which must be from two departments with no fewer than four from either, with the remaining two courses chosen from a third department. The chairs of the three departments involved must approve such programs.

ENVIRONMENTAL STUDIES

201 Human Activities and Natural Environments.* F. An examination of the complex system of relationships between human activities and natural environments. The ecology of natural systems will be studied by examining the relationships among their dynamic components. Upon this framework, activities by which societies—past and present—have used, affected, and transformed their natural settings are examined. Not open to freshmen. (Also listed as Geography 201) *Mr. H. Aay.*

202 Environment and Society: Issues and Policies.* S. The interactions among population, resources, technology, economics, and public policy are studied in order to understand and address the environmental issues and problems of our day. Attention is focused upon energy, material, and food resource issues as well as upon population and resource relationships. Political, economic, and technological policies plus individual lifestyles are considered as part of responsible earthkeeping. Not open to freshmen. *Mr. H. Aay.*

385 Internship in Environmental Studies.* F or S. This course is an internship involving field application of the concepts and principles learned as part of the environmental studies supplementary concentration. A student is placed in a position in a governmental agency, a not-for-profit organization, or a corporate firm which builds on previous instruction in the student's program of concentration in an area related to environmental matters. Students are assigned a specific project and work under the direct supervision of an employee

of the governmental, non-profit, or business entity, as well as under the supervision of the instructor. Prerequisites: Environmental Studies 201, 202, and permission of the instructor. *Mr. H. Aay.*

395 Seminar in Environmental Studies.* S. This course aims to develop a Christian philosophy of the environment and environmental management. Problems, controversies, developments, issues, and research in environmental affairs are examined. These topics are studied through readings, student reports, and guest lecturers. Prerequisites: Environmental Studies 201 and 202 or permission of the instructor. *Mr. H. Aay.*

GEOGRAPHY

100 Earth Science. F. An introductory study of four aspects of the earth: earth as a planet in the solar system; the structure and composition of earth's crust and interior; earth's atmosphere and weather processes; and the oceans. Laboratory. (Also listed as Geology 100) *Ms. N. Perrin.*

101 Introduction to Geography. F and S. A systematic overview of geography as a field of study: major paradigms, subfields, theories, theorists, concepts, techniques, and viewpoints. The course seeks to develop a geographic perspective on world and life. Principal topics for study include the physical earth, human ecology, and the spatial organization of society. *Mr. H. Aay.*

201 Human Activities and Natural Environments.* F. An examination of the complex system of relationships between human activities and natural environ-

ments. The ecology of natural systems will be studied by examining the relationships among their dynamic components. Upon this framework, activities by which societies—past and present—have used, affected, and transformed their natural settings are examined. Not open to freshmen. (Also listed as Environmental Studies 201) *Mr. H. Aay.*

210 Introduction to Cultural Geography.* F. An examination of the interactions between culture and nature in pre-agricultural, agricultural, and urban-industrial societies. The course explores the origins, character, content, organization, perceptions, and meanings of cultural landscapes, past and present, large and small. Prerequisite: 101. *Mr. H. Aay.* Not offered 1987–88.

220 Urban Geography.* F. A study of the spatial organization of cities and systems of cities. Both the internal structure and external relations of cities receive attention. The historic and present-day spatial organization of infrastructure, economic life, social activities, ethnicity, institutions, and politics are examined. Prerequisite: 101 or one social science course. *Mr. H. Aay.*

390 Independent Study. F, I, S, full or half course. The independent study of a subdiscipline or topic in geography not included in the regular curriculum. Prerequisite: permission of the department. *Staff.*

395 Research in Geography. F, I, S, full or half course. Field or library research on an approved geographical problem and presentation of the results of this research in a seminar. Open to qualified students by permission of the department. *Staff.*

GEOLOGY

100 Earth Science. F. An introductory study of four aspects of the earth: earth as a planet in the solar system; the structure and composition of earth's crust and interior; earth's atmosphere and weather processes; and the oceans. Laboratory. (Also listed as Geography 100) *Ms. N. Perrin.*

103 Man and the Earth. F and S, core. An introduction to geology. A study of the materials and processes of the earth leading to a responsible Christian appreciation for and use of the earth. The principles of geology are explored through a survey of the history of the ideas about the Earth. Basic insights of chemistry, biology, physics, and

mathematics are applied to the solution of practical geological problems, with emphasis on such geological hazards as earthquakes, volcanic eruptions, floods, marine erosion, and mass wasting and on the nature and distribution of fossil fuels, metals, ground water, and other mineral resources. Laboratory. *Ms. N. Perrin, Mr. D. Young.*

105 Introductory Field Geology. Summer. An introduction to geology through intensive field study. Students learn the basic principles of geology and become familiar with important earth materials and processes through firsthand observation of such features as the Cascade Range volcanoes, the Pacific Ocean coast, the Klamath Mountains, and the rivers and lakes of southern Oregon. Students live for about three weeks at a base camp located east of Ashland, Oregon, near the crest of the Cascades. Not open to students who have taken 103 or 151. Prerequisite: permission of instructor. *Mr. D. Young.* Not offered 1987–88.

151 Introductory Geology. F. A study of the geological structure of the earth. Topics included are: minerals and rocks; formation and alteration of rocks in the earth's crust; earth's interior and surface structure; surface processes producing landforms; and the earth as a representative planetary body in space. Laboratory. *Mr. J. Clark.*

152 Historical Geology. S, core. A study of geological structures that have existed in the past and of the changes and development that have taken place in the earth's crust. Evidences for these past structures and events are taken from present rock strata, including the fossil record. Laboratory. Prerequisites: 105, 151, or 103 and permission of instructor. *Ms. N. Perrin.*

201 Mineralogy.* F. A study of the principles of crystal structure in minerals with emphasis on the silicates. Modes of geologic occurrence of minerals are reviewed. Crystal morphology and mineral identification are emphasized in laboratory. Laboratory. Prerequisites: 105 or 151 and Chemistry 103. *Mr. D. Young.*

202 Optical Mineralogy.* S, half course. This course treats the theory of polarized light transmission in minerals, the use of the polarizing microscope in the identification of minerals and determination of their optical properties, and the use of the uni-

versal stage. Laboratory. Prerequisite: 201. *Mr. D. Young.*

212 Structural Geology.* S. An analysis of common geological structures such as folds, faults, joints, and foliations; inquiry into the means by which these structures are formed from stresses within the earth; methods of constructing and interpreting geological maps and cross sections; introduction to field-mapping techniques. Laboratory, field trip. Prerequisite: completion of or concurrent registration in 152. *Mr. J. Clark.*

301 Igneous and Metamorphic Petrology.* F. An investigation of the mineralogy, chemistry structure, texture, field associations, tectonic setting, and genesis of igneous and metamorphic rocks. The petrographic microscope is used extensively in the description and genetic interpretation of rocks. Laboratory. Prerequisite: 202. *Mr. D. Young.*

302 Sedimentology.* S. The study of sedimentary rocks. This course includes theories of depositional processes, lithification and diagenesis of sediments; classification of sedimentary rocks; comparisons of structures in modern deposits to those found in ancient rocks; and applications to fossil fuel industries. Laboratory. Prerequisite: 202. *Ms. N. Perrin.*

304 Geochemistry.* S. The origins and history of the solar system, earth, crust and mantle, and various rock types in light of the distribution of the chemical elements and of stable and radioactive isotopes. Prerequisites: 201, 105 or 151 plus Chemistry 104, or permission of the instructor. *Mr. D. Young.*

311 Geomorphology.* F. The investigation of landforms and the processes which cause them. This course studies the erosional and depositional features resulting from rivers, glaciers, and wind, as well as coastal, gravitational, and weathering processes. Landforms are described and classified from field observations, topographic maps, and aerial photographs. Explanations of the landforms are offered through quantitative modeling of the processes. Laboratory, field trips. Prerequisite: 151. *Mr. J. Clark.*

313 Paleontology.* F. A study of organisms that once lived on the Earth. Includes an examination of the processes of fossiliza-

tion and methods of discovering the structure, habitat, and relationships of those organisms, and a review of their distribution and life history. A broad spectrum of organisms is studied with emphasis on invertebrate animals. Prerequisite: 151 or Biology 202. *Mr. C. Menninga.* Not offered 1987-88.

314 Stratigraphy.* S. The fundamental principles of the classification and interpretation of rock strata are illustrated through intensive study of classic stratigraphic successions in the central Appalachians, the Colorado Plateau, Wyoming, and the British Isles. Laboratory, field trips. Prerequisite: 152. *Ms. N. Perrin.*

321 Glacial Geomorphology and Climatic Change.* S. Study of the effects of ice sheets and colder climates of past ice ages upon the earth's surface. In this course glaciology (accumulation and flow of glaciers) and glacial geology (landforms due to glaciation) are studied, emphasizing the glacial stratigraphy of Michigan. An overview of deposits of Quaternary age throughout the world gives additional evidence for and understanding of previous ice ages. Theories of climatic change, as well as man's effect upon and response to climatic change, are also discussed. Laboratory and field trips. Prerequisite: 311. *Mr. J. Clark.*

331 Geophysics.* F. An overview of physical methods used for determining properties of the earth's interior (solid earth geophysics) and for discovering economically important resources in the earth's crust (exploration geophysics). Topics in solid earth geophysics: heat flow and the earth's temperature distribution; gravity and the density profile and shape of the earth; magnetism of the earth and paleomagnetism; anelastic properties and viscosity of the earth; and earthquake prediction. Topics in exploration geophysics: reflection and refraction seismology, gravimetry, resistivity, and well-logging techniques. Laboratory. Prerequisites: 151, Physics 124 or 126, Mathematics 162, or consent of the instructor. *Mr. J. Clark.* Not offered 1987-88.

390 Independent Study.* F, I, S, full or half course. Prerequisite: permission of the department. *Staff.*

395-396 Research in Geology.* F, I, S, full or half course. Field and/or laboratory research on an approved geological prob-

lem and presentation of the results of the research in seminar. Open to qualified students by permission of the geology staff. *Staff.*

GRADUATE COURSES

520 **Advanced Earth Science.** This course includes consideration of the main ideas which serve as unifying principles in earth science. Recent discoveries and current research projects are reviewed. The course highlights ideas resulting from studies in earth sciences which have increased our understanding of the relationship between the earth and its human inhabitants. Topics include applications of geology to environmental problems, contributions of space research to understanding the earth, and the relationship between the results of geological study and teachings of the Bible. Special attention is given to topics and concepts which can be incorporated into elementary,

middle, and secondary school materials and activities. Prerequisite: Geology 100 or permission of the department. *Staff.*

590 **Independent Study** (graduate). F,I,S. *Staff.*

595 **Graduate Project.** F, I, S, full or half course. The prospectus for each Master of Arts in Teaching project must be developed under the supervision of a faculty member and must be approved by the student's graduate advisor. *Staff.*

JANUARY 1988 INTERIM

A catalog with the descriptions of all interim courses is available after October 1987.

W10 **Rocks and Blocks: Landforms and Cities.** *Mr. H. Aay, Mr. D. Young.*

IDIS W58 **Wilderness Skiing in Yellowstone: A Geo-Thermal Experience.** (Off-campus). *Mr. J. Clark, Mr. J. Gallagher.*

German

*Professors W. Bratt, B. Carvill (chair, Department of Germanic Languages), C. Hegewald, J. Lamse
Instructor T. Huizinga*

PROGRAMS FOR STUDENTS wishing to major in German are worked out for them individually by departmental advisors who should be consulted early. To be eligible a student must have completed at least two courses in German with a minimum grade of C (2.0) and must have completed 102, 122, or the equivalent.

The typical major requires ten courses in addition to the elementary courses and must include 123, 202, or the equivalent, 215, and at least two 300-level courses. Six-course minors must include 215. The nine-course teacher education major must include 215, 216, 250, and two 300-level courses. Prior to the teaching internship which is offered only during the spring semester, students must pass a German grammar test given in the first week of the fall semester. The elementary teacher education minor is 215, 216, 217, 250 or the German interim abroad, and two approved courses. The teacher education advisor is Ms. B. Carvill.

Calvin-sponsored programs are available in Germany and Austria for the interim, a semester, the academic year, or the summer. Students interested in such programs should work out the details with the department chair and the registrar.

The fine arts core may be met by German literature courses numbered 217 and above.

LANGUAGE

101 **Elementary German.** F. A first German course taught by the Total Physical Response method and the Natural approach. Students acquire a basic vocabulary and develop elementary listening, reading, and speaking skills by activating their natural ability to understand meaningful speech. *Mr. T. Huizinga.*

102 **Elementary German.** S. Continuation of 101. Further development of listening, reading, and speaking skills, as well as an introduction to basic German grammar. *Mr. T. Huizinga.*

121-122-123 **Introductory and Intermediate German.** F, I, S. A closely integrated sequence involving two semesters and the interim for students who have completed two years of high school German but who, on the basis of a placement test, are not prepared for 201. The course is also open with the permission of the department to students in teacher education programs who have had no foreign language in high school. *Staff.*

201 **Intermediate German.** F, core. Grammar review, West and East German *Landeskunde*, readings, and continued emphasis on the development of spoken and written German. Prerequisite: 102 or four units (two years) of high school German. *Staff.*

202 **Intermediate German.** S, core. Continuation of 201. Prerequisite: 201. *Staff.*

203 **Intermediate German.** F, core. A one-semester course intended specifically for students who have successfully completed three years (six units) of high school German. Selected readings and continued language study. *Mr. C. Hegewald.*

215 **Intermediate Oral and Written Composition.** F. Exercises, compositions, and drills designed to develop in the student intermediate competence in speaking and writing idiomatic German. Prerequisite: 123 or 202. *Mr. J. Lamse.*

216 **Advanced Oral and Written Composition.** S. Continuation of 215. *Mr. J. Lamse.*

LITERATURE

217 **Readings in Major German Authors.** S, core. Basic introduction to German literature. Selected readings in major German authors from 1750 to 1850. Prerequisite: 123 or 202. *Mr. J. Lamse.*

218 **Readings in Major German Authors.** F and S, core. Readings in major German authors from 1850 to the present. Prerequisite: 123 or 202. *Mr. W. Bratt.*

250 **German Civilization.** F, odd years, core. A study of the German spirit as it finds expression particularly in social customs and institutions, religious and political life, and the fine arts. Lectures and discussions. Prerequisite: 123 or 202. Not offered 1987-88.

301 **Classicism.*** S, even years. A study of the origins, nature, and literary manifestations of the classical ideal in eighteenth-century Germany. Readings from Lessing, Goethe, and Schiller. Prerequisite: 217, 218, or permission of the instructor. *Mr. J. Lamse.*

303 **Romanticism.*** S, odd years. The literary theory and philosophical-religious basis of the German romantic movement as reflected in representative works of both earlier and later Romanticists. Prerequisite: 217, 218, or permission of the instructor. *Mr. J. Lamse.*

304 **Realism.*** S, even years. Readings in German and Swiss prose fiction of the latter half of the nineteenth century. A survey of the intellectual and cultural changes immediately preceding this era and an analysis of some literary works characteristic of the period. Prerequisite: 217, 218, or permission of the instructor. *Mr. C. Hegewald.*

306 **Literature of the German Democratic Republic.*** F, even years. A survey of East German literature from its beginnings in the late 1940s to the present. The course includes an analysis of the relationship of the literature to the literary theories of Socialist Realism as well as to the political and social structure of the German Democratic Republic. Prerequisites: 217, 218, or permission of the instructor. *Mr. W. Bratt.*

307 **Early Twentieth-Century Literature.*** F, odd years. Selected readings in German

literature from 1890 to 1940, with special emphasis on the works of Hauptmann, Th. Mann, Kafka, Hesse, and Brecht. Lectures, discussions, and assigned papers. Prerequisite: 217, 218, or permission of the instructor. Ms. B. Carvill.

308 **Literature of the Federal Republic of Germany.** S, odd years. Readings in German literature from 1945 to the present from such writers as W. Borchert, Frisch, Böll, and M. Walser. Lectures, discussions, and assigned papers. Prerequisite: 217, 218, or permission of the instructor. Ms. B. Carvill.

390 **Independent Study.** This course is tailored to meet the needs of the individual student, to enable him to broaden his familiarity with the more important German literary works, and to deepen his understanding of them in tutorial discussions. Prerequisite: approval of the department chair. Staff.

395 **Seminar.**

CIVILIZATION

361 **Introduction to Modern German Culture.** F and S. A survey of the German

cultural tradition of this century as it finds expression in the various arts, with particular emphasis on films and representative works of literature in translation. Open to all students, but planned primarily for those in designated preprofessional courses whose programs include the "foreign culture" option. No knowledge of German is required. Mr. W. Bratt.

JANUARY 1988 INTERIM

A catalog with the descriptions of all interim courses is available after October 1987.

W50 **German Interim Abroad.** (Off-campus) Mr. J. Lamse.

IDIS W19 **Mirror of the Soul: Stories and Films.** Ms. B. Carvill, Ms. M. Vander Goot.

IDIS W20 **Nazi Germany.** Mr. C. Hegewald.

IDIS W56 **Up From the Ashes: The German Church's Quest for Obedience After the Holocaust.** Ms. A. Smith-Von Osten.

Greek

SEE THE DEPARTMENT OF CLASSICAL LANGUAGES for a description of courses and programs of concentration in Greek.

History

Professors R. Bolt (chair), H. Brinks, B. De Vries, D. Diephouse, S. Greydanus, F. Roberts, D. Van Kley, E. Van Kley, R. Wells
Associate Professors J. Bratt, D. Miller
Assistant Professor W. Van Vugt

PROGRAMS FOR STUDENTS majoring in history will be worked out for them by departmental advisors. Such programs will reflect the students' interests both

within the field of history and in related departments, their anticipated vocational goals, and the demands of the historical discipline. A minimum grade of C (2.0) in 101 or 102 is required for admission to major programs. For most programs a proficiency in either French or German is advised. Students are asked to consult with departmental advisors early in their college careers concerning their choice of a foreign language and, if secondary teaching is their goal, concerning the various types of programs leading to certification.

The minimum requirements for a major concentration are nine courses in history including 101, 102, or 102 Honors; the departmental seminar (395); and a program emphasizing either American, European, or world history concentrations. One upper-level interim course may be included in the required nine courses. The European concentration requires at least three courses from 301–305, at least one course from 310–312, and at least one additional course from 310–312 or from 355 and 356. The American concentration requires at least three courses from 310, 311, 312, 355, and 356; and at least two courses from 301–305. The world history concentration requires one course from 301–305 (from 301–302 if the student has taken 102); one course from 310–312; and at least four courses from 201, 202, 203, 204, 205, 206, 207, and 320. A 390 in a non-western field is also advised. The world history concentration is designed primarily for teacher education students. Other teacher education programs require two to three courses from both the European and the American sequence with electives from non-western history. A secondary school minor includes 101 or 102; two from 310, 311, 312 (or 211 plus either 355 or 356); 360, and two others. The elementary teacher education minor is 101 or 102; 211 or 215; one course from 201–207; one course from 301–312; 320; and an approved interim or semester course. The ideal teaching minor should include the designated courses in both programs. One upper-level interim course may be applied to a minor concentration. Students seeking special advice on teacher education programs, including group majors for middle school teaching, should consult Mr. Daniel Miller or Mr. Samuel Greydanus.

The core requirement in history must be met by one course from 101, 102, or 102 Honors; any other regular course in the department will satisfy an additional requirement in the contextual disciplines. Juniors and seniors who have not completed their core requirements in history should discuss with the department chair alternative ways of satisfying the requirement.

AREA SURVEYS

101 Western Civilization. F and S, core. A study of the main cultural currents of Western Civilization with primary emphasis on the period from antiquity through the sixteenth century. *Staff.*

102 Western Civilization. F and S, core. A study of the main cultural currents of Western Civilization with primary emphasis on the period since the Reformation. *Staff.*

102 Honors Western Civilization. F, core. A study of revolution and revolutionaries in Western civilization since 1500. Using case

studies of various types of revolution (political, social, economic, cultural), the course examines changing definitions of revolution and explores the historical impact of such figures as Calvin, Marx, and Freud. Lectures, discussion of assigned readings, and the preparation of several papers; no tests. *Mr. D. Van Kley.*

201 Ancient Near East.* S. A cultural history of the ancient Near East from prehistory to Alexander, based on evidences from archaeology and cultural anthropology as well as on ancient texts in translation, biblical accounts, and contemporary historical

records. Special consideration is given to geographical setting, artistic and linguistic traditions, and cultural contacts with European civilizations. *Mr. B. De Vries.*

202 **Modern Near East.*** F. A study of the transformation of the Near East from the rise of Islam through the establishment of independent national states following World War II. Particular attention is given to the institutionalization of Islam, the classical Arab Caliphates, the Crusades, the Ottoman Turkish and Safavid Persian states, the modernist movements in Islam, and the problems of the contemporary states. *Mr. B. De Vries.*

203 **Traditional East Asia.*** F. An introduction to the history of East Asian civilizations from the earliest times to the nineteenth century. Primary emphasis is placed on the civilization of China and Japan. Study of the growth and development of traditional East Asian society is supplemented by topical discussions of religion, philosophy, art, music, and literature. *Mr. E. Van Kley.*

204 **Modern East Asia.*** S. A study of the transformation of East Asian society resulting from the intrusion of the West, from the sixteenth century to the present. Primary emphasis is placed on the civilizations of China and Japan and on the contacts between East Asia and the West. Topics on East Asian religion, philosophy, art, literature, and music are included. *Mr. E. Van Kley.*

205 **History and Society in West Africa to 1800.*** F. A wide-ranging survey of prominent themes encompassing several centuries of West African history. The principal aim is to introduce students to some of the main currents of West African history and to provide insights into its society and culture. Themes include: precolonial times; culture, commerce, and state building; the trans-Saharan and Atlantic trade; Islam and the socio-political changes it brought; the Atlantic slave trade. Not offered 1987-88.

206 **History and Society in West Africa since 1800.*** S. An examination of the historical, political, and economic development of West Africa since 1800. The course examines European imperialism in the late nineteenth and twentieth centuries, the development of African nationalism, resistance and struggle for independence, neo-colonialism, and the origins of contemporary social, econom-

ic, and political problems in the new states of the area. Not offered 1987-88.

207 **Latin America.*** F. A study of continuity and change in Latin America from Pre-Columbian times to the present. Topics covered include the melting of races and cultures in the Conquest Era, the long-term influence of colonial institutions, the paradox of economic development and continued dependency, the current struggle between forces of the Left and the Right, and the crucial role of the Roman Catholic church. *Mr. D. Miller.*

NATIONAL HISTORIES

211 **Survey of American History.** F and S. Selected themes in American history from colonial times to the present. This course is not intended for those who plan to take period courses in American history. *Mr. R. Bolt, Mr. D. Miller, Mr. J. Bratt.*

212 **England.*** S. A survey of English history including the Anglo-Saxon background; the medieval intellectual, religious, and constitutional developments; the Tudor and Stuart religious and political revolutions; the emergence of Great Britain as a world power; the growth of social, economic, and political institutions in the modern period. *Mr. H. Ippel.*

215 **Canada.*** F. A tracing of the founding and character of New France followed by a careful examination of nineteenth- and twentieth-century Canada. *Mr. S. Greydanus.*

218 **Russia.*** S. A study of Russian and East European history from Byzantine and Slavic origins through the Russian Revolution of 1917 and the development of the contemporary Soviet state. Not offered 1987-88.

220 **France.*** F. A survey of the history of France from the "new monarchy" of Louis XI to the present. Particular attention is given to the religious wars of the sixteenth century, the growth of the French monarchy at the expense of other institutions, the character and influence of the French Enlightenment, the nature and repercussions of the French Revolution, and the causes of France's political decline in the late nineteenth century. *Mr. D. Van Kley.*

221 **The Netherlands.*** S. An introduction to the history of the Netherlands from Medi-

eval times to the twentieth century, with an emphasis on Dutch colonization and the history of Dutch immigration in the U.S.A., Canada, and elsewhere. *Mr. H. Brinks.*

223 **Germany.*** S. A survey of German history with particular attention given to the period from the Reformation to the present. Included in the course are medieval background, the Reformation and its impact on later German developments, the religious wars, intellectual developments of the eighteenth and nineteenth centuries, the movement toward political unity in the nineteenth century, World War I, the Weimar Republic, and the rise of the Nazi movement. *Mr. F. Roberts.*

STUDIES OF HISTORICAL PERIODS

301 **Classical History.*** F and S. A study of the history of Greece and Rome from the Minoan Age through the reign of the Emperor Theodosius. The emphasis is on the political and economic changes which were the background for the shifts in intellectual styles. Particular problems are studied in depth: the emergence of the city-state; the Periclean age of Athens; the age of Alexander; the crisis of the Roman Republic; and the Decline. Classics 311 or 312 may substitute for this course. *Mr. B. De Vries, Mr. G. Harris.*

302 **Medieval Europe.*** F. A study of European society from 400 through 1350. The broad sweep of political, economic, and intellectual change is focused on the analysis of particular topics, such as the emergence of a Christian society, the rise of Feudalism, the tensions between asceticism and humanism, the Crusades, and the Regnum-Sacerdotium controversy. *Mr. F. Roberts.*

303 **Renaissance and Reformation Europe.*** S. Studies in topics in European history from 1300 to 1650. Attention is given to such problems in intellectual history as the nature of humanism, the character of religious reform, and the rise of science. Requires readings in narrative histories and sources. *Mr. F. Roberts.*

304 **Early Modern Europe.*** S. A history of Europe from 1600 to 1815, from the Thirty Years War through the French Revolution, with considerable emphasis on the Age of Reason and Enlightenment. *Mr. D. Van Kley.*

305 **Modern Europe.*** F and S. The history of Europe from the French Revolution to World War I. Special attention is paid to social and cultural developments, including the rise of industrial society, ideologies and protest movements, nation-building, mass politics, materialism, and the *fin de siècle* revolution in art and thought. *Mr. D. Diephouse.*

310 **Colonial United States.*** F and S. A study of the colonial origins of the United States from the first settlements to about 1790, with primary emphasis on the intellectual, social, and religious developments, and on the European origins of American thought. Attention is given to the differing cultural values and institutions present in the colonies. This course is designed to serve as one of the American sequence and as an introduction to 355. *Mr. H. Brinks.*

311 **Nineteenth-Century United States.*** F and S. An examination of United States history from the end of the revolutionary era to 1901. Attention is given to the Federalist period, the origins of political parties, Jeffersonian and Jacksonian democracy, sectionalism, slavery, the Civil War and reconstruction, economic expansion and the rise of big business, political corruption and reform, and imperialism. *Mr. W. Van Vugt.*

312 **Twentieth-Century United States.*** F and S. A study of politics, diplomacy, labor, industry, and scientific achievement since the 1890s with emphasis on such developments as the Progressive movement, World War I, the retreat from international responsibility; the roaring twenties, the Great Depression, the New Deal, World War II, and domestic and foreign developments since World War II. *Mr. R. Bolt.*

320 **Contemporary World.*** S. A topical analysis of twentieth-century history, stressing Europe's place in a global civilization. Major themes include the growth of collectivism; the impact of mass democracy; the "international civil war"; the emergence of Third World societies; and the character of contemporary art, thought, and popular culture. *Mr. D. Diephouse.*

TOPICAL STUDIES

219 **Studies in Comparative History: Themes in British and American History.** The method of this course is comparative, which means that historical themes from both Britain and America will be explored in

order to make more meaningful judgments about historical issues common to both nations. Taught in London, England, it will integrate experience with traditional academic study. Prerequisite: History 101 or 102. A college-level course in British or American history is desirable but not required. *Mr. R. Wells.* Not offered 1987-88.

334 United States Constitutional History.* A study of the development of American legal and political traditions using the constitution as the focal point. Emphasis is on such themes as the interrelationship among the three branches of government and the relationship between legal education and the decisions of the courts. Particular attention is given to the Supreme Court decisions as they have reflected or molded social, intellectual, economic, and political change. Not offered 1987-88.

351 English Constitutional History.* F. A study of the origins and subsequent developments of English law, legal institutions and constitutional usage from 1066 to the present. Major topics considered are: the nature of English constitutional monarchy, the growth of Parliament, the development of English Common Law, the Tudor and Stuart revolutions, the Whig oligarchy, and the significant reforms of modern Britain. *Mr. H. Ippel.* Not offered 1987-88.

355 Intellectual and Cultural History of the United States.* F. An analysis of the changing intellectual patterns in American society as exemplified in religious, philosophical, political, social, and scientific thought. Emphasis is placed on the interaction of thought and society and some attention is given to European influence on American thought. A general knowledge of American history is assumed. *Mr. J. Bratt.*

356 Social and Cultural History of the United States.* S. A study of the development of American society from 1776 to the present with reference to developments other than those primarily political or intellectual, such as social reform movements, popular culture, art and architecture, educational developments, the labor movement, immigration, nativism and racism, and urban problems. Prerequisite: a general knowledge of American history. *Mr. R. Wells.* Not offered 1987-88.

360 Afro-American History.* S. An intensive inquiry into the role of the Afro-Ameri-

can in the history of the United States, including an evaluation of past and present assumptions of the place of the Afro-American in American life, and an acquaintance with the historiography on this subject. *Mr. S. Greydanus.*

380 Field Work in Middle East Archaeology. Summer. An on-site introduction to archaeological field work in the Middle East designed to expose the student to the methodologies involved in stratigraphic excavation, typological and comparative analysis of artifacts, and the use of nonliterary sources in the writing of Middle East history. Prerequisite: consent of the instructor. *Mr. B. De Vries.*

390 Independent Study. F, I, S. *Staff.*

395 Seminar in History.* F and S, honor sections. A course in historiography, the philosophy of history, historical bibliography, and the writing of history. *Staff.*

GRADUATE COURSES

571 Studies in History. Students will engage in a concentrated investigation of a particular topic or period of history. Advanced reading and discussion of the source materials, literature, problems, interpretations, and more recent findings on a selected period or topic are included. Topic will be selected each time the course is offered. *Staff.*

580 Resources for Teaching History and the Social Studies. An exploration of research in the various approaches to the teaching of history and the social studies on the secondary level. Course requirements include the development of a bibliography of resources for the teaching of history and the social studies which students will relate to the curriculum and philosophy of social studies teaching from a Christian perspective. *Mr. S. Greydanus.*

581 Historiography. The course focuses on historical writing as reflective of different personal and cultural styles and on the role of history in the intellectual adventure of man. Historians will be studied to determine their diverse opinions and interpretations. The focus is on understanding historical writing so that it can be taught more effectively. *Staff.*

590 Independent Study. F, I, S. *Staff.*

595 **Graduate Project.** F, I, S, full or half course. The prospectus for each Master of Arts in Teaching project must be developed under the supervision of a faculty member and must be approved by the student's graduate advisor. *Staff.*

JANUARY 1988 INTERIM

A catalog with the descriptions of all interim courses is available after October 1987.

W10 **American Mythology.** *Mr. J. Bratt.*

W11 **Civil War and Reconstruction.** *Mr. D. Miller.*

W12 **Native American History: An Anti-**

dote to the Teaching of Nationalistic History. *Mr. S. Greydanus.*

W50 **Background to Blitzkrieg: A History of World War II in Europe.** *Mr. J. Dodge, Mr. F. Roberts.*

W51 **America in the 1960s.** *Mr. W. Van Vugt.*

W52 **Asia in Western History.** *Mr. E. Van Kley.*

W53 **The Revolt of the Country Against the City: The Urban Crisis of Late Antiquity.** *Mr. B. De Vries.*

W54 **Rewriting the French Revolution.** *Mr. D. Van Kley.*

Latin

SEE THE DEPARTMENT OF CLASSICAL LANGUAGES for a description of courses and programs of concentration in Latin.

Mathematics

Professors P. Boonstra, J. Bradley, D. Brink, T. Jager (chair, Department of Mathematics and Computer Science), G. Klaasen, D. Laverell, S. Leestma, L. Nyhoff, C. Sinke, M. Stob, †G. Van Zwalenberg, G. Venema, P. Zwier
Assistant Professors V. Nyhoff, G. Talsma, X. Ye
Instructor L. Petrovich

A MINIMUM GRADE OF C (2.0) in a 200-level mathematics course is required for admission to a program of concentration in the department. The program consists of 161, 162, two 200-level courses, two semesters of 391, an approved interim, and at least four additional 300-level courses. Each program must include a two-course sequence at the 300 level, a course in algebra, a course in analysis, a course emphasizing applications, and a course emphasizing formal proof. Computer Science 151 is a required cognate, and a second course in computer science is recommended. Students with deficiencies in high school

algebra or trigonometry should take 110 before enrolling in 161. A minor consists of 161, 162, two 200-level courses, and two 300-level courses. Computer Science 151 is a recommended cognate.

Students preparing to teach mathematics at the secondary level complete a major program with an emphasis on algebra, analysis, or probability and statistics. Such majors require 161, 162, and an approved interim course. The remaining six 200- and 300-level courses are selected with the approval of the student's advisor. Computer Science 151 is a required cognate. Education 356 substitutes for the 391 required in other major programs. The secondary teacher education minor consists of 161; 162; one from 243, 261, or 361; 351; 321; and one additional 300-level course. The elementary teacher education minor is 110, 131, 221, 222, 223, one course from 132, 143, or an approved interim, and Computer Science 100 or 151. This program is modified for students who have completed four years of mathematics in high school. The advisors for the education programs are Mr. Paul Boonstra and Mr. Gary Talsma.

A group major in science and mathematics meets the needs of some students, particularly those in professional programs. These majors are not appropriate for students who anticipate attending graduate school or who are in teacher education programs. Such group majors require twelve courses in the sciences and mathematics, ten of which must be from two departments with no fewer than four from either, with the remaining two courses chosen from a third department. The chairs of the three departments must approve each program of this type. Group concentrations involving economics, philosophy, and other departments are possible on an individual basis.

The core requirements in mathematics may be met by 100, 131, 155, 161, or 221.

100 Elements of Modern Mathematics. F and S, core. An introduction to the content, methodology, and history of mathematics. Among the topics which may be covered are cardinal numbers and set theory, axiomatic systems, probability theory, computer programming, groups and fields, and number theory. Prerequisite: a year of high school algebra and geometry. *Staff.*

110 Elementary Functions. F and S. A course in elementary functions to prepare students for the calculus sequence. Topics include the properties of the real number system, inequalities and absolute values, functions and their graphs, solutions of equations, polynomial functions, trigonometric functions, exponential and logarithm functions. Prerequisite: two years of high school mathematics. *Staff.*

131 Finite Mathematics, Probability, and Statistics. F and S, core. Topics include a review of algebra, matrix theory, systems of linear equations, linear programming, elementary probability theory, decision theo-

ry, descriptive statistics, regression analysis, and statistical inference. The student is introduced to the use of the computer in statistical computations by means of the MINITAB statistical package. Intended for students other than mathematics and science majors. Prerequisite: two years of high school mathematics. *Staff.*

132 Calculus for Management, Life, and Social Sciences. F and S. Functions, limits, derivatives. Applications of derivatives to maximum-minimum problems; exponential and logarithm functions; integrals; functions of several variables. Not open to those who have completed 161. Prerequisite: 131 or permission of instructor. *Staff.*

143 Elementary Statistics. S. An introduction to the concepts and techniques of statistics, designed for students with limited mathematical background. Topics include descriptive statistics, elementary probability theory, random variables and probability distributions, binomial and normal distributions, sampling distributions, es-

timation, hypothesis testing, regression and correlation, analysis of variance, non-parametric methods. The student is also introduced to use of the computer in statistical computations and simulations by means of statistical packages such as MINITAB and SPSS. No prior knowledge of computing is required. Prerequisite: two years of high school mathematics. *Staff.*

155 Discrete Mathematics for Computer Science. F and I, core. An introduction to the topics of discrete mathematics necessary for the study of computer science. Topics include the natural number system, sets, relations, Boolean algebras, combinatorics, sequences and recurrences, graphs, and trees. Prerequisite: three years of college preparatory mathematics. *Mr. J. Bradley.*

161 Calculus I. F, I, and S, honors section, core. Functions, limits, derivatives, applications of derivatives, integrals, exponential and logarithmic functions. Prerequisite: high school mathematics through trigonometry or 110. *Staff.*

162 Calculus II. F and S, honors section. Trigonometric functions, techniques of integration, applications of integrals, sequences and series. An introduction to partial derivatives and multiple integrals. Prerequisite: 161. *Staff.*

221 The Real Number System and Methods for Elementary School Teachers. F and S, core. This course provides prospective elementary teachers with the background needed for teaching elementary mathematics. It considers both content and methodology relevant to school mathematics. Topics covered include the real number system and its subsystems, probability, and statistics. Pedagogical issues addressed include the nature of mathematics and of mathematics learning, the impact of calculators and computers on elementary school mathematics, and the importance of problem solving. Students will not receive credit for both this course and 100. Prerequisites: a year of algebra and a year of geometry in high school. *Mr. P. Boonstra, Mr. G. Talsma.*

222 Geometry and Methods for Elementary School Teachers I. F and S, half course. This course is a continuation of 221. It considers both content and methodology relevant to teaching elementary geometry. Topics covered include basic geometric

concepts in two and three dimensions, transformations in the plane, and measurement. Pedagogical issues addressed include the role of geometry in the elementary school curriculum, applications of computers to geometry, and the importance of problem solving. Prerequisite: 221 or permission of instructor. *Mr. G. Talsma.*

223 Geometry for Elementary Teachers II. S, half course. A study of selected topics in geometry, including microcomputer applications using LOGO. An in-depth study of some of the topics introduced in 222. Prerequisite: 222. *Staff.*

231 Differential Equations with Linear Algebra. F and S. Solutions and applications of first and second order ordinary differential equations. Elementary linear algebra. Higher order linear equations, systems of linear differential equations, numerical methods, non-linear equations. Prerequisites: 162 and experience in computer programming. *Staff.*

243 Statistics. F and S. Data collection, random sampling, experimental design, descriptive statistics, probability, random variables and standard distribution, Central Limit Theorem, statistical inference, significance tests, point and interval estimates, and simple linear regression. The student is introduced to the use of the computer in statistical computations and simulations by means of statistical packages such as MINITAB and SPSS. Prerequisite: 162. *Mr. S. Leestma.*

255 Applied Linear Algebra. F and S. Matrices, row operations, systems of linear equations, pivoting strategies, vector spaces, linear independence, dimension, orthogonality, determinants, eigenvectors and eigenvalues. Emphasis on computations with matrices. Prerequisites: 162 and either Computer Science 141 or 151. *Mr. D. Brink.*

261 Multivariate Calculus. F and S. A study of vectors and functions in two and three dimensions. Polar, cylindrical, and spherical coordinate systems. Partial derivatives, multiple integrals, vector functions, vector analysis. Prerequisite: 162. *Staff.*

321 Foundations of Geometry.* S. Consideration of Euclidean geometry as an axiomatic system, introduction to non-Euclidean geometry, the Poincare model.

Prerequisite: a 200-level course. *Mr. G. Talsma.*

325 History of Mathematics.* S. A study of the historical development of certain basic mathematical concepts from early times to the present, with consideration of the problems that mathematicians have faced in each age. Prerequisite: a 200-level course. Not offered 1987–88.

333 Advanced Calculus for Applications.* F. Fourier series, Laplace transform, series methods in ordinary differential equations, orthogonal functions, vector field theory, and partial differential equations. Intended for engineers, physicists, and others interested in applications of analysis. Prerequisites: 231 and 261. *Mr. D. Laverell.*

335 Numerical Analysis.* S. Analysis of errors in numerical methods, real roots of equations, approximations using polynomials, numerical integration, applications to differential equations, Lagrange and spline interpolation, least squares approximations, orthogonal polynomials, and applications. Also listed as Computer Science 335. Prerequisites: Computer Science 141 or 151 and Mathematics 255, or permission of the instructor. *Staff.*

343 Probability and Statistics.* F. Probability, probability density functions; binomial, Poisson, and normal distributions; central limit theorem, limiting distributions, sample statistics, hypothesis tests, estimators. Prerequisite: 261 or 362. *Mr. C. Sinke.*

344 Mathematical Statistics.* S. A continuation of 343 including theory of estimation, hypothesis testing, nonparametric methods, regression analysis, and analysis of variance. Prerequisite: 343. *Mr. C. Sinke.*

351 Abstract Algebra.* F. Set theory, relations and functions, equivalence relations; the integers, mathematical induction, and elementary number theory; groups, rings, fields, and polynomials. Prerequisites: two 200-level courses. *Mr. T. Jager.*

352 Advanced Linear Algebra.* S. Vector spaces, matrices, linear equations, linear transformations, determinants, polynomial algebras, eigenvalues and eigenvectors, inner-product spaces, spectral decompositions, canonical forms for matrices. Prerequisite: 351. *Mr. T. Jager.*

361 Real Analysis I.* F. The real number system, set theory, the topology of metric spaces, numerical sequences and series, real functions, continuity, differentiation, and Riemann integration. Prerequisites: two 200-level courses. *Mr. D. Brink.*

362 Real Analysis II.* S. A continuation of 361. Sequences and series of functions, functions of several variables, Lebesgue integration. Prerequisite: 361. *Mr. D. Brink.*

365 Complex Variables.* S. Complex numbers, complex functions, integration and the Cauchy integral formula, power series, residues and poles, conformal mapping. Prerequisite: 261 or 362. *Staff.*

381 Advanced Logic.* F. Topics include the formalization of propositional and quantificational logic. Taught jointly with the Philosophy Department and also listed as Philosophy 381. Not offered 1987–88.

385 General Topology.* F. Elementary set theory, topological spaces, separation properties and connectivity, continuous mappings, homeomorphisms, product and quotient spaces, invariants under continuous mappings, compactness, metric spaces and completeness. Prerequisite: 261 or 362. *Mr. G. Venema.*

390 Independent Study.* F, I, S. Independent study of topics of interest to particular students, under supervision of a member of the department staff. Open to qualified students with permission of the department chair. *Staff.*

391 Colloquium. F and S, quarter course. Meets weekly for an hour for the presentation of various topics in mathematics, computer science, and related disciplines by students, faculty, and visiting speakers. Prerequisites: two 200-level courses. *Staff.*

395 Senior Thesis in Mathematics.* F, I, S. The course requirements include an expository or research paper and an oral presentation on a selected topic in mathematics. Open to qualified students with the permission of the chair. *Staff.*

GRADUATE COURSES

510 Advanced Geometry for Teachers. A study of geometry from the point of view of groups of transformations, including considerations of isometries, translations, glide reflections, and similarities. Applications to theorems in Euclidean geometry. Con-

sideration of affine, projective, hyperbolic, and elliptic geometries, and models for each. Offered on a tutorial basis only. Prerequisite: 321 or its equivalent. *Staff.*

512 Philosophy and Foundations of Mathematics. A study of the philosophical problems which arise in the context of mathematics; logicism; intuitionism and formalism; metamathematics and the theorems of Gödel, Church, and Tarski; some philosophical implications of these theorems. Some attention is paid to the philosophical stance of materials and texts written for the classroom. Offered on a tutorial basis only. Prerequisite: undergraduate mathematics minor or permission of instructor. *Staff.*

513 Real Analysis and Topology for Teachers. Construction of the real number system; metric space topology with applications to Euclidean spaces, limits, continuous functions, differentiation, and Riemann Stieltjes integration. Offered on a tutorial basis only. Prerequisite: 261. *Staff.*

580 Advanced Methods and Materials in Secondary School Mathematics. A study of methods which can be used to teach mathematics in the junior and senior high school.

Consideration is also given to materials, both commercial and teacher-made, Prerequisite: mathematics minor or major. *Staff.*

590 Independent Study. F, I, S. *Staff.*

595 Graduate Project. F, I, S, full or half course. The prospectus for each Master of Arts in Teaching project must be developed under the supervision of a faculty member and must be approved by the student's graduate advisor. *Staff.*

JANUARY 1988 INTERIM

A catalog with the descriptions of all interim courses is available after October 1987.

W10 Mathematics and Culture. *Mr. V. Nyhoff.*

W51 Optimization. *Mr. D. Brink.*

W52 A Reformed Perspective on Mathematics. *Mr. D. Laverell, Mr. C. Sinke.*

W53 Graph Theory and Its Applications. *Mr. J. Bradley, Mr. P. Prins.*

W54 Optimal Strategies in Sports. *Mr. M. Stob, Mr. G. Talsma.*

Music

*Professors D. De Young, J. Hamersma, †H. Slenk, C. Stapert (chair), D. Topp, J. Worst
Associate Professors A. Armstrong, G. Huizenga, C. Kaiser, R. Rus
Assistant Professor M. Mustert*

WITHIN THE LIBERAL ARTS FRAMEWORK, the Music Department addresses itself to students majoring in music, to general students wishing to increase their understanding and enjoyment of music through study, and to the campus community. Students can major in music by following one of the programs of study outlined below, fulfill a fine arts core requirement by taking one of the specified core courses, or take any course for which they are qualified. In addition, any qualified student may participate in one of the many performing ensembles. All students, as well as the general public, are welcome at the frequent concerts and recitals sponsored by the Music Department.

The department offers a variety of programs of study leading to the Bachelor

of Arts degree. For admission to a major program of study, students must complete 103, 104, 114, and 124, with a minimum grade of C (2.0) in each. Applicants will be informed of the department's action within a month after completing these courses.

Foundational courses in music. Each of the programs listed below requires the following foundational courses: 103, 104, 113, 114, 123, 124, 203, and 204.

The Liberal Arts major in music. The major in music leading to the Bachelor of Arts degree consists of a survey of the structure and history of music. It is comprised of nine courses: the foundational courses plus the completion of either 233, one course in applied music, and two non-applied electives; or by 303, 304, one course in applied music, and one non-applied elective.

Students with more specialized interests in music are advised to follow one of the programs described below.

Programs for students planning graduate work in music. Students wishing to pursue graduate study in music are advised to choose one of three programs: Music History, Theory and Composition, or Applied Music. Each program has the following basic requirements: the foundational courses, plus 213, 214, 223, 224, 303, and 304; 121, 131, 141, 161, or 171 each semester; 180 each semester. In addition students elect four courses from one of the following areas: *Music History*—311, 312, 313, and an approved interim course; *Theory-Composition*—311, 312, and two from 315, 316, or 317; *Applied Music*—eight semesters from 210, 220, 230, 240, 260, or 270, including a solo recital.

Programs for students preparing to teach in the schools. Students desiring to teach music in the schools are advised to choose one of three programs. Two thirteen-course concentrations enable graduates to teach music in grades k-12. These programs, with a primary emphasis on the secondary level, require the foundational courses plus 213, 223, 237, 303, 304, and 339; 180 each semester, plus four and one-half course units from one of the following concentrations: *instrumental music*, 195, 196, 197, 198, 337, four semesters of 140, 150, 160, or 170; and four semesters of 161 or 171; *vocal music*, 214, 224; 313 or an approved interim; 338; two semesters of 110 or 120; four semesters of 130; and four semesters of 131 or 141. In addition to this thirteen-course concentration in music, these students complete five additional cognates from core and professional education to fulfill state certification requirements for both a major and a minor in music. However, these students are also advised to complete a minor in another department, if possible. The cognates include a core history course, a core fine arts literature course (if the history course is broad in coverage as in 101 or 102, it is recommended that the literature course focus more intensely on a narrower time frame), Philosophy 208 (Note: This course counts as the sixth course in the contextual disciplines for secondary music majors), Music 302 (a substitute for Education 303), and Music 356 (a substitute for Education 356). This is also the appropriate program for students interested in doing graduate work in music education. Students in this program must pass a comprehensive screening test in music, which is given each April.

A ten-and-one-half course concentration qualifies graduates to teach in a regular elementary classroom and to teach music in grades k-8. The program requires the foundational courses plus 233, 237, 339; 180 each semester; and three and one-half additional courses from one of the following concentrations: *instrumental music*, 195, 196, 197, 198, three semesters of 140, 150, 160, or 170; two semesters of 161 or 171; and one semester from among 110, 120, or 130; *vocal music*, two semesters of 110 or 120; three semesters of 130; two semesters of 131 or 141; one course from 311-319; and three-fourths course elective from 213, 214, 223, 224, or applied music. Students in this program must pass a comprehensive screening test in music, which is given each April. Fine Arts Studies majors and minor are available for students who wish fewer courses in music.

The seven-course secondary teacher education minor is 103, 113, 123, 233, 234, 237, 339; two semesters of 110 or 120; two semesters of 130, two semesters of 131, 141, 161, or 171; and one course elective in music. The elementary teacher education minor is 103, 113, 123, 233, 234, 237, 339, two semesters from 110, 120, 130, 140, 150, 160, 170, two semesters from 131, 141, 161, 171, a half-course elective, and one approved interim or semester course, which may be Philosophy 208.

Programs for students interested in church music. Students preparing for work in church music may choose either organ or choir. Each program has the following basic requirements: the foundational courses plus 213, 214, 223, 224, 236, 237, 303, 304, and 180 each semester. In addition students elect five and one-half courses from one of the following two areas: in Organ—110 (first two semesters), 210 (six semesters including some directed fieldwork and a public recital with scores), 130 (two semesters), 131 or 141 (two semesters), and an interim in church organ music; in Choir, 130 (six semesters), 110 or 120 (two semesters), 131 or 141 (six semesters), 337, 338, and an interim in church choir music which includes some directed fieldwork and a public choral recital.

A six-course minor in church music includes 103, 113, 123, 236, 237, and three additional course units in organ or choir. The organ group requires six semesters of 110, 130, 131, or 141; and an interim in church organ music. The choir group requires four semesters of 130, two semesters of 131 or 141, two semesters of 110 or 120, and an interim in church choral music.

General regulations and advisors. The advisor for applied music majors is Ms. Ruth Rus and the advisor for music education programs is Mr. Dale Topp. All transfer students must consult Mr. John Hamersma at their first registration for an evaluation of their transfer credits in music and to receive counseling into the appropriate sequence of music courses. During their first semester at Calvin, such students must validate their transfer credits in keyboard harmony with Ms. Marilyn Slenk and in aural perception with Ms. Ruth Rus. Those not meeting minimum standards will be required to enroll in 113 or 123.

Core courses in music. The fine arts core requirement may be met in several ways. Students with a minimal musical background may prefer 133, 236, 238, or 241. Students with greater musical background should take 233, 234, or possibly, 103. Because 103 satisfies the core requirement and is the initial course in all

concentrations involving music, freshmen considering any of these programs should take 103 along with 113 and 123, both quarter courses, which are also part of such programs.

GENERAL AND CORE COURSES

133 The Enjoyment of Music. F and S, core. An introductory course in music listening for students of any class level with any sort of background in music. Following a two-week introduction for all students, each student will elect four three-week units from the list that appears below. Each unit consists of eight classroom presentations and discussions plus a final test. Each unit will be completed before the next begins. Students will do listening and reading assignments. Topical units are chosen from: chamber music, symphony, program music, American music, pre-Baroque music, piano music, church music, the avant garde, and vocal music. *Mr. A. Armstrong, Mr. C. Kaiser, Mr. D. Topp.*

233 History of Music I.* F, core. A survey of the stylistic development and the cultural context of the art of music in Western civilization. The course begins with an introduction to musical thought and practice in antiquity and the early Christian era followed by a study of Gregorian chant and the principal repertoires of polyphony through the Baroque period. *Mr. C. Stapert.*

234 History of Music II.* S, core. A survey of the stylistic development and the cultural context of the art of music in Western civilization from the Classical period to the present. The class will study representative works of major composers. *Mr. C. Stapert.*

236 The Enjoyment of Church Music. F, core. How is music useful to the church, what ought one to listen for in church music, by what criteria should church music be judged, how is one to worship by means of music, and how is church music to be enjoyed? Lectures, discussions, readings, record listening, and church services. Open to freshmen. *Mr. J. Hamersma.*

241 American Popular and Traditional Music.* F and S, core. A survey of five basic genres of popular American music showing their roots in European art music and in American folk music, particularly country music, folk music, blues and jazz, popular music theater, and rock. *Mr. J. Worst.*

BASIC COURSES

103 Materials of Music I. F, core. A course in the development of the ability to grasp and notate the rhythmic, melodic, and harmonic elements of music. Students anticipating any concentration involving music must take 113 and 123 concurrently. See note above concerning the use of this course to meet fine arts core requirements. *Ms. G. Huizenga.*

104 The Literature and Materials of Music II. S. A continuation of 103. A coordinated study of the historical, theoretical, and practical aspects of music by means of lectures, score study, written exercises, listening, performance, and reading. A study of the music of the late Baroque and Classical eras. Students intending to major in music must take 114 and 124 concurrently. Prerequisite: 103. *Ms. G. Huizenga.*

113 Keyboard Harmony I. F, quarter course. A course in the development of the ability to play at the keyboard the rhythmic, melodic, and harmonic elements of music. The student is required to play all the major, minor, and modal scales as well as easy chord progressions using all the diatonic triads in root position and some in first and second inversion. To be taken concurrently with 103. Prerequisite: piano skills. Others will be required to take remedial piano. *Ms. M. Slenk.*

114 Keyboard Harmony II. S, quarter course. A continuation of 113. The student is required to play progressions involving seventh chords in their various inversions, to demonstrate the ability to use secondary dominants at the keyboard, and to modulate to closely related keys by means of common chord and chromatic modulation. *Ms. M. Slenk.*

123 Aural Perception I. F, quarter course. A course in the development of the ability to hear and to sing at sight the rhythmic, melodic, and harmonic elements of music. Rhythmic perception involves all note values and rests in various combinations, with an emphasis on duplet and triplet contrasts. Melodic perception involves all intervals

smaller than an octave above and below a given note. Harmonic perception involves the major and minor triads in root position, first inversion, and second inversion as well as augmented and diminished triads. To be taken concurrently with 103. *Ms. R. Rus.*

124 Aural Perception II. S, quarter course. A continuation of 123. Rhythmic perception in this course involves the use of ties and syncopation, melodic perception involves the intervals between the octave and the twelfth including one- and two-part melodic dictation, and harmonic perception involves the dominant seventh chords as well as harmonic dictations using the chords studied in 123. *Ms. R. Rus.*

203 The Literature and Materials of Music III. F. A continuation of 104. A study of the music of the Romantic era. Assignments include composition, analysis, a book review, and a demonstration project in class. Prerequisite: 104. Students whose programs require 213 and 223 must take those courses concurrently. *Mr. J. Worst.*

204 The Literature and Materials of Music IV. S. A continuation of 203. A study of post-Romantic and Contemporary music. Assignments include composition, analysis, a book review, instrument building, and possibly some live performing. Prerequisite: 203. Students whose programs require 214 and 224 must take those courses concurrently. *Mr. J. Worst.*

213 Keyboard Harmony III. F, quarter course. A continuation of 114. To be taken concurrently with 203. Prerequisite: 114. *Ms. M. Slenk.*

214 Keyboard Harmony IV. S, quarter course. A continuation of 213. *Ms. M. Slenk.*

223 Aural Perception III. F, quarter course. A continuation of 124. To be taken concurrently with 203. Prerequisite: 124. *Ms. R. Rus.*

224 Aural Perception IV. S, quarter course. A continuation of 223. *Ms. R. Rus.*

237 Conducting. S, half course. A course in basic, general conducting, normally taken in the sophomore year. Prerequisite: 103. *Mr. M. Mustert.*

303 The Literature and Materials of Music V.* F. A continuation of 204. A study of Western music prior to 1500. Prerequisite: 204. *Mr. C. Stapert.*

304 The Literature and Materials of Music VI.* S. A continuation of 303. A study of the Western music of the late Renaissance and early Baroque eras. Prerequisite: 303. *Mr. J. Hamersma.*

ADVANCED COURSES

311 Vocal Polyphony of the Renaissance.* S. A study of the vocal style of Palestrina. Exercises in modal counterpoint. Listening repertory of compositions. Prerequisite: 303. *Mr. C. Stapert.* Not offered 1987-88.

312 Instrumental and Vocal Polyphony of the Late Baroque.* F. A study of contrapuntal practice of late Baroque composers, principally J. S. Bach. Exercises in tonal counterpoint. Listening repertory of compositions. Prerequisites: 304 or 104 and 233. *Staff.*

313 Studies in Music History: The Passions and Mass of J. S. Bach.* S. A study of musical style, structure, rhetoric, symbolism, and meaning of three masterpieces of Christian music. Prerequisite: 203. *Mr. C. Stapert.*

315 Arranging, Orchestration, and Scoring.* F. Survey of the history of the orchestra and orchestration, and problems involved in writing for orchestra, band, and stage band. A survey of the technical limitations of each instrument. Projects written by class members will be performed by department organizations whenever possible. Prerequisite: 104. *Mr. J. Worst.*

316 Arranging, Orchestration, and Scoring.* S. Continuation of 315, which is prerequisite. *Mr. J. Worst.*

317 Composition.* F and S. Writing in contemporary forms and according to contemporary practice. Prerequisite: 104 or permission of the instructor. May be repeated for credit as often as a student's schedule allows. *Mr. J. Worst.*

337 Instrumental Conducting.* F, half course. A course in advanced conducting techniques appropriate to bands and orchestras. Prerequisite: 237. *Mr. D. De Young.* Not offered 1987-88.

338 Choral Conducting.* F, half course. A course in advanced conducting techniques appropriate to choirs. Prerequisite: 237. *Mr. H. Slenk.* Not offered 1987-88.

390 Independent Study. *Staff.*

MUSIC EDUCATION

238 **Elementary School Music.*** F and S, core. A study of the content and methods for teaching music in the elementary school classroom. Includes consideration of philosophy and materials. This course is recommended for elementary education students. (Music 339 is required of elementary music education majors.) Not open to freshmen. *Mr. D. Topp.*

302 **Introduction to Music Teaching.*** F and S. An analysis of the teaching-learning process in the classroom. The course includes observation and participation in school activities and a laboratory experience to develop competence in the classroom use of audio-visual equipment. This course substitutes for Education 303 for secondary music education students and must be taken concurrently with Education 301. The in-school experience will be divided equally between traditional classroom and music teaching. *Mr. D. Topp.*

339 **School Music.*** F, half course. A study of the philosophy, methods, and materials for teaching elementary and secondary school music. This course is required of secondary music education majors and minors and is also open to other elementary education majors with a background in music. *Mr. D. Topp.*

356 **Seminar in Music Methods.** S. A seminar taught in conjunction with Education 346 involving general problems of pedagogy as well as the specific methods for teaching music in rehearsal and classrooms. The seminar provides a forum for the discussion of problems that develop during directed teaching. *Mr. D. Topp.*

APPLIED MUSIC

Not more than two course units of credit in applied music and drama may be applied to the minimum requirements for graduation unless the addition is part of a designated major or minor music concentration. See fees on page 27.

INDIVIDUAL LESSONS

At least twelve lessons a semester are required and students taking individual lessons must also register for 180.

100 **Harpsichord.** Quarter course. Individual lessons in harpsichord. *Ms. E. Farr.*

110 **Organ.** Quarter course. Individual lessons in organ emphasizing skills for the church organist. *Ms. S. Boomsma, Mr. J. Hamersma.*

120 **Piano.** Quarter course. Individual lessons in piano. *Ms. K. Henry, Ms. B. Mustert, Ms. R. Rus, Ms. L. Vanden Berg.*

130 **Voice.** Quarter course. Individual lessons in voice. *Ms. T. Haan, Ms. G. Huizenga, Mr. C. Kaiser, Ms. C. Sawyer.*

140 **Brasses.** Quarter course. Individual lessons in trumpet, horn, euphonium, trombone, or tuba. *Mr. M. Bowman, Mr. D. De Young, Ms. M. Gage.*

150 **Percussion.** Quarter course. Individual lessons in snare drum, tympani, and other percussion instruments. *Mr. D. Gross.*

160 **Strings.** Quarter course. Individual lessons in violin, viola, violoncello, bass viol, or classical guitar. *Mr. A. Emerson, Mr. R. Harbaugh, Mr. L. Herzberg, Mr. P. Vondiziano.*

170 **Woodwinds.** Quarter course. Individual lessons in flute, oboe, clarinet, bassoon, saxophone, or recorder. *Ms. R. Bylsma, Mr. M. Colley, Mr. M. Kornacki.*

210 **Advanced Organ.** Half course. Individual lessons for the music major concentrating in organ. *Mr. J. Hamersma.*

220 **Advanced Piano.** Half course. Individual lessons for the music major concentrating in piano. *Ms. R. Rus.*

230 **Advanced Voice.** Half course. Individual lessons for the music major concentrating in voice. *Mr. C. Kaiser.*

240 **Advanced Brasses.** Half course. Individual lessons for the music major concentrating in trumpet, horn, euphonium, trombone, or tuba. *Mr. D. De Young.*

260 **Advanced Strings.** Half course. Individual lessons for the music major concentrating in violin, viola, violoncello, bass viol, or classical guitar. *Staff.*

270 **Advanced Woodwinds.** Half course. Individual lessons for the music major concentrating in flute, oboe, clarinet, bassoon, saxophone, or recorder. *Staff.*

CLASS LESSONS

180 **Repertory Class and Studio Classes.** F and S, weekly, no credit. Performance

classes for students of applied music for the purpose of gaining experience in public performance and increasing knowledge of music literature. Attendance is required of all music majors and students registered for individual lessons in applied music. *Staff.*

195 String Methods. F, half course. Class lessons on all string instruments for the instrumental music education major. Emphasis is on the methods for teaching string instruments. Elementary playing skills are developed. *Ms. M. De Young.*

196 Brass Methods. S, half course. Class lessons on all brass instruments for the instrumental music education major. Emphasis is on the methods for teaching brass instruments. Elementary playing skills are developed. *Mr. D. De Young.*

197 Percussion Methods. F, half course. Class lessons on percussion instruments for the instrumental music education major. Emphasis is on the methods for teaching percussion instruments. Elementary playing skills are developed. *Mr. D. Gross.* Not offered 1987-88.

198 Woodwind Methods. S, half course. Class lessons on all woodwind instruments for the instrumental music education major. Emphasis is on the methods for teaching woodwind instruments. Elementary playing skills are developed. Not offered 1987-88.

ENSEMBLES

Membership in ensembles is limited to Calvin students except when there is a specific need and the non-student is not replacing a student.

101 Meistersingers (formerly Men's Choir). F and S, quarter course. An ensemble devoted to singing a wide variety of literature suitable to the college male glee club. Open to the general college student. *Mr. M. Mustert.*

111 Lyric Singers (formerly Women's Choir). F and S, quarter course. An ensemble of treble voices devoted to singing a wide variety of literature, both sacred and secular. Emphasis is given to three- and four-part singing, voice development and preparation for performances. Open to the general college student. *Mr. M. Mustert.*

121 Collegium Musicum. F and S, quarter course. An ensemble of singers and instrumentalists devoted to the performance of

medieval, Renaissance, and Baroque music. Open to all students who meet the requirements of instrumentation and the demands of musicianship. Collegium can also include various other small, faculty-directed ensembles such as string quartet, woodwind quintet, flute choir, trombone choir, and jazz band. These are open to members of band and orchestra who meet the requirements of instrumentation and the demands of musicianship. *Ms. R. Bylsma, Mr. D. De Young, Mr. M. Mustert, Mr. C. Stapert.*

131 Campus Choir. Quarter course. Representative works in the field of choral literature are studied and sung. Emphasis given to the development of singing and sight-reading skills as well as to regular performances. Open to all students who meet the requirements of voice and musicianship. *Mr. A. Armstrong.*

141 Capella. Quarter course. Representative works in the field of choral literature are studied and a limited number of selections are prepared for concert performance. Membership is maintained at a set limit and is open only to those who meet the demands of voice, sight reading, and choral musicianship. *Mr. M. Mustert.*

161 Calvin Band and Knollcrest Band. Quarter course. In both bands representative works in wind literature are studied and prepared for concert performance. The Calvin Band meets four times per week and membership is maintained at a set instrumentation. It is open to students who meet the demands of musicianship and the instrumentation needs of the ensemble. The Knollcrest Band meets three times per week and is open to all freshmen and sophomores who wish to participate in concert band. *Mr. D. De Young.*

171 Orchestra. Quarter course. Representative works in the field of chamber and symphony orchestra literature are studied and prepared for concert performance. Open to all students who meet the demands of musicianship. *Mr. D. De Young.*

181 Oratorio Chorus. No credit. The study of representative works of the great masters of choral writing with a view to public performance. Handel's *Messiah* is performed annually at Christmas time and another oratorio is presented in the spring. Open to all who meet the requirements of voice and musicianship. *Mr. H. Slenk.*

GRADUATE COURSES

510 **School Choral Music.** An examination of the significant choral literature from the Renaissance to the present day. For daily research projects the student will use the reference works, scores, and recordings in the Calvin libraries. The instructor will call attention to the repertoire suitable for junior and senior high school choirs. Prerequisite: undergraduate major or minor in music or permission of instructor. *Mr. M. Mustert.*

511 **School Instrumental Music.** A survey of music and materials available for instrumental classes, small ensembles, bands and orchestras at the elementary, middle school, and high school level. The course covers such topics in terms of their musical value as well as for their effectiveness as teaching tools, the history and the development of literature for the wind band, and the principles of good programming. *Mr. D. De Young.*

512 **Using Music to Teach Other Subjects.** An examination of the ways in which music may support the learning of such other subjects as history, literature, geography, physical education, basic school skills, Bible, psychology, sociology, and foreign languages. Students will learn how to find, evaluate, and present music in areas that they select. No previous musical skills are required. Students electing the course for only one-half course credit will do less research. *Mr. D. Topp.*

580 **Advanced Methods and Materials for Music Education.** An examination of music teaching methods and materials in a philosophical and historical context. Students

will use readings in the philosophy and history of education combined with related lectures and class discussions as material for developing their own attitudes toward music education. Includes organization of programs for personal and professional growth. *Mr. D. Topp.*

590 **Independent Study.** *F, I, S. Staff.*

595 **Graduate Project.** *F, I, S,* full or half course. The prospectus for each Master of Arts in Teaching project must be developed under the supervision of a faculty member and must be approved by the student's graduate advisor. *Staff.*

JANUARY 1988 INTERIM

A catalog with the descriptions of all interim courses is available after October 1987.

W12 **Accompaniment Guitar.** *Mr. P. Vondiziano.*

W14 **Music in Time.** *Mr. M. Mustert, Mr. C. Stapert.*

W50 **The Mind Behind the Music: The Short Organ Hymn.** *Mr. J. Hamersma.*

W52 **Vocal Pedagogy for the Singer, Classroom Teacher, and Choral Conductor.** *Mr. A. Armstrong.*

W53 **Singing for Pleasure.** *Mr. C. Kaiser.*

W54 **Music for the Absolute Beginner.** *Mr. D. Topp.*

W55 **Introduction to Music Theory.** *Ms. T. Huizenga.*

IDIS W15 **The Raj Quartet.** *Mr. H. Slenk.*

Nursing

Professor C. Kielinen (chair)

Assistant Professors †C. Danford, M. Doornbos (acting chair, first semester), B. Gordon, M. Gritter, M. Leen, B. Medema, D. Rubingh, B. Timmermans

Instructor S. Vandenberg

Teacher-Practitioners M. Vanderveen (Holland Community Hospital), M. Miller, S. Mlynarczyk (Butterworth Hospital)

STUDENTS SHOULD INDICATE their interest in nursing at the time they apply for admission to the college. They should start work on their prenursing requirements in their freshman year, following closely the suggested program on page 70. Transfer students who wish to be considered for admission to the nursing program should consult the department chair.

Students wishing to enter the Hope-Calvin Department of Nursing should make formal application to the department by January 15 of their sophomore year. Applicants should be aware that admission to the nursing program is selective and is not guaranteed by a student's acceptance to the college. Further information and application forms are available in the Department of Nursing and in the Registrar's Office.

The baccalaureate nursing program requirements are described on pages 69-70.

301 Concepts of Nursing. F. This course introduces the nursing student to the theory and practice of professional nursing. The course focuses upon the concepts of Man, Health, and Nursing. Prerequisites: admission to the nursing program and registration in 311 and 321. *Staff.*

311 Communication, Relationships, and the Nursing Process. F. Communication skills, relationship development, health assessment, and decision-making as they relate to the nursing process. Clinical experiences provide opportunities for the application of theoretical concepts to well clients. Individual family visits will be arranged. Prerequisites: admission to the nursing program and registration in 301 and 321. *Ms. D. Rubingh.*

321 Assessment and Intervention Strategies for Nursing. F. This course is designed to assist students in developing general physical assessment skills and basic procedural skills necessary for providing nursing care to clients. The course consists of two hours of theory presentation and three hours of laboratory per week. Prerequisites: admission to the nursing program and registration in 301 and 311. *Ms. B. Medema, Ms. B. Timmermans.*

352 Alterations, Adaptations, and Nursing I. S, one and three-quarters course units. An introduction to the adaptation process of clients in altered states of health. Consideration is given to pathophysiology, socio-cultural factors, and developmental concepts. The role of the professional nurse is examined with respect to leadership, legal-ethical issues, standards of practice, and research. The course consists of six hours of theory presentation each week.

Prerequisites: 301, 311, 321, and registration in two sections of 375. *Staff.*

373 Acute Care Nursing. May-June Term. An in-depth exposure to the reality of nursing practice providing care for clients with alterations of health status. The four-week experience includes application of nursing theory to practice. Prerequisites: 352 and two sections of 375. *Staff.*

375 Nursing Care for Clients in Altered States of Health I. F and S, one and one-half course units. Clinical nursing practice in a nursing specialty area provides students with an opportunity to apply core theory within a nursing setting. Clinical conferences are held weekly. The course consists of sixteen hours of clinical laboratory per week. Students select two clinical components concurrently with 352:

1. Nursing care of child-bearing families
2. Nursing care of children
3. Mental health nursing
4. Nursing care of adults

Prerequisites: 301, 311, 321 and registration in 352 or 401. *Staff.*

401 Alterations, Adaptation, and Nursing II. F, one and three-quarters course units. This course is divided into core-theory and seminar. Core-theory focuses on nursing care of clients in situations where life processes are threatened. Alterations in physiological regulation, associated psychosocial aspects of individual and family adaptation, and the multi-dimensional role of the nurse are considered. A concurrent seminar provides opportunities for the student to make relationships between core theory and clinical nursing experiences. The course consists of six hours of theory presentation. Prereq-

quisites: 373, 375, and registration in 425. *Staff.*

425 Nursing Care of Clients in Altered States of Health II. F, one and one-half course units. A continuation of 375. Clinical nursing practice in nursing specialty areas provides students with an opportunity to apply core theory in a nursing setting. Clinical conferences are held weekly. Students select two different clinical components while taking 401. The course consists of sixteen hours of clinical laboratory per week:

1. Nursing care of child-bearing families
2. Nursing care of children
3. Mental health nursing
4. Nursing care of adults

Corequisite: 401. Select two clinical components concurrently with 401; select clinical components which are different from those selected in 375. *Staff.*

472 Individualized Clinical Nursing. I, three-quarters course. An individualized clinical nursing experience designed to meet specific learning needs of students. Students are given opportunities to synthesize their previous learning through caring for

clients with complex health problems within a clinical setting. Two nursing shifts and seven working days are used. Prerequisites: four sections of 375 and 401. *Staff.*

474 Nursing Management for Groups of Clients. S, two course units. This course gives students the opportunity to synthesize nursing theory and skills while developing a more advanced level of nursing practice. Clinical components include experiences in institutional inpatient and outpatient community settings. The focus is on nursing management of groups of clients. Nursing theory is presented in weekly seminars; clinical experiences relate theory to practice. Prerequisites: 401, 425, 472, and registration in 482. *Ms. B. Gordon, Ms. D. Rubingh, Ms. M. Vanderveen.*

482 Nursing in Transition. S. This core theory course expands the students understanding of professional nursing. It explores organizational structure within the health care system. Emphasis is given to multi-dimensional aspects of nursing including teaching groups, research in nursing, and legal-ethical issues. Prerequisites: 472 and registration in 474. *Staff.*

Off-campus programs

CALVIN COLLEGE OFFERS semester- and year-long programs for students who want to study abroad and for those who would benefit from a different sort of academic experience in the United States than can be offered on campus. Although some of the programs are offered in conjunction with other institutions, they are officially Calvin programs, and students in them are eligible for financial aid. Students in most programs are juniors or seniors but students in some programs, such as the Study in Spain program, may be freshmen.

The specific requirements for admission differ from program to program, as indicated below, but for each a student must be in good academic and social standing and must be recommended by the advisor of the program concerned. Furthermore, the student and his academic advisor need to determine in advance how credit for such programs will be applied to graduation requirements. Once admitted, the students must make a special registration at the Registrar's Office and must make financial arrangements, which differ from program to program, to pay the appropriate fees at the Business Office.

Other international programs not sponsored by Calvin College are available to students. Information on such programs is available at the Registrar's Office. Credit for them will be considered as transfer credit and financial aid is not available through the college.

AMERICAN STUDIES PROGRAM

Calvin College participates in the American Studies Program in Washington, D.C., which is sponsored by the Christian College Coalition and is based on the principle of integrating faith, learning, and living. Students spend time in Washington, D.C., serving as interns in a variety of governmental and non-governmental agencies and participating in an academic seminar program. This "Washington campus" for the Coalition Colleges is viewed as one way of challenging students to consider the meaning of proclaiming the Lordship of Jesus Christ in all areas of life, including career choices, public policy issues, and personal relationships.

Applicants should be juniors or seniors, should have a grade point average of 3.0 or higher, and should show promise of benefiting from the internship and seminar experience. Further information and application forms may be obtained from Mr. James De Borst of the Department of Political Science.

CCCP 346 American Studies Seminar. F and S, one-half to two course units. Four consecutive seminar modules in which four different public policy issues are addressed from a Christian point of view. The seminars are available through the Christian College Coalition's American Studies Program in Washington, D.C., and utilize the resources of the United States' capital. Prerequisites: concurrent registration in 356 (American Studies Internship) and acceptance into the American Studies Program.

CCCP 356 American Studies Internship. F and S, one-half to two course units. Part-time work-study experience in Washington, D.C., through the Christian College Coalition's American Studies Program. Internships are individually arranged to complement the student's academic major or special interest. Prerequisites: concurrent registration in 346 (American Studies Seminar) and acceptance into the American Studies Program.

AU SABLE INSTITUTE OF ENVIRONMENTAL STUDIES

This institute is sponsored by Calvin College and other evangelical Christian colleges and offers course instruction and internships in environmental studies. In a setting of northern lower Michigan forests, wetlands, lakes, and rivers, students take courses which provide academic content, field experiences, and practical tools for stewardship of creational resources. Students who also complete work for a bachelor's degree at a liberal arts college approved by the Institute may earn certificates as environmental analysts, land resource analysts, water resource analysts, and naturalists.

Courses are offered during the January interim (I), during late May to early June (May term), during June and early July (Summer I), and from the middle of July to the middle of August (Summer II).

A summer fellowship and some grant-in-aid funds are available each year to qualified students. Interested students should get course enrollment forms and applications from the Au Sable advisor, Mr. Alan Gebben of the Biology Department.

ASI 210 Winter Recreation. I, quarter course. Instruction in cross-country skiing, downhill skiing, snowshoeing, orienteering, inner-tubing, and winter camping.

ASI 212 Winter Orienteering. I, quarter course. Students learn to use orienteering as a tool to navigate safely through the winter woods. They refine skills in cross-country skiing, winter first aid, and survival. Prerequisite: 210 or permission of the instructor.

ASI 215 Environmental Recreation. May term, quarter course. Students will learn skills to enable them to move through the forest and to permit them to spend extended periods of time in the forest with a minimum impact on the environment. Specific skills include map and compass use and minimum impact camping.

ASI 295 Natural History in Spring. May term. Springtime plants and animals, their

field identification, field biology, behavior and landscape context, with a focus on spring flora, amphibia and birds. Designed with a focus on observation and sounds of life in the field that occur between the end of the spring college semester and the end of the spring high school semester to provide prospective teachers and naturalists with an opportunity to investigate the natural history of this very active time of year.

ASI 301 Land Resources. Summer I. Systems-level perspective on land forms and ecosystems. Includes analysis and interpretation of on-site data recorded in the field and remote-sensing data derived from satellite and low-altitude aerial imagery. Field trips to and analysis of forests, bogs, marshes, dunes, and rivers. Includes application to policy and land use planning. Prerequisite: one year of introductory science.

ASI 302 Water Resources. Summer II. Field study of lakes and streams with applications to planning and management. Includes an introduction to limnology and investigation of representative lakes and streams of the region. Prerequisite: one year of general biology and one year of general chemistry.

ASI 303 Natural Resources Practicum. Summer I. Environmental analysis and natural resource planning in cooperation with local government.

ASI 304 Natural Resources Practicum. Summer II. Environmental analysis and natural resource planning in cooperation with local government.

ASI 305 Ornithology. May term. Biology, behavior, ecology and identification of birds. Work will be primarily conducted in the field and will cover the major habitats of northern lower Michigan, including wetlands, lakes, rivers, forests, dunes, and open field communities. Emphasis will be placed on identification of the spring bird fauna of northern lower Michigan by sight and by call. Prerequisite: one course in introductory biology or zoology.

ASI 310 Winter Biology. I. Study of the biology and environment of northern Michigan plants and animals in winter condition. Lecture, films, and field experience. Prerequisite: one course in biology.

ASI 311 Field Botany. Summer I. Field identification and ecology of vascular plants as components of natural communities in Michigan. Emphasis is placed upon on-site examination of plants in communities such as bog, dune, forest, marsh, meadow, and swamp. Plants difficult to study under field conditions are brought to the laboratory for dissection and identification. Ecological features such as community stratification and plant zonation along ecological gradients are examined. Prerequisite: one year of general biology or one semester of botany.

ASI 312 Insect Taxonomy and Ecology. Summer II. A study of insect taxonomy, ecology, life histories, and economic importance. Special attention is given to environmental stewardship issues including use of insecticides, biological control, integrated pest management, and impact of cultivation on formation of pest faunas. Field methods are stressed. Prerequisite: one year of general biology or one semester of general zoology.

ASI 321 Animal Ecology. Summer I. The interrelationships between animals and their biotic and physical environments, including behavioral aspects. This is a field course which centers on the autecology of northern Michigan fauna from a stewardship perspective. Included are studies of a resident population of beavers. Prerequisite: one year of introductory science.

ASI 322 Aquatic Biology. Summer II. A field course which involves collecting, culturing, identifying, and preserving aquatic plants and animals. Emphasis is upon water as a habitat, adaptation of organisms, and species interactions. Ramifications of human impacts receive special attention. Prerequisite: one year of general biology or one semester each of general zoology and general botany.

ASI 332 Environmental Chemistry. Summer II. Principles and analysis of chemical movement and distribution, both natural and man-induced, in natural environments. Sampling and analytical methods are included for water, soil, and air. Work will be conducted both on site in natural habitats and the laboratory. Prerequisite: one year of general chemistry and one semester of either biochemistry or organic chemistry.

ASI 350 **Environmental Ethics.** I. Contemporary programs of environmental stewardship are investigated, including use of renewable and nonrenewable natural resources, pollution, appropriate land use and development, Third World concerns, and preservation of wild nature. These problems are set in a historical perspective of mankind's relationship to the natural environment, especially as this relationship is viewed in the light of Christian thought and doctrine. Current attempts to develop a theology of nature and principles of Christian stewardship are considered.

ASI 390 **Directed Individual Study.** Summer I and II. Prerequisite: permission of instructor.

CENTRAL COLLEGE PROGRAM

In cooperation with Central College, Calvin college offers semester- and year-long programs of study in France, Germany and Austria, Netherlands, Spain, and Wales which permit students to register for courses in a variety of subjects. To be eligible a student must have completed the study of the appropriate language through the second-year level. Those who need language review may take a month-long intensive course in the country of their program before the beginning of the fall semester. English language programs are available in Wales and England.

To be eligible for such programs, students must be maintaining a cumulative grade point average of 2.5 and must have the recommendations of two faculty members. Students should apply at the Registrar's Office.

CHICAGO METROPOLITAN PROGRAM

The Chicago Metropolitan Center is a semester-long program sponsored by Calvin college together with Central, Dordt, Hope, Northwestern, and Trinity Colleges and is administered by Trinity Christian College. It offers qualified juniors and seniors with a grade point average of at least 2.5 the opportunity to gain a semester's credit, studying and working in Chicago. Students spend four days a week in an internship related to their career interest and academic major, and participate in seminars one day per week at CMC's Loop Center.

All students must take the Field Intern-

ship and select two of the three seminar available. Selection should be made in consultation with the Registrar.

CMET 345 **Field Internship.** F and S, two course units. Students enrolled in the Chicago Metropolitan Center program have a large number of placements available to them. Students may select internships from a range of organizations which include art centers, banks, businesses, hospitals, media centers, newspapers, publishing houses, mental health clinics, churches, social work agencies, museums, libraries, and zoos. Work internships demand high quality work and are supervised on the job and by Metropolitan Center staff members.

CMET 301 **Fine Arts Seminar.** F and S, one course unit. An investigation of urban cultural life as reflected in the arts of Chicago. Data for exploration is gathered by attendance at plays, concerts, movies, and art galleries. This primary information is processed through readings, lectures, and classroom discussion. The seminar operates on the premise that art mirrors the ideas and values held by a particular society or civilization and that students can be helped to read this cultural mirror more effectively.

CMET 303 **Metropolitan Seminar.** A broad survey of the major issues in the life of the metropolitan community of Chicago. The seminar treats the economic, educational, political, and social welfare systems. Also it examines the meaning of living in the urban environment, the nature of the relationship between the city and the suburbs, and the relations of national priorities to the quality of life in the urban centers.

CMET 305 **Values Seminar.** F and S, one course unit. An exploration of the values dimension in life, what one lives for and why. Emphasis is placed on helping students determine their personal structure of values in the light of biblical norms. What is sought is a blueprint for an integrated life of Christian action and reflection. All Chicago Metropolitan Center students are required to take this seminar.

LATIN AMERICAN STUDIES PROGRAM

Participants in the Latin American Studies Program, administered by the Christian College Coalition, will live and study for a semester, either in the fall or spring, in

Costa Rica. Patterned after the American Studies Program in Washington, D.C., the program is designed to expose students to the economic and political realities of the relationship between the United States and developing nations of Latin America, to increase sensitivity to the needs of Christians in the Third World, and to deepen understanding of the Lordship of Jesus Christ in an international context.

Applicants must be juniors or seniors, have a 2.75 or higher grade point average, and must receive a recommendation from a member of the Department of Spanish. Students will study the Spanish language intensely, will take a course in Latin American history and culture, and will be involved in a service experience. For further information and application forms consult the Spanish Department.

NETHERLANDS STUDIES PROGRAM

This cooperative program with Dordt College is offered each spring semester in Amsterdam. It enables students to live with Dutch families for part of their stay and near the Free University of Amsterdam for the remainder. Prerequisite is a semester of college-level Dutch or its equivalent, sophomore status or higher, and a cumulative grade point average of at least 2.5. The advisor is Mr. Martin Bakker.

A plan of study will be devised for each student from the following courses:

DCNP 102 **Elementary Dutch II.** Continuation of 101. Fundamentals of grammar, pronunciation, conversation, and composition.

DCNP 201 **Intermediate Dutch I.** Emphasis on conversation based on literature and newspapers.

DCNP 202 **Intermediate Dutch II.** Continuation of 201.

DCNP 251 **Dutch Art and Architecture.** Three sem. hrs. A study of seventeenth-century, as well as contemporary, styles in painting, sculpture, and architecture. Based on observations in museums and the environment.

DCNP 253 **International Marketing.** Three sem. hrs. The application of business administration principles to international business with emphasis on the Benelux countries.

DCNP 255 **Dutch Culture and Civilization.** Three sem. hrs. The course guides the students in an exploration of selected topics in Dutch culture and civilization. The emphasis is on methods of investigation and analysis of cultural data. The course is supported by excursions and field trips.

DCNP 257 **History of the Low Countries.** Three sem. hrs. A study of Low Countries in the late nineteenth and twentieth centuries with special emphasis on those cultural themes influencing and shaping modern Dutch institutions, beliefs, and ways of life.

DCNP 301 **Advanced Dutch I.** Composition and conversation based on readings in literature, art, and history.

DCNP 302 **Advanced Dutch II.** Continuation of 301.

DCNP 390 **Guided Independent Study.** Three sem. hrs.

OREGON EXTENSION PROGRAM

This cooperative program is conducted in Ashland, Oregon, during the fall semester. About thirty students become part of a small, intellectual community in a quaint rural setting. Instruction is personalized in tutorial or small groups. The focus is on Christian reflection on contemporary life and thought. Students study one course in each of the following categories: Modern Visions of Human Nature; Science and Technology in the Modern World; Modern Visions of Society; and Religion and Modern Life. More than half of the academic work must be outside students' primary field of interest.

Applicants ordinarily should plan to take the program in their junior or senior year, have a grade point average of 3.0 or higher, and show promise of benefiting from tutorial and small group study and discussion. Details about the program and application forms are available at the Registrar's Office. Credit is issued by Trinity College, Deerfield, Illinois.

STUDY IN SPAIN PROGRAM

Calvin offers introductory and advanced Spanish language programs each spring semester in Denia, Spain. Students live with Spanish families and attend classes at the local university. The cost of the programs, including air travel to Spain, is approx-

imately the same as for a semester in residence on campus.

In the introductory program, students earn credit for Spanish 101, 102, 201, and 202. Because enrollment is limited, preference is given to sophomores and upper-class students who are maintaining a cumulative average of at least 2.5, but freshmen with good records will be considered.

In the advanced program, Spanish 202 or its equivalent is a prerequisite. Students select four courses from Spanish 215, 216, 217, 309, and 371. The program is limited to ten students who are maintaining a cumulative average of 3.0 or better.

Complete information and application forms are available in the Spanish Department.

- SPAN 101 Elementary Spanish I.
- SPAN 102 Elementary Spanish II.
- SPAN 201 Intermediate Spanish I.
- SPAN 202 Intermediate Spanish II.
- SPAN 215 Advanced Grammar and Conversation.
- SPAN 216 Advanced Composition and Translation.
- SPAN 217 Readings in Spanish Literature.
- SPAN 309 Spanish Drama.
- SPAN 371 Civilization of Spain.

Philosophy

*Professors P. De Vos, K. Konyndyk (chair), G. Mellema, †C. Orlebeke, D. Ratzsch, **N. Wolterstorff*

Associate Professors S. Wykstra, L. Zuidervaart

Assistant Professors L. Hardy, D. Snyder, M. Talbot

Professor of Interdisciplinary Studies †M. S. Van Leeuwen

THE DEPARTMENT OFFERS A MAJOR concentration appropriate not only for future teachers of philosophy, but also for aspirants to professions such as law, the ministry, and government service. It consists of eight courses including Introduction to Philosophy (153), one course in logic, two historical period courses (251–252), an advanced historical course, two systematics courses (one of which must be from the advanced level), and an elective. The student is also required to take a four-unit cognate in another department that is approved by the departmental advisor.

A minor concentration consists of 153; 171 or 173; 251 and 252; and two philosophy electives. Students with special interests, or who may wish to modify these minor requirements, should consult the department chair.

Students who wish to present one course toward the core requirement in philosophy should take 153. Those who wish to present two courses should take 153 and either 171 or 173; 153 and any intermediate level course; or, for those in teacher education, 153 and 209 or Education 304.

ELEMENTARY COURSES

153 **Introduction to Philosophy.** F and S, core. A one-semester introduction to philosophy which aims to give the student a Christian philosophical framework for his thinking, along with some awareness of important alternative philosophical perspectives. *Staff.*

171 **Introduction to Logic.** F and S. A course in elementary deductive and inductive logic with emphasis upon the use of logic in evaluating arguments. Suitable for freshmen; not recommended for students aiming toward graduate study of philosophy. *Mr. D. Ratzsch, Mr. D. Snyder.*

173 **Introduction to Symbolic Logic.** F. A course in elementary symbolic logic, including some modal logic. This course is recommended especially for science and mathematics majors, and for those intending to study philosophy on the graduate level. Open to qualified freshmen. *Mr. G. Mellema.*

INTERMEDIATE SYSTEMATIC COURSES

All intermediate courses presuppose one course in philosophy and (after 153) satisfy core.

201 **Philosophy of Social Science.*** F. A study of philosophical problems arising out of the methods and results of the social sciences. Not offered 1987-88.

202 **Philosophy of Law.*** F. A consideration of such topics as: the nature and types of law; sources of law; and the basis of a legal system, of legal and political authority, of obedience to law, and of human rights. *Mr. P. De Vos.*

203 **Philosophy of Physical Science.*** F. A study of philosophical problems arising out of the methods and results of the physical sciences. *Mr. D. Ratzsch.*

204 **Philosophy of Religion.*** S. A study of some philosophical questions arising from religious belief. *Mr. S. Wykstra.*

205 **Ethics.*** F and S. A course designed to deal both historically and situationally with the persistent problems of the moral life. *Mr. P. De Vos, Mr. D. Snyder.*

207 **Political and Social Philosophy.*** S. A systematic study of the problems of social and political thought, historically ori-

ented, with emphasis on political and social ideals, such as political and social justice; equality and the law; the basis of social and political authority; rights and obligations. *Mr. P. De Vos.*

208 **Aesthetics.*** F. A study of the nature of art and aesthetic judgments. *Mr. L. Zuidervaart.*

209 **Philosophy of Education.*** S. A study of the nature, aims, and principles of education. *Mr. G. Mellema.*

INTERMEDIATE HISTORICAL COURSES

All intermediate courses presuppose one course in philosophy and (after 153) satisfy core.

251 **History of Philosophy I.*** F and S. A survey of the major Western philosophers and philosophical movements of the ancient and medieval periods. *Mr. M. Talbot, Mr. S. Wykstra.*

252 **History of Philosophy II.*** F and S. A survey of some of the major Western philosophers and philosophical movements from the seventeenth century to the present. A continuation of 251, which is a recommended preparation. *Mr. K. Konyndyk, Mr. L. Hardy.*

ADVANCED HISTORICAL COURSES

All advanced courses presuppose two or more philosophy courses, or one philosophy course plus junior or senior standing. All satisfy core (after 153).

312 **Plato and Aristotle.*** S. Advanced study of Plato and Aristotle. *Staff.*

322 **St. Thomas Aquinas.*** F. An intensive study of selected passages from Aquinas' *Summa Theologiae* dealing with the topics of God, human knowledge, and virtue. *Staff.*

331 **Kant.*** F. A study of the *Critique of Pure Reason*. *Mr. L. Hardy.*

333 **Kierkegaard.*** A study of selected philosophical works of Kierkegaard, focusing primarily on his philosophy of religion. Not offered 1987-88.

334 **Marx and Marxism.*** A critical study of the thought of Karl Marx and his most important interpreters, including Lenin and contemporary Marxist humanists. Not offered 1987-88.

335 **Nineteenth Century Philosophy.*** F. A study of some major figures in nineteenth century continental European philosophy. *Mr. L. Hardy.*

336 **Studies in Modern Philosophy: Recent Advances in the Philosophy of Science.*** S. *Mr. D. Ratzsch.*

340 **Twentieth-Century Continental Philosophy.*** A study of major figures in recent phenomenology and existentialism. Not offered 1987-88.

ADVANCED SYSTEMATIC COURSES

367 **Issues in Social and Political Philosophy.*** An examination of some significant topics in social and political thought, including human rights and the Calvinist and liberal traditions. Not offered 1987-88.

371 **Epistemology.*** F. A study of the nature, sources, types, and limits of human knowledge. *Mr. N. Wolterstorff.*

375 **Philosophical Anthropology.*** A critical examination of major philosophical discussions of the nature of man, with special attention to the concepts of mind, body, action, soul, and immortality. Not offered 1987-88.

381 **Advanced Logic.*** Topics include the formalization of propositional and quantificational logic. Taught jointly with the Mathematics Department and also listed as Mathematics 381. Not offered 1987-88.

390 **Readings and Research.** F, I, S. Prerequisite: permission of chair. *Staff.*

395 **Metaphysics.*** S. A study of selected topics of metaphysics. *Mr. K. Konyndyk.*

GRADUATE COURSES

501 **The Educational Enterprise: A Philosophical Perspective.** Summer. An examination of factors presently operative in the educational enterprise from the perspective of the history of Western philosophy. *Mr. G. Mellema.*

590 **Independent Study** (graduate). F, I, S. *Staff.*

595 **Graduate Project.** F, I, S, full or half course. The prospectus for each Master of Arts in Teaching project must be developed under the supervision of a faculty member and must be approved by the student's graduate advisor. *Staff.*

JANUARY 1988 INTERIM

A catalog with the descriptions of all interim courses is available after October 1987.

W10 **God, Just War, and Nuclear Deterrence.** *Mr. K. Konyndyk.*

W11 **Christian Apologetics.** *Mr. M. Talbot.*

W50 **Creator and Creatures—Toronto Interim.** (Off-campus) *Mr. H. Hart, Mr. L. Zuidervaart.*

IDIS W16 **Business and Engineering Ethics.** *Mr. R. De Jonge, Mr. G. Mellema.*

Physical education and recreation

Professors R. Honderd, J. Timmer (chair), D. Tuuk, D. Vroon, M. Zuidema
Associate Professors G. Van Andel, N. Van Noord, D. Zuidema
Assistant Professors E. Douma, N. Meyer, J. Pettinga
Instructor J. Ter Molen

THE DEPARTMENT SERVES a number of functions—it provides a required but flexible sequence of physical education courses for all students; it offers professional training for physical education teachers, coaches, and recreation leaders; and it directs an extensive program of intramural, recreational, and intercollegiate sports for men and women.

Admission to any of the major concentrations requires the approval of the department chair. The general nine-course major leading to a Bachelor of Arts degree in physical education requires 201, 212, 213, 220, 301, 315, 325, and 332 plus two course credits from courses numbered 200 and above. For those students interested in exercise science, the general major sequence is required, plus a seven-course science cognate consisting of Biology 131, 205 and 206; Chemistry 113 and 114; Physics 223; and Mathematics 143. Students selecting a concentration in exercise science should plan to enter graduate school to complete their specialization.

The nine-and-one-half course teacher education major requires 201, 212, 213, 220, 301, 302, 325, 332, and 380, plus two course credits from the 240 series, Teaching of Education Sport Activities.

The required eight and one-half course units for the major in recreation are met by 201, 215, 303, 304, 305, 310, 346. The four required cognate courses include Psychology 201; Psychology or Sociology 310; Physical Education 220; and one unit from Physical Education 221, 230–243, or 380. Students who wish to pursue professional certification in therapeutic recreation (recreation therapy) are also required to take Recreation 314 and 324.

The program in recreation leads to a Bachelor of Science in Recreation and requires the approval of the recreation advisor, Mr. Glen Van An del.

Students who wish to minor in physical education may choose from two areas of concentration. A secondary teacher education minor requires six courses: 212, 220, 302, 325, 332, 380, and one course unit from the 240 series. The elementary teacher education minor is 212; 220; one course unit from 240–243; 302; 325; 350; and a half course credit in 380. A teacher education minor with a coaching emphasis requires 212, 220, 312, 315, 325, 380, and one course credit from the 230 series.

The liberal arts core requirement in physical education may be met by taking two quarter courses from those numbered 100–124, Health Fitness Courses; and the remaining two courses from 125–149, Competitive Sports, 150–179, Recreation Sports and Dance, or 180–199, Special Emphasis Courses. Physical Education 221, and courses from the 230 series or 240 series may be substituted for one of the courses in the 125–186 series. Although students may take courses in addition to these, only one course unit of credit may be applied to the minimum graduation requirements.

PHYSICAL EDUCATION COURSES

104 Physical Education Perspectives. F and S, quarter course. Required of all students. This course covers topics dealing with a Christian perspective on physical education. A survey of positive health practices in health fitness, including cardiovascular and muscular physiology, nutrition,

body composition, and stress management. Also included are lectures on play, leisure, recreation, and sports in a contemporary society. The course involves lectures, laboratories, discussions, and exercise sessions. *Staff.*

110–124 Health Fitness. F and S, quarter credit. Required of all students. The

courses listed in this series have as a primary goal physical conditioning. Courses are either concerned with aerobic cardiovascular conditioning or the development of efficient muscular function. The courses included in this series are: aerobic jogging, aerobic swimming, aerobic dance, basketball, weight training, weight reduction, and therapeutic exercise. Prerequisite: 104. *Staff.*

125-149 Competitive Sports. F and S, quarter credit. The courses listed in this series include team and individual sports popular in the American society. The course's primary goals are skill development and participation. The courses included in this series include: volleyball, soccer, badminton, golf, tennis, and racquetball. In many courses personal equipment is needed to enroll in the courses. Prerequisite: 104. *Staff.*

150-179 Recreational Sports and Dance. F and S, quarter credit. The courses listed in this series have as their primary goals skill development and participation. The activities are less competitive and have great lifetime recreational value. The courses include: skiing, bowling, new games, swimming, and dance. Prerequisite: 104. *Staff.*

180-199 Special Emphasis Courses. F and S, quarter credit. The courses listed in this series are offered to attempt to meet the special needs of students. Students may select a course from this group based on counseling or academic program. The courses include: beginning swimming, senior life saving, first aid, sports officiating, self-defense for women, and karate. *Staff.*

201 Historical Foundations of Physical Education, Recreation, and Sport.* F. A study of physical education, recreation, and sport in the context of their history and development as well as an overview of their role in and significance to contemporary society. *Mr. J. Pettinga.*

212 Anatomical Kinesiology. F. A study of human motion based on structural foundations. Particular attention is given to bone, joint, muscle, connective and nerve structures, and the movement patterns specific to these structures. An analysis of efficient anatomical movement patterns for locomotor, manipulative, and sport skills are studied in the course. Prerequisite: Biology 115. *Mr. R. Honderd.*

213 Mechanical Kinesiology. S. An investigation into the physical laws of motion and how these laws apply to the human body and to objects projected by the human body. Specific sports skills are analyzed with respect to both kinematics and kinetics. Students determine efficient movement patterns for sports skills based on the mechanical principles studied in the course. Prerequisites: 212 and Physics 223. *Staff.*

215 Physical Education and Recreation for Special Populations. F. Philosophy and basic concepts relating to planning and conducting programs in community settings for individuals with disabilities. Concepts and techniques in program planning, leadership and adaptation of facilities, activities and equipment in recreation and physical education services for individuals with special needs are reviewed and discussed. Prerequisites: Physical Education/Recreation 201 or permission of the instructor. *Mr. G. Van Andel.*

220 Motor Learning and Skill Performance. F. This course in the psychology of learning, particularly motor learning, emphasizes theory formation and empirical strategies. It includes an examination of the various characteristics of the learner, an attempt to develop specific theories of how motor skills are acquired, and a review of teaching strategies that are appropriate for teaching them. The focus is on the learner, the learning process, and methods of instruction and includes an evaluation of growth and the developmental factors influencing learning. The course gives opportunities for practical experience in applying motor learning principles. This course substitutes for one course unit in the 230 series. *Mr. M. Zuidema.*

221 Elementary School Activities and Programs.* F and S, half course. The course provides a working knowledge of the fundamentals of physical education planning for elementary school children. It substitutes for one-quarter course in basic physical education (110-199) for physical education majors and minors and for elementary teacher education students. *Mr. M. Zuidema, Staff.*

230-238 The Coaching of Sports. Half courses. Students with a major concentration in physical education must combine various courses to total the required two-

course credit. Prerequisite: a record of participation in skill performance or completion of the same activity in 380.

- 230 Field Hockey. F. Ms. D. Zuidema.
231 Basketball. F. Mr. E. Douma. Not offered 1987-88.
232 Baseball/Softball. S. Mr. J. Pettinga. Not offered 1987-88.
233 Track and Field. S. Mr. R. Honderd.
234 Soccer. F. Mr. M. Zuidema.
235 Volleyball/Tennis. S. Mr. D. Vroon, Staff.
236 Football. F. Mr. J. Pettinga. Not offered 1987-88.
238 Wrestling. F. Mr. J. Pettinga. Not offered 1987-88.

240-243 **Teaching of Activities.** F and S, half courses. A study of the basic principles, terminology, skills, and strategies involved in various educational sports activities and the methods and materials that are appropriate for incorporating these activities into physical education programs. Lectures, discussions, demonstrations, laboratory experiments, and student presentations. Prerequisites: 220 and completion of a basic physical education course in the activity to be studied or credit for that activity in 380.

- 240 Teaching of Gymnastics and Rhythmics. Ms. N. Van Noord.
241 Teaching of Team Sports. Mr. D. Vroon.
242 Teaching of Aquatics. S. Mr. J. Timmer. Not offered 1987-88.
243 Teaching of Racquet Sports and Golf. F. D. Zuidema. Not offered 1987-88.

301 **Measurement and Evaluation in Physical Education.*** S, half course. A study of the evaluation techniques in physical education. Emphasis on evaluation of physical fitness, body mechanics, growth, motor ability, sport skills, knowledge of health practices and sports activities, and program evaluation. Consideration is given to the organization of evaluation programs and the use of such programs. The course gives opportunity for practical experience in administering tests. Mr. M. Zuidema.

302 **Organization of the Curriculum and Programs of Physical Education.** S. A study of the structure and curricula of modern physical education programs of elementary and secondary schools and the closely-related areas of administration of athletics, intramurals, recreation, and health programs. Opportunity is given to

construct total programs of physical education for selected schools. Staff.

312 **Physiology of Conditioning and Injuries.** F, half course. The study of physiological principles as they apply to physical training and rehabilitation from injury. Specific types of training programs are studied. Laboratory topics will include athletic injury treatment, taping techniques, and first aid procedures. May substitute for 230 in major programs with the approval of the department. Prerequisite: a biology core course. Mr. J. Timmer.

315 **Sociology of Sport.** S. A study of the social and social-psychological dynamics of sports in modern society. Areas receiving special attention are youth sports, interscholastic sports, and professional sports. Emphasis is put on describing and understanding sports participants, observers, and the relationship of sport as an institution to the rest of the social structure. Offered as Sociology 315. Mr. G. De Blacy.

325 **Physiology of Physical Activity.*** S. A study of physical efficiency and physiological principles involved in human exercise. Emphasis will be placed on the responses of the respiratory, cardiovascular, and muscular systems. The course includes the physiology of factors affecting performance such as the environment and the use of tobacco, alcohol, and drugs. Prerequisite: a biology core course. Mr. J. Timmer.

332 **Philosophy of Physical Education and Sport.** F, half course. This course introduces the student to the philosophical reflections in physical education and sport and examines existing theories about physical education and sport in society. Prerequisites: 201, Philosophy 153, or 151 and 152, junior status. Not offered 1987-88.

380 **Individual Competences.** F, I, S, half course. This course offers opportunity for physical education majors and minors to develop the physical condition and skill necessary to be beginning teachers in physical education. It requires active participation and competence in a variety of physical education skills. Students should register for this course when they are admitted to a major or minor in the department and remain registered for it until they have completed the other departmental requirements. Mr. E. Douma.

390 **Independent Study.** F, I, S. Staff.

RECREATION COURSES

303 Leadership in Recreation Programs.

S, half course. This course studies the organization of recreation programs and gives opportunity for observing programs in action, for structuring new programs, and for developing leadership skills. *Ms. D. Zuidema.*

304 Management of Leisure Services. S.

A study of the principles, policies, theories and procedures involved in the organization and administration of leisure services in a variety of contemporary settings. *Mr. G. Van Andel.*

305 Program Planning and Development. F.

A study of the principles and techniques of recreation program development. The application of a program development model which is used in the organization and planning of recreation programs is emphasized. *Mr. G. Van Andel.*

310 Theory and Philosophy of Leisure. F.

A study of the theories and philosophies of work, recreation, and leisure that influence contemporary culture. Emphasis is placed on the development of a Christian perspective on work, recreation, and leisure and its implications for professional practice. *Mr. G. Van Andel.*

314 Principles of Therapeutic Recreation. S.

An introduction to the history, philosophy, and concepts of therapeutic recreation. An orientation to the role and function of therapeutic recreation personnel in the treatment of persons with psychological impairments, physical impairments, developmental impairments, pediatric illnesses, and the problems of aging are presented. Prerequisites: Physical Education/Recreation 215, Physical Education and Recreation for Special Populations, or permission of the instructor. *Mr. G. Van Andel.*

324 Therapeutic Recreation Practice. S.

An introduction to the basic methods and techniques used in the delivery of therapeutic recreation services. Skills in interpersonal and helping relationships are reviewed and practiced in the context of their application to specific treatment approaches including leisure counseling, play therapy, physical confidence classes, stress-challenge, and physical fitness programs. Prerequisites: Physical Education/Recreation 215, Physical Education and Recreation for Special Populations, and Recreation 314, Principles of Therapeutic Recreation, or permission of the instructor. *Mr. G. Van Andel.* Not offered 1987-88.

346 Field Internship and Seminar. S and SS,

three course units. This course involves a full-time, one-semester field experience in a recreation service or agency. The seminar focuses on the problems and issues involved in relating classroom learnings to professional practice. Prerequisites: completion of all courses in the recreation program, a minimum cumulative average of C (2.0), and the approval of the department. *Staff.*

JANUARY 1988 INTERIM

A catalog with the descriptions of all interim courses is available after October 1987.

W10 Dance and Related Arts in Elementary Education. *Ms. E. Van't Hof.*

W14 Application of Psychology to Athletics and Physical Education. *Ms. N. Van Noord.*

IDIS W55 Christianity and Sport. *Mr. M. Zuidema.*

IDIS W58 Wilderness Skiing in Yellowstone: A Geo-Thermal Experience. (Off-campus). *Mr. J. Clark, Mr. J. Gallagher.*

Physics

Professors R. Griffioen, A. Kromminga, D. Van Baak, H. Van Till, J. Van Zytveld (chair)

Associate Professor S. Haan

Assistant Professors P. Keegstra, R. Mawhorter

STUDENTS INTENDING TO MAJOR IN PHYSICS are advised to enter college with four years of mathematics and to take their required courses in mathematics (Mathematics 161, 162, 231, 261) and physics (Physics 123, 124, 181, 182, 225, 226) during their freshman and sophomore years. Computer Science 141 is also recommended for the first semester of the freshman year. Students may apply for admission to the department before completing 226 and Mathematics 231, but they must have completed the designated courses with a minimum average grade of C (2.0) before they can be admitted to the major program.

The major program of concentration in physics consists of a total of nine courses, including the required basic physics courses listed above. Each student's program of concentration must be approved by the department and must include an appropriate distribution of theory and laboratory courses as well as cognate courses in mathematics.

Students planning to pursue graduate study in physics should take, in addition to the introductory courses, 280, 335, 345, 346, 375, 376, a minimum of a half course credit of 382, 365 or 379, 395 and 396 or an interim course in research, and Mathematics 333.

The nine-course unit secondary education concentration requires Interdisciplinary 210 or Philosophy 203, Physics 123, 124, 181, 182, 225, 226, 280, one advanced theory course from 335–379, a half course unit of 382, a half course unit of 390 involving a study topic appropriate for students planning to teach high school physics, and approved electives from advanced physics courses, Astronomy 201, and Geology 331. Student teaching is offered only in the spring semester. The advisor for this program is Mr. John Van Zytveld.

A physics-computer science group major consists of 126, 186, 225, 280, and 385 (123, 124, 181, and 182 may be substituted for 126 and 186); Computer Science 151, 152, 251, and one from 243, 252, 370, or an approved interim; Mathematics 161, 162, 231 or 255, and 261; and additional approved courses to provide a minimum total of six courses in either physics or computer science.

The teaching group major in physics and chemistry consists of Physics 123, 124, 181, 182, 225, 226; Chemistry 103, 104, and either 253–254 or 261–262; and two and a half courses of approved electives. Courses recommended for such electives include Physics 280, 382, Chemistry 201, 304 or 317, and 396. The advisors for such programs are the chairs of the two departments.

A group major in science and mathematics meets the needs of some students, particularly those in professional programs. The majors are not appropriate for students who anticipate attending graduate school in physics or who are in teacher education programs. Such group majors require twelve courses in the

sciences and mathematics, ten of which must be from two departments with no fewer than four from either, with the remaining two courses chosen from a third department. The chairs of the three departments must approve each program of this type.

A six-course minor, which is also appropriate for teacher education, consists of 123, 124, 181, 182, 225, 226, 382, plus one and a half course units approved by the department chair.

The physical science core requirement may be met by 110, 111, or 223. Students preparing to be elementary teachers should take 111 and Interdisciplinary 213 unless they have had high school physics, in which case they need take only Interdisciplinary 213.

INTRODUCTORY COURSES

110 Physical Science. F and S, core. This course evaluates the basic assumptions used in the scientific study of nature, discusses the methods of scientific investigation and the development of scientific theories, and presents the results of scientific investigations in the fields of physics and chemistry. It also acquaints students with the fundamental laws of physics and chemistry and explains certain important physical phenomena. This course is designed primarily for non-science majors and is not open to those who have taken or plan to take 111, 123, 126, or 221. Laboratory. Prerequisites: high school algebra and Mathematics 100, 221, or the equivalent. *Staff.*

111 Physical Science for Elementary School Teachers. F and S, core. An introduction to the physical sciences for students preparing to be teachers in the elementary school. Employing extensive laboratory experience and an historical approach, this course pays particular attention to the processes involved in scientific investigation and in the development of scientific understanding. The principal topics for consideration are selected from theories of motion, with application to observational astronomy. This course is the department's physical science core course for future elementary school teachers, but is open to other students interested in a laboratory-oriented course. Not open to those who have taken or plan to take 110, 123, 126, 221, or 223. Prerequisites: a year of algebra and a year of geometry in high school and successful completion of the competency test in arithmetic. *Mr. S. Haan, Mr. J. Van Zytveld.*

123 Introduction to Modern and Classical Physics. F, half course. This course, along

with 124, serves as an introduction to both classical and modern physics for students planning to major in science or mathematics. Mathematically qualified students are encouraged to satisfy the core requirement with 123-124 rather than with 110. Topics in classical physics include mechanics and thermodynamics. The nature of scientific study in general and its place in one's world and life view are discussed. Prerequisites: concurrent registration in or completion of 181, Mathematics 161, and, if possible, Computer Science 141. *Mr. J. Van Zytveld.*

124 Introduction to Modern and Classical Physics. S, core. A continuation of 123, which is a prerequisite. Prerequisites: Mathematics 161 and concurrent registration in Mathematics 162 and Physics 182. *Mr. J. Van Zytveld.*

126 Introductory Physics: Mechanics and Heat. S. An introduction to classical Newtonian mechanics applied to linear and rotational motion; a study of energy and momentum and their associated conservation laws; an introduction to the concept of heat and a study of the first and second laws of thermodynamics. This course serves as a preparation for 225 and is intended primarily for engineering students and others who cannot fit 123-124 into their programs. Prerequisites: Mathematics 161 and concurrent registration in Mathematics 162 and Physics 186. *Staff.*

195 Physics Student Seminar. F and S. An introduction in a seminar format to recent developments in physics. Both readings and laboratory topics are available for study and discussion. Junior and senior physics majors must attend each semester; freshmen and sophomores intending to major are encouraged to attend. *Mr. D. Van Baak.*

221 General Physics. F, one and one-quarter course. This course is designed for those who do not intend to do further work in physics. The major areas of physics are discussed: mechanics, heat, electricity and magnetism, light, waves, relativity, and quantum theory. Laboratory. Prerequisites: plane trigonometry and high school algebra. *Mr. R. Mawhorter.*

222 General Physics. S, one and one-quarter course, core. A continuation of 221, which is a prerequisite. Laboratory. *Mr. R. Mawhorter.*

223 Physics for the Health Sciences. F, core. An introduction to those topics in physics which are applicable to a variety of health science fields with special emphasis on understanding various physical aspects of the human body. Topics include basic laboratory techniques and instruments for physical measurements, data analysis, basic mechanics, fluids, heat, electrical circuits, sound, optics, radioactivity and x-rays, a discussion of the nature of physical science, and a Christian approach to science. Laboratory. Prerequisites: high school geometry and algebra. Not open to those who have taken or plan to take 221. *Mr. D. Van Baak.*

225 Introductory Physics: Electricity, Magnetism, and Waves. F, core. A study of the properties of electric and magnetic fields and of the integral form of Maxwell's equations which describe these fields; a mathematically unified treatment of alternating current circuits, general wave phenomena, and geometrical and physical optics. Laboratory. Prerequisites: 124 or 126, 182 or 186, Mathematics 162, and concurrent registration in Mathematics 261. *Mr. R. Griffioen, Mr. A. Kromminga.*

226 Introductory Modern Physics. S. An introduction to quantum effects and the wave-particle duality of matter and radiation; a study of the structure of atoms, molecules, solids, nuclei, and fundamental particles as described by Schroedinger theory. Einsteinian relativity is also considered. Prerequisites: 225, Mathematics 261, and Computer Science 141. *Staff.*

280 Analog and Digital Electronics. S. An introduction to electronic circuits and devices and their applications. The following topics are included: A.C. circuit analysis, diode and transistor characteristics, amplifiers, oscillators, operational ampli-

fiers, digital logic gates, flip-flops, counters, integrated circuits, and microprocessors. Laboratory exercises in all of the above topics are performed. Prerequisite: 225. *Staff.*

285 Introduction to Digital Electronics. F. An introduction to digital electronics for students with little or no background in physics or electronics. Topics include: basic circuit elements and laboratory instruments, discrete circuits for digital functions, Boolean algebra for circuit design, logic circuit analysis and design, and integrated circuits. Not intended for students who have taken or plan to take 280, or Engineering 204 and 284. Laboratory. *Mr. P. Keegstra.*

385 Introduction to Microprocessors.* S. An introduction to microprocessors, including the following topics: technology of microprocessor development, microprocessor architecture, programming, systems design, interfacing, and peripherals. Laboratory. Prerequisites: 285 or its equivalent and programming experience. *Staff.*

ADVANCED THEORY COURSES

Prerequisites for all of the 300-level physics courses are Computer Science 141 or its equivalent as well as Mathematics 231 and 261.

335 Classical Mechanics.* F, alternate years. The motion of particles, of systems of particles, and of rigid bodies is studied by Newtonian and Lagrangian techniques. Topics included are: oscillatory motion, motion in a central force field, motion in non-inertial reference frames, motion of charged particles, and the inertia tensor of rigid bodies. Hamilton's canonical equations are developed and applied to simple systems. Prerequisite: 124 or 126. *Mr. D. Van Baak.*

345 Electromagnetism.* F, alternate years. The basic equations of classical electromagnetism are developed. Applications are made to static boundary-value problems and electromagnetic energy. Maxwell's equations are developed and applied to radiation in free space. Prerequisite: 225. Not offered 1987-88.

346 Electromagnetism.* S, alternate years. The equations of classical electromagnetism are further developed. Applications are made to electromagnetic momentum, electromagnetic properties of matter, physical

optics, and diffraction. Radiation and the relativistic character of electromagnetism are discussed in detail. Prerequisite: 345. Not offered 1987-88.

365 Thermodynamics and Statistical Mechanics.* Alternate years. Equations of state, heat capacities, and the laws of thermodynamics. The thermodynamic potentials. Application to some simple systems and changes of phase. Kinetic theory. Statistical mechanics with emphasis on the canonical ensemble. Determination of entropy and the thermodynamic potentials with application to crystals and gases. Introduction to quantum statistical mechanics. Prerequisite: 335. *Mr. A. Kromminga.* Offered Interim 1988 rather than spring semester.

375 Quantum Mechanics.* F. The main emphasis is on wave mechanics and its application to atoms and molecules. One-electron atoms are discussed in detail. Additional topics discussed are electronic spin and atomic spectra and structure. Nuclei, the solid state, and fundamental particles are also considered. Prerequisite: 226 or Chemistry 326. *Mr. R. Mawhorter.*

376 Quantum Mechanics.* S. A continuation of 375, which is a prerequisite. *Mr. R. Mawhorter.*

379 Contemporary Physics.* S. An introduction to one or more of the major areas of current research in physics. The course emphasis may be on solid-state, atomic, nuclear, or elementary-particle physics. Prerequisite: 375. Not offered 1987-88.

390 Independent Study in Physics. F, I, S, half or full course. Independent readings and research in physics under the supervision of a member of the departmental staff. Prerequisite: permission of the chair. *Mr. J. Van Zytveld.*

LABORATORY COURSES

181 Basic Electrical Measurements. F, quarter course. An introduction to basic D.C. electrical measurements including Kirchhoff's Laws, potentiometer circuits, and bridge circuits. Techniques of data handling and analysis and a brief introduction to A.C. circuits are included. *Mr. P. Keegstra.*

182 Electrical Measurements. S, quarter course. Applications of D.C. electrical mea-

surements; A.C. circuits, including experiments on frequency response and resonance; and an introduction to digital circuitry. Prerequisites: 181 and Mathematics 161. *Staff.*

186 Introductory Physics Laboratory. S, quarter course. An introduction to basic D.C. electrical measurements and their use in studying various mechanical systems and thermodynamic phenomena. Not open to those who have taken 181. Concurrent registration is required in 126 or the permission of the instructor. *Staff.*

382 Modern Physics Laboratory.* F and S, quarter course. An introduction to the basic laboratory techniques in atomic, nuclear, and solid-state physics and a study of some of the more important experiments on which modern physical theory is based. This course may be repeated with the permission of the instructor. Prerequisites: 280, Engineering 204 and 284, or a year of college physics and permission of the instructor. *Mr. D. Van Baak.*

395-396 Physics Seminar and Research.* F, S, half course; I, full course. Experimental or theoretical research on an approved topic and presentation of the result of the research in a departmental seminar. Prerequisites: 382 and the approval of the department. *Mr. D. Van Baak.*

GRADUATE COURSES

510 Physical Science and Contemporary Society. This course is designed to show the elementary or middle school teacher how physical science and its resulting technology interact. It does not deal primarily with the concepts and theories of physical science, but will focus on the societal impact of physical science. Topics of major interest include energy sources and energy use, supply and use of other material resources, and the limitations of physical science in solving societal problems. Prerequisite: 111 or its equivalent. *Staff.*

590 Independent Study. F, I, S. *Staff.*

595 Graduate Project. F, I, S, full or half course. The prospectus for each Master of Arts in Teaching project must be developed under the supervision of a faculty member and must be approved by the student's graduate advisor. *Staff.*

JANUARY 1988 INTERIM

A catalog with the descriptions of all interim courses is available after October 1987.

W10 History of Science in the Arab World. Mr. J. Van Zytveld.

W50 Microcomputers and the Real World. Mr. D. Van Baak.

365 Thermodynamics and Statistical Mechanics. Mr. A. Kromminga.

Political science

Professors J. De Borst (chair), R. De Vries, J. Penning, C. Smidt, C. Strikwerda
Assistant Professor K. Hollingsworth

TO BE ADMITTED TO A MAJOR PROGRAM in political science a student must have completed one of the core credit courses (151, 201, 202, 203, or for Canadians, 210) with a minimum grade of C (2.0). The major program requires: 201; one from 203, 206, and 303; 207; 305 or 306; and six additional courses in the department. Only one interim course may be applied to a major. Canadian students should take Political Science 210. Students planning to pursue graduate work in political science should take both 305 and 306.

Students preparing for a secondary teaching certificate should follow the normal major but need complete only five additional courses. A secondary teacher education minor requires 151, 201, 202, and three additional courses approved by the departmental advisor for teacher education, Mr. Robert De Vries. The elementary teacher education minor is 151, 201, 202, one from 207, 308, and 309, one from 203, 206, 303, or, for Canadian students, 210, one from 209, 310, 312, 315, 317, and 318. One interim course can substitute for a course in the last three categories.

A general departmental minor consists of a course in American politics from 201, 202, 209, 310, 312, 313, or 315, a course in comparative and international politics from 203, 206, 207, 210, 303, 308, or 309, a course in political theory from 151, 305, or 306, and three additional courses, one of which may be an interim course.

Although the core may be satisfied by 151, 201, 202, 203, or 210, Canadians are advised to take 210 and prospective elementary teachers either 201 or 210.

151 Introduction to Politics. F and S, core. A general survey course which introduces students to the nature and study of politics and includes some of the enduring questions of conflict and cooperation within and between nation-states. For freshmen and sophomores only. *Staff.*

201 American Politics. F and S, core. A study of American national politics. Empha-

sis is on the social context, constitutional foundations and the major institutions, processes, and functions of American politics. *Staff.*

202 American State and Local Politics. F, core. A study of American politics on the state and local levels. Emphasis is on state policy making, urban politics, and metropolitan politics. *Mr. J. Penning.*

- 203 **Comparative Government: Europe.** S. core. A study of the government and politics of Great Britain, France, and Germany. *Mr. C. Strikwerda.*
- 206 **The Soviet Union and China.** F. A study of the development of communist political systems in the Soviet Union and China and other selected communist states. *Mr. C. Strikwerda.*
- 207 **Introduction to International Politics.** F. A study of power relations among nation-states analyzing different theoretical approaches to the study of international politics, describing the state system and its basis in the doctrine of sovereignty, and examining the phenomena of nationalism, imperialism, and war. Included are the problem of war and peace and how states try to resolve conflicts peaceably through diplomacy. *Mr. R. De Vries.*
- 209 **Public Administration.** S. An introduction to the political process. Principles of administrative organization, public management, personnel administration, and budgeting. The political and administrative problems encountered by government agencies charged with carrying out public policies. *Mr. J. Penning.*
- 210 **Canadian Government and Politics.** S. A study of the political system of Canada with emphasis on national (federal) government and politics. Major topics covered include the origins and development of Canada's political institutions; Canada's constitution; Canadian federalism; the operation of the parliamentary-cabinet system in Canada; political parties and elections; social forces and trends in Canadian politics. This course carries core credit for Canadian students only. *Mr. J. De Borst.*
- 303 **Comparative Government: The Non-Western World.** F. A study of the politics of Asian and African states. Emphasis is on the issues and problems posed by the modernization process. *Mr. R. De Vries.*
- 305 **History of Political Thought to the Reformation.** * F. The development of political thought from ancient Greece to the sixteenth century. *Mr. K. Hollingsworth.*
- 306 **History of Modern Political Thought.** * S. Representative political theorists from the Reformation to the present. *Mr. K. Hollingsworth.*
- 308 **Principles of American Foreign Policy.** * S. An analytical view of American foreign policy; its domestic sources; the process of formulating policy; the instruments of American diplomacy; the nature of U.S. relations with hostile powers, allies, the emerging nations, and the United Nations; the limitations and potentials of American foreign policy. *Mr. R. De Vries.*
- 309 **International Organizations.** * F. An examination of regional and universal international organizations; their processes, functions, and impact on the international system. Special emphasis is given to the limitations and possibilities of the United Nations system. *Mr. R. De Vries.* Not offered 1987-88.
- 310 **The Judicial Process and Civil Liberties.** * A study of the judicial process in American politics. Special attention is given to the role of the Supreme Court, the power and practice of judicial review, and the Court's interpretations of the Constitution, especially in the area of freedom of expression and defendant rights. *Mr. J. De Borst.* Not offered 1987-88.
- 312 **Congress and the Legislative Process.** * S. A study of Congress, its members, and the legislative process. Attention is given to the impact of institutional, political, and personal factors in the legislative process, to change in the relative importance of Congress in the policy-making process, and to the types of policies which are likely to emerge from legislative bodies. The focus is upon Congress, but state and foreign legislatures are considered for comparative purposes. *Mr. C. Smidt.*
- 315 **The American Presidency.** * F. An historical and critical study of the American presidency including an analysis of the growth of the office, the selection process, the nature of presidential power, the domestic and international pressures and constraints on the office, and the relationship of the presidency to other agencies and branches of government. *Mr. J. De Borst.*
- 317 **Parties and Elections.** F. An analysis of the nature and importance of political parties and of elections to American politics. Topics included are: party development, party organization, campaign management, electoral laws, voting behavior, and election reforms. In election years, students enrolled in this course will be encouraged to partici-

participate in the political campaign of the party or candidate of their choice. *Mr. C. Smidt.*

318 American Politics and Mass Media.*

S. A survey of the relationship between American politics and the mass communications media. The course covers the way the federal government through its regulations and its dissemination of information affects the operations of the media, and how the media influence the social and political values of Americans and the functioning of the political system. *Mr. C. Smidt.*

380 Internship in State and Local Government. S,

two course units. A field experience involving working for a government agency, an elected government official, or a private interest group at the state or local level of government. Interns work ten to sixteen hours per week for thirteen weeks under the direction of an agency instructor. They also attend weekly seminars conducted by the college instructor. Prerequisites: two political science courses, including 202, or permission of instructor. *Mr. J. Penning.*

390 Independent Study. F, I, S. Reading or directed projects for majors. Open with

the permission of the chair and the instructor under whom the work will be done. *Staff.*

395 Seminar: Perspectives on Soviet Politics.* S. This seminar focuses on differing perspectives on the nature and direction of Soviet economic and political development since 1917 and the restructuring being attempted by M. Gorbachev. Primary attention is given to the issue of Soviet reform. Readings, reports, and a major paper are required. Prerequisites: 206, History 218, or permission of the instructor. *Mr. C. Strikwerda.*

JANUARY 1988 INTERIM

A catalog with the descriptions of all interim courses is available after October 1987.

W10 Understanding Public Policy. Mr. J. Penning.

W54 Interim in Washington, D.C. (Off-campus) Mr. C. Strikwerda.

IDIS W53 Russia and the Caucasus. Mr. C. Strikwerda.

Psychology

Professors M. Bolt, J. Brink, W. Joosse, A. Reynolds, W. Sanderson, S. Stehouwer, R. Stouwie (chair), R. Terborg, G. Weaver
Assistant Professor J. Lee

THE DEPARTMENT OFFERS A VARIED set of courses dealing with important facets of individual human functioning. The major and minor programs in psychology are designed to allow students the flexibility to select courses which fit their present interests as well as their future expectations. Students majoring in psychology often enter "people-related" jobs in business, education, and the social services, or pursue graduate study in psychology or associated fields.

Students intending to major in the department must complete 151 with a minimum grade of C (2.0). The nine-course major consists of 151, 250, 306, three 300-level electives, one of which must be chosen from 330 through 334, and three additional courses from the department. Not more than one interim may be

included in the nine-course major nor may 390, or any interim, be counted as a 300-level elective.

Students intending to do graduate work in psychology or related fields should include 395 in their program of concentration and should plan their program with a departmental advisor.

The teacher education minor consists of six courses: 151, 212, 306, 311, one course from 330-334, and one elective.

The general psychology minor consists of six courses: 151, 250 or 306, one course from 330-334, and three electives including one additional 300-level course. One elective may be an interim course.

The core requirement in psychology is best met by 151. Education 301 satisfies the core requirement only for students in teacher education programs.

151 Introductory Psychology. F and S, core. An orientation to many of the central concerns of psychology, this course includes consideration of such issues as perception and consciousness, learning and memory, motivation and emotion, personality development and social interaction, stress and adjustment. Students are introduced to the methods of psychological research and to the role of psychology in scientific endeavor and human application. The psychology core requirements for students in teacher education programs should be met by Education 301 rather than by this course. *Staff.*

201 Developmental Psychology: Lifespan.* F and S. An overview of human psychological development from birth to death. The primary objective is to understand the behavior characteristic of each stage of development and the psycho-social factors which influence that behavior. Not open to students who have taken or plan to take 204 or 207. Prerequisite: 151, Education 301, or permission of the instructor. *Mr. W. Joesse.*

204 Developmental Psychology: Child.* F and S. A basic overview of normal development from birth to adolescence. Organization is chronological (infant, toddler, etc.) and conceptual (cognitive development, social-personality development, etc.). Not open to students who have taken or plan to take 201. Prerequisite: 151, Education 301, or permission of the instructor. *Mr. R. Stouwie.*

207 Developmental Psychology: Adolescent.* F. A study of the transitional years of human development from puberty to early adulthood. Emphasis is on developmental changes and on the tasks which the adolescent faces in his different roles. Not open to students who have taken or plan to take 201.

Prerequisite: 151, Education 301, or permission of the instructor. *Mr. R. Stouwie.*

211 Personality and Adjustment.* F. A study of psychological theory and research pertinent to personality dynamics and adjustment. Coverage includes concepts of mental health, need fulfillment, sources of conflict and stress, the nature and effects of anxiety, the self concept, and principles of emotional and interpersonal competence. Attention will be given to the personal application of these topics. Prerequisite: 151 or permission of the instructor. *Mr. W. Joesse.*

212 Psychopathology.* F and S. A study of the wide range of abnormal behaviors. Emphasis is on causes, dynamics, and classification, with some attention to treatment approaches. Prerequisite: 151 or permission of the instructor. *Mr. S. Stehouwer, Mr. G. Weaver.*

216 Psychology of the Exceptional Child.* S. A basic overview of children who differ physically, mentally, or behaviorally from "normal" children. Emphasis on causal factors, characteristics, and diagnosis. Not open to students who have taken or plan to take Special Education 216. Prerequisite: 151, Education 301, or permission of the instructor. *Mr. R. Stouwie.*

250 Statistics and Research Design.* F and S. An introduction to scientific research in psychology including the formulation of hypotheses, the design and execution of experiments, the analysis and interpretation of data through statistical procedures, and the communication of results. Two-hour laboratory each week. *Mr. A. Reynolds.*

301 Organizational Psychology. S. A consideration of psychological concepts and research related to human action in work sit-

uations, particularly in organizations. The course includes discussions of the psychological processes of individuals involved in work and management (e.g., perceptual discrimination in varying tasks, strategies in problem solving, motivation for power and achievement, effects of compensation on learning), and the social psychology of the work organization (communication patterns, decision-making processes, performance evaluation, conflict, and stress). The relationship of psychological theory and practice are analyzed through case studies of organizational experiences. Prerequisite: 151 or permission of the instructor. *Mr. G. Weaver.*

306 History and Systems of Psychology.* F and S. A study of the origins of contemporary psychology within science and within philosophy, and of the development of various systematic approaches to psychology as a separate academic discipline in Europe and the United States. Prerequisites: two courses in psychology or permission of the instructor. *Mr. W. Sanderson.*

308 Experimental Psychology.* S. A continuation of 250 with an emphasis on general research methodology at both the conceptual and applied levels. Consideration is given to topics such as the scientific study of human behavior, the formulation of research problems and hypotheses, research design, statistical inference, decision-making, and the writing of research reports. For major and others interested in the social, behavioral, and health sciences. Prerequisites: 151 and 250 or permission of the instructor. *Mr. R. Terborg.*

310 Social Psychology.* F and S. A study of how people think about, influence, and relate to one another. Attention is given to such topics as persuasion and attitude change, conformity and obedience, group conflict and decision-making, stereotypes and illusions of social thought, attraction and prejudice, altruism and aggression. Students may not receive credit for this course and Sociology 310. Prerequisite: 151 or permission of the instructor. *Mr. M. Bolt, Mr. J. Brink.*

311 Theories of Personality.* S. An introduction to modern American and European theories concerning the psychological structure, dynamics, and development of the human personality. Prerequisites: 151, 212, or

permission of the instructor. *Mr. W. Sanderson.*

312 Principles of Psychological Measurement.* F. An introduction to theoretical and practical issues of psychological testing as they relate to assessment, selection, and classification of personnel. Prerequisite: 250 or permission of the instructor. *Mr. A. Reynolds.*

313 Mental Health and the Classroom.* F. An introduction to the developmental needs and common developmental crises of school age children. Emphasis is on the methods of communication and classroom management which allow the teacher to promote healthy adjustment. (Previously 335.) Prerequisite: 151, Education 301, or permission of the instructor. *Mr. S. Stehouwer.*

314 Theories of Counseling and Psychotherapy.* F. An introduction to counseling and psychotherapeutic methods for dealing with emotional disorders. The course includes an overview of major approaches to counseling and psychotherapy with an analysis of the theoretical aspects and techniques employed. An attempt is also made to integrate these various approaches and to view them from a Christian perspective. Prerequisite: 311 or permission of the instructor. *Mr. S. Stehouwer.*

315 Practicum in a Clinical Setting.* S. An introductory course in theoretical and applied psychotherapy, taught in a hospital setting, and appropriate for students interested in clinical and general psychology. This course deals cognitively and critically with various modes of psychotherapy from a Christian perspective, gives the student an acquaintance with a variety of mental hospital procedures, and offers the opportunity to begin in a minimal way and under supervision some direct experience with the disturbed. Prerequisites: junior-senior standing; departmental approval; 151, 212, and 311. *Staff.*

322 Perspectives of Psychology.* The purpose of this course is to explore the relationship of psychology to—or its involvement in—such areas as literature, religion, art, and morality. *Staff.*

323 Psychology and Religion.* A consideration of relationships between psychological explanations and religion. The course includes discussions of several major

psychologies of religion, recent theory and research on the psychological dimensions of religious praxis, and the possible relationships between psychological and theological explanations of human action. Prerequisite: 151 or permission of the instructor. *Mr. G. Weaver*. Not offered 1987-88.

330 Psychology of Motivation.* S. A thorough discussion of the psychological study of motivation. Recent research findings as well as theory formation in the areas of emotion and motivation are included. Two-hour laboratory each week. Prerequisite: 151 or permission of the instructor. *Mr. G. Weaver*.

331 Psychology of Sensation and Perception.* A detailed examination of the theories and research pertaining to various sensory and perceptual processes in human beings. Methodological, physiological, and pre-theoretical issues are addressed. Two-hour laboratory each week. Prerequisite: 151 or permission of the instructor. Not offered 1987-88.

332 Psychology of Learning Processes.* F. A consideration of the relationship of empirical findings and theoretical formulations to various learning processes. Included are such issues as the role of reinforcement and punishment, methods of enhancing or suppressing performance, biological limits on learning, stimulus generalization and discrimination learning, the structure and organization of memory, and factors related to forgetting and retention. The importance of learning theory for psychology in general is stressed. Two-hour laboratory each week. Prerequisite: 151 or permission of the instructor. *Mr. R. Terborg*.

333 Physiological Psychology.* An intensive investigation of the physiological bases of behavior. Theories and research concerning the relationship between the nervous system and several aspects of behavior are discussed. Discussion of the mind/brain problem. Two-hour laboratory each week. Prerequisite: 151 or permission of the instructor. Not offered 1987-88.

334 Cognitive Psychology.* F. A survey of research and theory in the study of human thinking. The course covers the acquisition, representation, and use of knowledge with emphasis on the processes of attention, memory, language, and problem solving. Two-hour laboratory each week. Prerequisite: 151 or permission of the instructor. *Mr. J. Lee*.

390 Independent Study. F, I, S. Prerequisite: permission of the department chair.

395 Research Seminar.* F and S. The preparation, presentation, and discussion of papers based on current psychological literature and upon individual empirical research on selected topics. Prerequisite: 250 or permission of the instructor. *Staff*.

GRADUATE COURSES

510 Educational Measurement. This course provides a theoretical and practical background which will enable classroom teachers to construct or select tests for specific purposes. It is designed to enable teachers to use test scores wisely and effectively in the learning process. A major paper requires knowledge and application of the concepts of reliability and validity as well as practical considerations in the evaluation of a standardized test of the student's choice. *Mr. A. Reynolds*.

511 Introduction to Guidance and Counseling. A survey of principles, major theories, and resources which shape guidance and counseling efforts in the schools. The course focus is on how a teacher can best contribute to and benefit from those efforts. *Staff*.

590 Independent Study. F, I, S. *Staff*.

595 Graduate Project. F, I, S, full or half course. The prospectus for each Master of Arts in Teaching project must be developed under the supervision of a faculty member and must be approved by the student's graduate advisor. *Staff*.

JANUARY 1988 INTERIM

A catalog with the descriptions of all interim courses is available after October 1987.

W50 To Punish or Not to Punish? *Mr. R. Terborg*.

W51 Knowing Yourself: The Psychology of Self-Understanding. *Mr. J. Brink, Mr. G. Weaver*.

W52 Christian Perspectives on Parenting. *Ms. N. Stehouwer, Mr. S. Stehouwer*.

W54 Psychology of Individual Differences. *Mr. A. Reynolds*.

W55 Social Psychology Through Literature. *Mr. M. Bolt*.

IDIS W18 *The Christian's Self-Image.* Mr. W. Joosse.

IDIS W19 *Mirror of the Soul: Stories and Films.* Ms. B. Carvill, Ms. M. Vander Goot.

Religion and theology

*Professors W. De Boer, †H. Hoeks, **J. Primus (chair), G. Spykman, L. Sweetman, H. Vander Goot, L. Vos*

Associate Professor J. Schneider

Assistant Professors L. Belleville, T. Dozeman, T. Eves, P. Holtrop

THE DEPARTMENT offers a major in religion and theology, a group minor in missions, a teaching minor in the academic study of religions, and several other departmental minor programs. These programs will be worked out with the help of departmental advisors who will take into account the student's special needs and interests.

The major program in religion and theology requires ten courses including 103 or 108, 206, 301, 303, and 396. One interim course, if approved by the department chair, may be included in the required ten courses. An approved four-course sequence in another department is also required. Prerequisite to admission to the program is the completion of 103 or 108 with a minimum grade of C (2.0). The advisor for this program is the department chair.

For students interested in missions, there is a group minor in missions consisting of six courses. Three courses are required: 203, 204, and Sociology 253; and three courses approved by the advisor are selected from the following: 305, Geography 210, Sociology 217, 311, Economics 337, area study courses (History 202, 203, 204, 205, 206, 207, 360, Spanish 372, 373), multicultural lecturer courses, an appropriate interim course and other courses approved by the advisor as part of an introduction to wholistic missions. This group minor may be taken with a religion and theology major program. The advisor for this program is Mr. Leonard Sweetman.

The teaching minor leading to certification in the academic study of religions requires six courses. All students complete a four-course sequence consisting of Religion and Theology 151, 305, 395, and Interdisciplinary 234. Two additional courses are chosen in consultation with the advisor of the program from the following: Art 231, Classics 231, History 201, 202, Philosophy 204, 205, Psychology 323, Religion and Theology 206, 207, 208, 301, 303, 311, 313, 327, 328, 332, and Sociology 217, 311, or approved interim courses. Student teaching is offered only in the spring semester. The advisor for this program is the department chair.

There are three other departmental minor programs. One in biblical studies requires five courses from 103 or 108, 207, 208, 302, 327, 328, plus another core course. The minor in theological studies requires five courses from 204, 206, 301,

303, 304, 308, 311, 312, 313, Interdisciplinary 234, plus one biblical studies core course. The minor in religion and theological studies requires 151 plus one course from each of the following categories: biblical, theological, historical, religio-cultural, and missions and world religions. An appropriate interim course may be included in any of these programs with the approval of the department chair.

The core requirements in religion and theology are met by selecting one from the following courses in biblical studies: 103, 108, 207, 208, 327, and 328, and one from the following courses in theological, historical, and religio-cultural studies: 206, 301, 303, 304, 308, 311, and 312. Any departmental course except interims may be chosen by students electing a third core course in religion and theology. Interdisciplinary 234 will also satisfy a third core course in religion and theology.

BIBLICAL STUDIES

103 Biblical Literature and Theology. F and S, core. A study of the unfolding of the history of redemption as set forth within the historical framework of the Old Testament, Intertestament, and New Testament eras. Biblical books are analyzed, varying modes of literary expression are examined, and the major themes of Scripture are explicated. Students may not take this course and 108. Open only to freshmen and sophomores. *Staff.*

108 New Testament Biblical Theology. F and S, core. A more complete coverage of the biblical theology of the New Testament than can be offered in 103. Open only to freshmen and sophomores. *Staff.*

207 Old Testament Prophets. S, core. An intensive study of the place and role of the major and minor prophets in the Old Testament, the commentary they offer upon the history of redemption in Old Testament times, and an exploration of their basic themes and their continuing relevance. Not open to freshmen. *Mr. T. Dozeman.*

208 New Testament Letters. F and S, core. An intensive study of the place and role of the epistles in the canon of the New Testament, the doctrinal and ethical interpretations which these epistles give of the redemption portrayed in the gospels, the light they shed on the early Christian church, and their abiding relevance and significance. Not open to freshmen. *Staff.*

302 Biblical Archaeology.* S. A study of the pertinent archaeological data which provide a background for or throw light upon the biblical narrative. Prerequisites:

one course in biblical studies and junior or senior standing. *Staff.*

327 Old Testament Interpretation.* F, core. An intensive study of the basic principles and methods of biblical interpretation developed in the context of the biblical-theological themes of the Old Testament. Designed especially for departmental majors. Prerequisite: junior or senior standing. *Mr. T. Eves.*

328 New Testament Interpretation.* S, core. An intensive study of the basic principles and methods of biblical interpretation developed in the context of the biblical-theological themes of the New Testament. Designed especially for departmental majors. Prerequisite: junior or senior standing. *Mr. L. Vos.*

THEOLOGICAL STUDIES

206 Reformation Theology. F and S, core. A study of Christian doctrine as formulated in the Protestant Reformation and refined and elaborated by later Reformed theologians. Comparisons are drawn between the Reformed system and those of other branches of Christendom. Calvin's *Institutes of the Christian Religion* serves as a basic text. Not open to freshmen. *Staff.*

308 Contemporary Theology.* F, core. A study of major twentieth-century Christian theologians against the background of eighteenth- and nineteenth-century philosophy and theology. Selected writings of significant contemporary theologians (such as Barth, Bultmann, and Tillich) are read and evaluated. Prerequisite: junior or senior standing. *Mr. H. Vander Goot.*

312 **Early Christian Theology.*** S, core. A study of the growth of the church and its self-conscious commitment to an articulation of its faith; from the sub-apostolic age through St. Augustine. Development and growth of thought will be emphasized and selected writings of major theologians will be studied. Prerequisite: junior or senior standing. *Mr. Gordon Spykman.*

313 **Roman Catholic Theology.*** S. The development of Roman Catholic theology from the medieval era to present times, finding its climax in contemporary changes growing out of Vatican II. The Council of Trent, Counter-Reformation theology, papal encyclicals, Vatican I, and major schools of thought and shifting practices are examined. Prerequisite: junior or senior standing. Not offered 1987-88.

HISTORICAL STUDIES

303 **General Church History.*** S, core. A survey of the history of the Christian church from its beginning to the present time, noting deviations from apostolic faith and practice, the interplay with the political, the great church councils, the crises that emerge, divisions and reunions, and the confluence of forces that determine the complexion of the Christian church today. Not open to freshmen. *Mr. J. Schneider.*

304 **American Religious History.*** F, core. A consideration of the religious history America country from the immigration period to the present. Attention is paid to the European background, the early church beginnings in their diversity, the colonial era, the westward movement, current ecumenism, and the major social and political developments in their influence upon the American religious scene. Consideration will also be given to the historical antecedents and the development of the Christian Reformed Church in America. Not open to freshmen. *Mr. J. Primus.*

332 **Christian Liturgy.*** F. A study of the development, theology, and practice of Christian liturgy from its biblical beginning to the contemporary liturgical renewal movement. Synagogue and early Christian precedents, Roman Catholic and Eastern Orthodox liturgical development, Reformation protests and emphases, and the recent liturgical renaissance are examined. Prerequisite: one course in biblical studies, preferably 103. Not offered 1987-88.

RELIGIO-CULTURAL STUDIES

301 **Christianity and Culture.** (Studies in Calvinism.)* F and S, core. An historically-oriented study of the Reformed Christian tradition in the Western world—its origin and development, its basic concepts and life-perspectives, its cultural impact and contemporary relevance. Not open to freshmen. *Staff.*

311 **Basic Christian Ethics.*** S, core. A biblical-theological study of moral issues, both personal and social, considering relevant ethical principles and practices as they developed in the Judeo-Christian tradition. Prerequisite: junior or senior standing. *Mr. P. Holtrop.*

IDIS 234 **The Contemporary American Religious Situation.*** S. A description and analysis of current American religious developments in historical, sociological, and theological perspective. Institutional and non-institutional developments, within and outside of the Judeo-Christian tradition, will be examined. Satisfies as a third core course in religion and theology. Not offered 1987-88.

MISSIONS AND WORLD RELIGIONS

203 **Theology of Mission.** F. A survey of biblical material pertaining to mission. These materials are used in evaluating the contemporary problems of mission: i.e., re-nascent non-Christian religions, ecumenism, mission in the ferment of social revolution. Not open to freshmen. *Mr. L. Sweetman.*

204 **History of Missions.** F. The record of missionary history through the ancient, medieval, and modern periods is examined with a view to ascertaining the principles that come to expression, the methods employed, the areas covered, the chief figures, and the measure of success or failure. In the modern period the great missionary conferences of the twentieth century are analyzed and evaluated. Not open to freshmen. Not offered 1987-88.

305 **World Religions.*** S. An analytical and critical study of the phenomena, the conceptual pattern, and the sacred texts of the major non-Christian religions: "primitivism," Hinduism, Buddhism, Shinto, and Islam. Each religion is studied as a total perspective for life which is embodied in inter-personal and communal life, in cult,

and in ideology. The study includes popular as well as official expressions of the religions. Not open to freshmen. *Mr. L. Sweetman.*

RELIGION AND EDUCATION

151 Introduction to Religion Studies. F. An introductory course appropriate to prospective teachers and required of those students who wish to minor in the academic study of religions. This course deals critically with views of the origin, nature, and function of religions as they are found in the disciplines of cultural anthropology, the history and literature of religion, the phenomenology of religion, the psychology of religion, the sociology of religion, and the philosophy of religion. This course also includes a consideration of the problem of "objectivity," an introduction to alternative pedagogical approaches to the study of religions, and exposure to materials and media appropriate to teaching religion studies as well as a study of court opinions relative to religion studies in both Canada and the United States. *Mr. L. Sweetman.*

390 Independent Study. *Staff.*

395 Seminar: Religion and Education. F. A course for seniors in the academic study of religions minor. It includes practical and bibliography work and concludes with a major research paper. *Staff.*

396 Seminar: Religion and Theology. S. A course for senior majors in religion and theology which provides a focus on significant theological issues and on theological bibliography. A major research paper is required. *Staff.*

GRADUATE COURSES

510 Old Testament Writings. A study of the Old Testament writings with a major emphasis on the Psalms, Proverbs, Job, and Ecclesiastes. The nature of wisdom and hymnic texts is pursued in the context of their historico-cultural background. Attention is paid to the didactic use of these

texts. Prerequisite: two courses in biblical studies beyond the 100 level or permission of the instructor. *Staff.*

580 Perspectives, Programs, and Practices in Bible and Religion Curriculum. A study of various approaches in the schools to curriculum and teaching in biblical studies, church history, Reformed thought, and world religions. Consideration is given to the way fundamental differences of perspective on biblical Christianity influence the selection and use of curriculum designs, materials, and teaching techniques. Course content is adapted to the various grade levels of particular interest to enrollees. *Staff.*

590 Independent Study. F, I, S. *Staff.*

595 Graduate Project. F, I, S, full or half course. The prospectus for each Master of Arts in Teaching project must be developed under the supervision of a faculty member and must be approved by the student's advisor. *Staff.*

JANUARY 1988 INTERIM

A catalog with the descriptions of all interim courses is available after October 1987.

W11 Practical Guidelines for Christian Living: I Corinthians. *Ms. L. Belleville.*

W54 God's Passion for the World. *Mr. T. Dozeman, Mr. T. Eves.*

W50 Interim in Israel: Experiencing the Bible on Location. (Off-campus) *Mr. W. De Boer.*

W51 The Gospel According to Eve. *Mr. L. Vos.*

W52 Liberation Theology. *Mr. G. Spykman.*

W53 A Reformed Response to Nietzsche's Anti-Christian Vision. *Mr. J. Schneider.*

IDIS W56 Up From the Ashes: The German Church's Quest for Obedience After the Holocaust. *Ms. A. Smith-Von Osten.*

Sociology and social work

Professors G. De Blacy, P. De Jong, H. Holstege, R. Rice, T. Rottman, W. Smit (chair), D. Smalligan, D. Wilson

Associate Professors H. Allen, J. Nielsen

Instructor M. Loyd-Paige

THIS DEPARTMENT OFFERS courses in sociology, criminal justice, social work, and anthropology. Sociology is the study of the principles of group relationships, social institutions, and the influence of the group on the individual. Criminal justice is the study of the nature of crime in society and the interrelationship among criminal law, social order, and social justice. Social work is the study of the application of these principles and related theories to the helping professions. Programs in the department may lead to a departmental major in sociology, a group major in criminal justice, and a group minor in social work, which is open to both sociology and non-sociology majors.

The major concentration in sociology consists of 151, 318, 320, and six additional sociology courses. Social work courses are not part of the sociology major. One interim course may be included among these six additional courses. Students who spend a semester at the Chicago Metropolitan Study Center may apply some of that work to a departmental major. For admission to the major program, a student must complete 151 with a minimum grade of C (2.0).

The twelve-course group major in criminal justice provides the theory, context, and practice needed to qualify graduates to make informed decisions in the area. Seven courses must be taken in the Department of Sociology and Social Work: 151, 300, 301, 306, 313, and two course units from either 380 or Political Science 380. The remaining courses provide a foundation for a broad range of criminal justice vocations. Two courses must be selected from either Political Science 201, 202, 209, 210, 310 or from Psychology 212, 211, 310, 311; a third course is chosen from any of these or from an approved interim; and two courses must be chosen from Philosophy 202, 207, and either 205 or Religion 311. The advisor for this program is Mr. T. Rottman.

The group major prepares students for a variety of careers in law enforcement, working with the courts, and assisting with corrections and is helpful to those who expect to be involved with probation, parole, detention homes, half-way houses, police and security work, rehabilitation centers, and correctional facilities.

The group minor in social work consists of six courses: 300, 301, 303, 305 and two units of credit from 380 and 381. The social work courses prepare one to work not only with individual clients in counseling situations but also to work in social institutions, and, when necessary, for change within these very institutions. Consequently this group minor prepares one to work in various capacities in both private and public organizations. All students with this minor are required to have at least three hundred hours of field work. These placements are available with over fifty different private and governmental organizations.

The core requirement in sociology may be met by 151 or 217. Sociology 217 and 311 may be a part of the teaching minor in the academic study of religions.

SOCIOLOGY COURSES

151 Sociological Principles and Perspective. F and S, core. A general introduction to sociology as a body of knowledge dealing with group relationships as these affect both the individual and society. An attempt is made to show how a sociological perspective offers a rational interpretation of issues current in our society. *Staff.*

210 Physical Anthropology. A critical analysis and evaluation of human evolution. Various Christian positions regarding these issues are examined. The issues in the present "creation-evolution controversy" are also evaluated in the light of Scripture and the teachings of the church. *Mr. D. Wilson.* Not offered 1987-88.

217 Social Anthropology. F and S, core. A study of the historical trends in anthropology that have led to its present day perspective. The concepts of functionalism and cultural relativism are examined and evaluated. The course surveys various cultural patterns around the world. *Mr. D. Wilson.*

253 Intercultural Communication. F and S. An examination of the anthropological principles relating to cross-cultural communication. This examination requires an extensive comparison of the components of cultural systems and the nature of cultural dynamics. The areas of application include government, business, peace corps, development, and mission work, with special emphasis on the last two. Special topics include developing an appropriate attitude regarding indigenous cultures and the management of culture shock. *Mr. D. Wilson.*

302 Urban Sociology and Community Organization.* F. A descriptive and theoretical analysis of urban society and urban sub-communities. The emphasis is on urban processes and problems and sub-cultures within the city as well as on such contemporary issues as community development and planning. Not offered 1987-88.

304 The Family.* F and S. An intensive culturally comparative and historical analysis of the family as an institution. The contemporary courtship, marriage, and divorce patterns of the American family are also discussed. *Mr. H. Holstege.*

306 Sociology of Deviance.* F. An analysis of deviant behavior: its causes, manifestations, prevention, and programs of control. Special attention is given to the role of social norms in generating as well as controlling deviance. Emphasis is put on ways in which social structures generate and label deviance. Implications are drawn for various institutions, particularly the school and the church. *Mr. P. De Jong.*

308 Population and Society.* F. This introduction to demographic analysis of society includes a consideration of the major demographic theories of population growth and how these contribute to an understanding of population explosion; a review of how the socio-cultural dimension of human society affects major sources of population growth (fertility, mortality, migration, and how variations in these reciprocally affect society); and an analysis of the causes and consequences of population size, distribution, and composition for human society. *Staff.*

309 Sociology of Education.* F. A study of education as a social institution and the school as an organization. Emphasis is on discussing the functions of education for society and the effects of society on education and schools. The school class as a special system is also analyzed with special consideration given to the role of the teacher. *Staff.*

310 Social Psychology.* F and S. Human behavior as a consequence of psychological make-up and socio-cultural environment. Attention is given to social interaction as it occurs in small group settings. Attention is also given to theoretical frameworks emphasizing self-concept and role playing. Students may not receive credit for this course and Psychology 310. *Mr. G. De Blaey.*

311 Sociology of Religion.* A study of the organizational forms of religion, with special attention being given to the influence and effectiveness of the church in its function as a social institution and to the social influences which have, in turn, affected the church. *Mr. W. Smit.* Not offered 1987-88.

312 The Sociology of Community.* A cross-cultural analysis of the changing nature of the community as a human ecologi-

cal organization and as a structured system of status and power. Utopian dreams of ideal communities are contrasted with the types of communities actually found in primitive, agrarian, and industrial societies. Not offered 1987-88.

313 The Criminal Justice System.* F and S. A study of the nature of crime in society and the interrelationships among criminal law, social order, and social justice. Attention is given to theories and definitions of crime, its cause and control; changing ideas about the role of police, court, and prison personnel; and the place of the Christian community in developing and maintaining an improved system of criminal justice. *Mr. T. Rottman.*

314 Contemporary Social Problems.* S. The course will begin with a theoretical examination of social problems generally. Various contemporary social problems will be discussed. This semester the problem selected for major emphasis is that of inequality between the sexes. *Ms. M. Loyd-Paige.*

315 Sociology of Sport.* S. A study of the social and social-psychological dynamics of sports in modern society. Areas receiving special attention are youth sports, interscholastic sports, and professional sports. Emphasis is put on describing and understanding sports participants and observers and the relationship of sport as an institution to the rest of social structure. *Mr. G. De Blaeij.*

316 Social Gerontology.* S. A cross-cultural examination of how various societies react toward the elderly. Specific substantive issues included are: discrimination against the elderly, familial relationships, social security, nursing home services, housing needs, and employment opportunities. There is an analysis of proposed changes in American society which would give assistance to senior citizens. *Mr. H. Holstege.*

318 Sociological Theory.* F. An assessment of sociological theory in terms of its historical development and current role in understanding human behavior. Particular attention is given to the function of theory in the research process. Direction is given to the student in the formulation of sociological hypotheses from data. Prerequisite: 151. *Mr. H. Holstege, Mr. T. Rottman.*

320 Sociological Research.* S. An assessment of the nature of the research process as applied to the study of theoretical problems in social science. Students are guided in designing and conducting a research project, involving definition of the problem, consideration of appropriate methods, and the collection and analysis of data. Prerequisite: 151. *Mr. W. Smit.*

390 Independent Study. F, I, S. Prerequisite: permission of the department chair and of the instructor. *Staff.*

395 Seminar.

SOCIAL WORK COURSES

300 Social Welfare Policy and Services. F and S. An analysis of the social welfare system. Social welfare institutions and specific policy areas which influence current social work services are examined. The application of specific policies to income maintenance, mental health, poverty programs, and corrections are some of the areas covered. *Staff.*

301 Social Work Practice. S. Students are taught the techniques of social work with an emphasis on how basic social work concepts are related to professional practice. *Mr. P. De Jong.*

303 Child Welfare and Family Services.* S. A study of social policy and service delivery in child welfare and family service agencies. Major topics include: a history of child welfare and family service policy in Europe and North America and the factors causing changes in these policies; a description and evaluation of the contemporary service delivery system and treatment methods; a study of unmet needs and present trends; and a sociological analysis of the relationship between the family, courts, politics, and contemporary American society. *Mr. J. Nielsen.*

305 The Helping Interview. F and S. A course to teach students the basic skills necessary to conduct the helping interview. Students will participate in videotaped role plays. The course also includes contextual material about ethical issues, a Christian view of relationship and interviewing, and interviewing people from different backgrounds. Prerequisite: 301 or permission of instructor. *Mr. P. De Jong.*

380 **Field Instruction in Social Agencies.** F and S. This field-based course provides a perspective on the various levels of intervention and types of services provided by social agencies. Each student will be assigned to work with a field instructor in a social agency. The college instructor, the student, and the field instructor will plan a program of involvement in the agency that will build on the student's previous instruction on campus and toward his career goals. Prerequisites: 300 and 301 or the permission of the instructor. *Mr. J. Nielsen, Mr. D. Smalligan.*

381 **Practicum in Clinical Social Work.** S. This course provides an opportunity for the student to relate social work knowledge to a clinical setting. Various roles and modes of clinical social work are studied from a Christian perspective. The social worker's role is related to those of other professionals such as the psychiatrist, the clinical psychologist, the adjunctive therapist, the psychiatric nurse, and the rehabilitation therapist and to the part each plays in the clinical team. Each student is assigned to a staff social worker who will supervise his direct work with patients. Prerequisites: junior-senior status, 300 and 301, and departmental approval. *Mr. D. Smalligan.*

GRADUATE COURSES

501 **School in Community.** Summer. A study of the reciprocal relationship between

the school and the community. Particular attention is paid to the interrelationship between the school and religious, familial, political, and economic institutions. *Mr. G. De Blacy.*

590 **Independent Study.** F, I, S. *Staff.*

595 **Graduate Project.** F, I, S, full or half course. The prospectus for each Master of Arts in Teaching project must be developed under the supervision of a faculty member and must be approved by the student's graduate advisor. *Staff.*

JANUARY 1988 INTERIM

A catalog with the descriptions of all interim courses is available after October 1987.

W10 **The Planned Family.** *Mr. W. Smit.*

W11 **Anatomy of the Sports Fan.** *Mr. G. De Blacy.*

W13 **Using Games to Understand Sociology.** *Ms. M. Loyd-Paige.*

W50 **Organized Crime and Substance Abuse.** *Mr. H. Holstege.*

W55 **The Child Care Worker.** *Mr. A. Verkaik.*

W58 **Social Work Treatment in Mental Health Settings.** *Mr. L. Sonksen, Ms. M. Zwaanstra.*

Spanish

Professors Y. Byam, E. Greenway

Associate Professors S. Clevenger, E. Cortina (chair)

Assistant Professor M. Pyper

Instructor M. Bierling

PROGRAMS FOR STUDENTS wishing to major in Spanish are worked out individually by the faculty advisor. To be eligible a student must have completed at least two courses with a minimum average of C (2.0) and must have completed 101-102, 121-122, or the equivalent.

The typical major requires ten courses beyond 102 or 122; may include 123 or 201 and 202; and must include 215, 216, 217, 218, and four 300-level literature courses. Six-course minors are also possible.

Teacher education majors require nine college-level courses including 215, 216, 217, 218, 360, and one from 371, 372, or an interim abroad. The minor requires six college-level courses and should include 215, 216, 217, and 218. Students in teacher education must pass a Spanish proficiency examination prior to the teaching internship, which is offered only during the spring semester. The advisor for these programs is Ms. Ynés Byam.

During the spring semester Calvin offers a full-time language program in Spain by which students can complete 101, 102, 201, and 202, satisfying the foreign language requirement for a bachelor's degree. An advanced program for Spanish majors and minors is also available in Spain. However, all students whose major program is Spanish (including those with group majors of which Spanish is a part) must take their last Spanish course on campus. The advisor for these programs is the department chair.

The fine arts core may be met by 217, 218, and 300-level literature courses.

LANGUAGE

Students in Calvin's Semester in Spain program, which is taught during the second semester of each year in Denia, Spain, receive credit for 101, 102, 201, and 202.

101 Elementary Spanish. F. An introductory course in the use and comprehension of oral and written Spanish. *Staff.*

102 Elementary Spanish. S. Continuation of Spanish 101. *Staff.*

121-122-123. Introductory and Intermediate Spanish. F, I, S. A closely integrated sequence involving two semesters and the interim for students who have completed two years of high school Spanish but who, on the basis of a placement test, are not prepared for 201. *Staff.*

201 Intermediate Spanish. F. Review of essential grammatical structures and further training in spoken and written Spanish. Readings from significant Spanish authors. Prerequisites: 101 and 102 or other equivalents. *Staff.*

202 Intermediate Spanish. F and S. Continuation of 201. *Staff.*

215 Advanced Grammar and Conversation. S. A course for the student who wishes to improve his facility in the language, who is preparing for graduate study, or who expects to teach Spanish. The course includes the study of conversation, grammar, vocabulary, and idioms to develop

competence in speaking idiomatic Spanish. The emphasis is on improved pronunciation and fluency through conversation, debates, and oral presentations. Prerequisite: 202 or its equivalent. *Ms. Y. Byam.*

216 Advanced Composition and Translation. F. Extensive work in composition and translation to develop skill in written communication for students interested in teaching or in continuing their studies in graduate school. Reading selections by well known writers from various genres serve as models. A major paper in Spanish is required. Prerequisite: 202 or approval of instructor. *Ms. E. Cortina.*

LITERATURE

217 Readings in Spanish Literature. S. An introduction to the major writers and movements in Spanish literature from the Middle Ages to the present. Conducted in Spanish. Prerequisite: 202. *Staff.*

218 Readings in Latin American Literature. F. An introduction to the major writers and movements in Latin American literature from the New World conquest to the present day. Conducted in Spanish. Prerequisite: 202. *Staff.*

303 The Spanish Novel. S. A study of the Spanish novel from *La Celestina* to the present requiring the reading and interpretation of selected chapters from outstanding novels as well as of complete works. The emphasis is on the chief characteristics of the

various types of novels. Conducted in Spanish. Prerequisite: 217. Not offered 1987-88.

305 **Spanish Poetry.** A study of the characteristics of Spanish poetry by means of extensive readings and detailed examination of the works of the major poets from the Middle Ages to the present. Conducted in Spanish. Prerequisite: 217. *Staff.*

306 **Latin American Poetry.** A study of the history and characteristics of Latin American poetry from the colonial period to the present. Conducted in Spanish. Prerequisite: 218. Not offered 1987-88.

307 **The Latin American Novel.** F. A study of the novels of Latin America with particular emphasis on those written during the last two centuries. Attention is given to the historical setting and to the intrinsic literary value of each novel. Conducted in Spanish. Prerequisite: 218. Not offered 1987-88.

309 **Spanish Drama.** F. A study of the dramatic expression of Spain in the Golden Age and through the post-Civil-War era. Conducted in Spanish. Prerequisite: 217. *Ms. S. Clevenger.*

CIVILIZATION

360 **Spanish-English Linguistics.*** F. An examination of the differences between the English and Spanish languages, particularly those involving sound, spelling, structure, and vocabulary. Students will investigate stress, pitch, juncture, rhythm, phoneme, allophone, morpheme, and the diagramming of grammatical constituents in order to improve their own communication skills in both languages and to understand the errors made by those learning a second language. Testing and assessment of language skills is discussed. The course is planned primarily for those interested in bilingual education but it is useful for others wanting to understand linguistics. Prerequisite: 202. *Ms. M. Bierling.*

371 **Civilization of Spain.** S. A study of the non-literary expressions of the Spanish

mind and culture, of the history of Spanish social, political, and religious institutions, and of current problems in Spanish life. The course complements and enriches literary studies. Conducted in Spanish. Prerequisite: 202 or the equivalent. Not offered 1987-88.

372 **Latin American Civilization.** S. This course introduces the students to the culture of Latin America. Material covered includes historical backgrounds of the various countries; political, social, and religious institutions and values; and non-literary expressions. Reading materials include literary and non-literary sources. Conducted in Spanish. Prerequisite: 202 or the equivalent. Not offered 1987-88.

373 **Hispanic Culture in the United States.*** F. A study of the history and culture of Hispanic groups in the United States, their political, social, and religious institutions, and their value systems. The course is planned to assist students in understanding the cultural contributions of each Hispanic group within the broader American culture. Reading materials include literary and non-literary sources. Prerequisite: 202. *Ms. Y. Byam.*

390 **Independent Study.*** F, I, S. Prerequisite: permission of the department chair.

395 **Seminar.***

JANUARY 1988 INTERIM

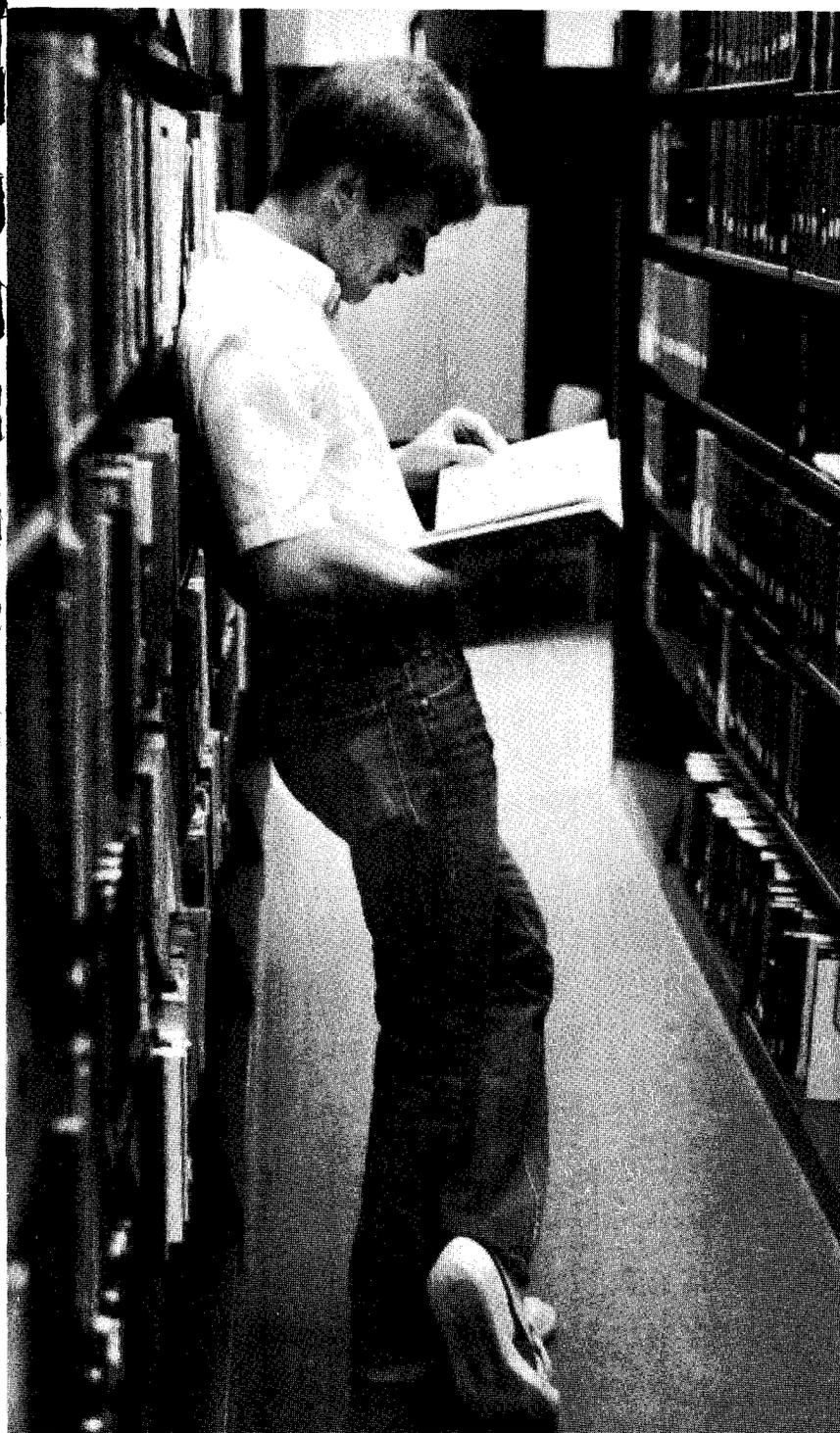
A catalog with the descriptions of all interim courses is available after October 1987.

W11 **Introduction to Spanish Culture.** *Staff.*

W50 **Conflict and Compromise in Spanish Literature.** *Ms. S. Clevenger.*

W51 **Spanish Interim in the Dominican Republic.** (Off-campus). *Ms. Y. Byam.*

122 **Intermediate Spanish.** *Staff.*





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- Governing Board, H. H. Meeter Center for Calvin Studies*, B. Armstrong, J. De Jong, A. Diekema, R. Kingdon, J. Stek, T. Minnema, F. Roberts (1990), L. Sweetman (1989), and one board member.
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Athletics Committee, B. Klooster (1989, chair), P. Boonstra (1988), P. Burch, L. Louters (1990), K. Rajballie, W. Van Vugt (1990).

Chapel Committee, J. Worst (1988, chair), P. Burnes, J. Clark (1990), D. Cooper, J. De Vries, L. Stob, D. Van Goor, J. Witvliet.

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Student Conduct Committee, H. Vander Goot (1988, chair), J. Brink (1989), J. De Jong, T. Hoezee, R. Honderd (1990), B. Medema (1989), J. Vander Hulst, E. Vander Lugt.

Student Life Committee, A. Joosse (1988, chair), W. Boer, D. Cooper, C. Derrer, T. Hoeksema, T. Hoezee, G. Klaasen (1989), W. Stob, G. Van Andel (1990), S. Verbrugge.

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 Political Science, James De Borst, *chair*
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 History, Robert Bolt, *chair*
 Philosophy, Kenneth Konyndyk, *acting chair*
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Faculty

Faculty members on leave of absence for the academic year are indicated by a dagger (†), those on leave for the first semester are indicated by an asterisk (*), and those on leave for the second semester are indicated by double asterisks (**).

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Chaplain, Emeritus

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- G. Roderick Youngs, Th.B., M.A., Ed.D.
Professor of Psychology, Emeritus
- Sydney T. Youngsma
Assistant to the President, Emeritus
- Mildred Reitsema Zylstra, M.A.L.S.
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ACTIVE

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Professor of Geography and Environmental Studies
- Henry L. Allen, M.A. (Chicago, 1979)
Associate Professor of Sociology and Social Work
- Michael A. Anderson, M.S. (Wisconsin, 1985)
Instructor in Economics and Business
- Samuel J. Anema, M.S. (Western Michigan, 1970)
Director of Computing Services
- Anton E. Armstrong, M.M. (Illinois, 1980), D.M.A. (Michigan State, 1987)
Associate Professor of Music

- Martinus A. Bakker, M.A. (University of South Africa, 1967), Ph.D. (Open Universiteit, 1987)
Professor of Germanic Languages
- **Claude-Marie Baldwin, M.A., Ph.D. (Michigan State, 1977, 1984)
Professor of French
Chair of the Department of French
- Henry J. Baron, M.A. (Michigan, 1966), Ph.D. (Illinois, 1972)
Professor of English
- Lionel L. Basney, M.A., Ph.D. (Rochester, 1968, 1971)
Professor of English
- John D. Beebe, M.A. (South Dakota, 1966), Ph.D. (Chicago, 1970)
Professor of Biology
Chair of the Department of Biology
- Linda L. Belleville, M.A. (Trinity Evangelical Divinity School, 1980), Ph.D. (University of St. Michael's College, 1986)
Assistant Professor of Religion and Theology
- Marilyn R. Bierling, M.A. (Michigan, 1974)
Instructor in Spanish
- Ronald L. Blankespoor, Ph.D. (Iowa State, 1971)
Professor of Chemistry
- Kathryn Blok, M.A., Ed.S., Ph.D. (Michigan State, 1968, 1975, 1981)
Director of the Academic Support Program
- Patricia Vanden Berg Blom, M.A., Ph.D. (Michigan, 1975, 1982)
Associate Professor of Communication Arts and Sciences
- Donald L. Boender, M.A. (Michigan, 1965)
Dean of Men
- Warren J. Boer, B.D. (Calvin Theological Seminary, 1963), M.A. (Princeton Theological Seminary, 1969), D.Min. (Fuller Theological Seminary, 1974)
Director, Broene Counseling Center
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Vice President-designate for Administration and Finance
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Professor of Art
- **Ervina Boevé, M.A. (Michigan, 1954)
Professor of Communication Arts and Sciences
- Martin Bolt, M.A., Ph.D. (Michigan State, 1967, 1969)
Professor of Psychology
- Robert Bolt, M.A. (Michigan, 1953), Ph.D. (Michigan State, 1963)
Professor of History
Chair of the Department of History
- Helen Bonzelaar, M.A. (Western Michigan, 1964), Ph.D. (Michigan State, 1984)
Professor of Art
Chair of the Department of Art
- Paul H. Boonstra, M.A. (Michigan, 1958), M.S. (Purdue, 1963), Ph.D. (Michigan State, 1970)
Professor of Mathematics
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Professor of Education
- Hessel Bouma III, Ph.D. (Texas, 1975)
Professor of Biology
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Professor of Mathematics and Computer Science
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Professor of Biology

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Associate Professor of History
- Kenneth D. Bratt, M.A., Ph.D. (Princeton, 1973, 1985)
Professor of Classical Languages
- Wallace H. Bratt, M.A., Ph.D. (Michigan, 1956, 1966)
Professor of Germanic Languages
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Professor of History
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Professor of Physics
Dean for the Natural Sciences and Mathematics and for the Contextual Disciplines
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Associate Professor of Physics
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Multicultural Lecturer
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College Organist
- Lee P. Hardy, M.A. (Duquesne, 1978), M.A. (Pittsburgh, 1980)
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Professor of Classical Languages
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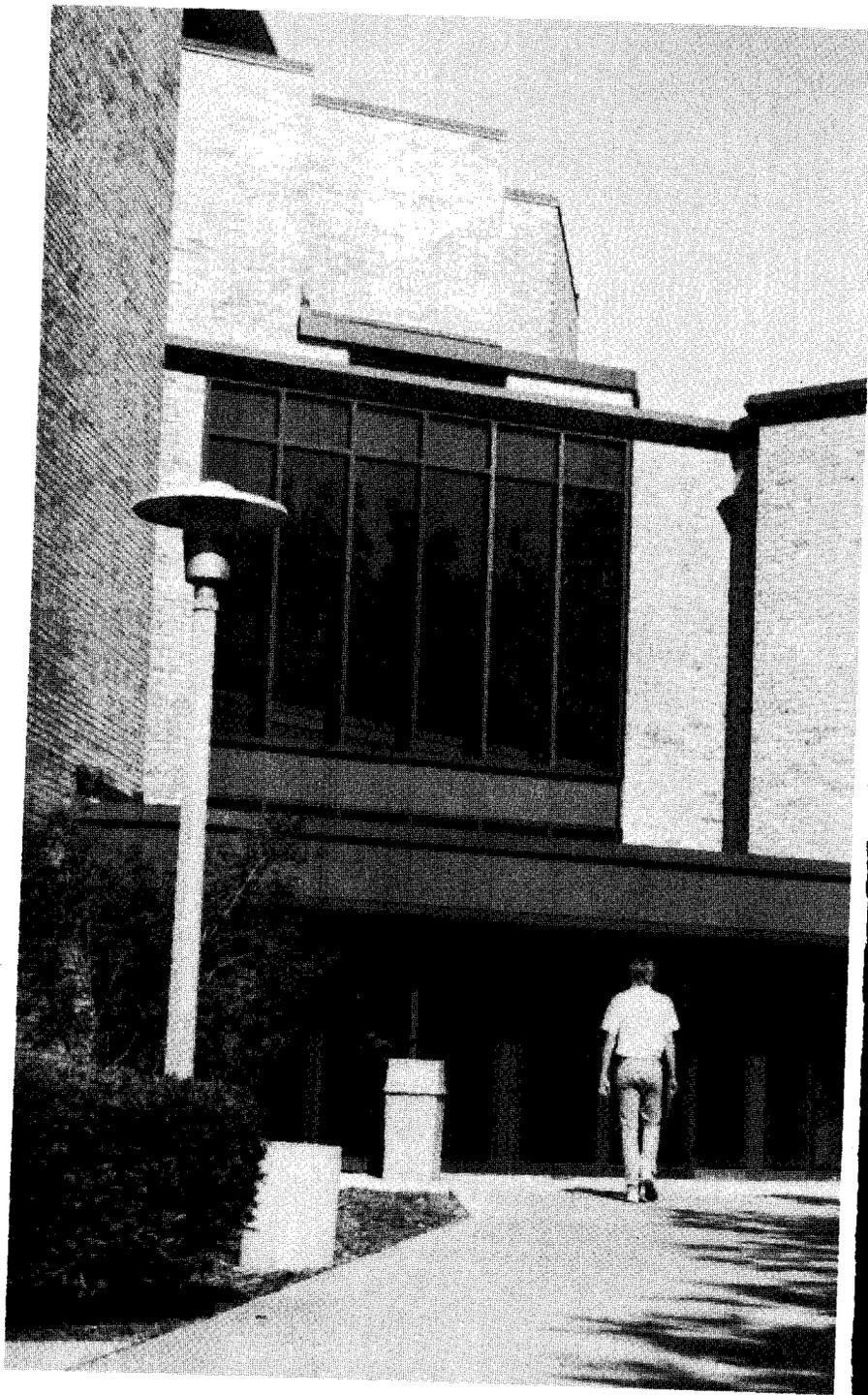
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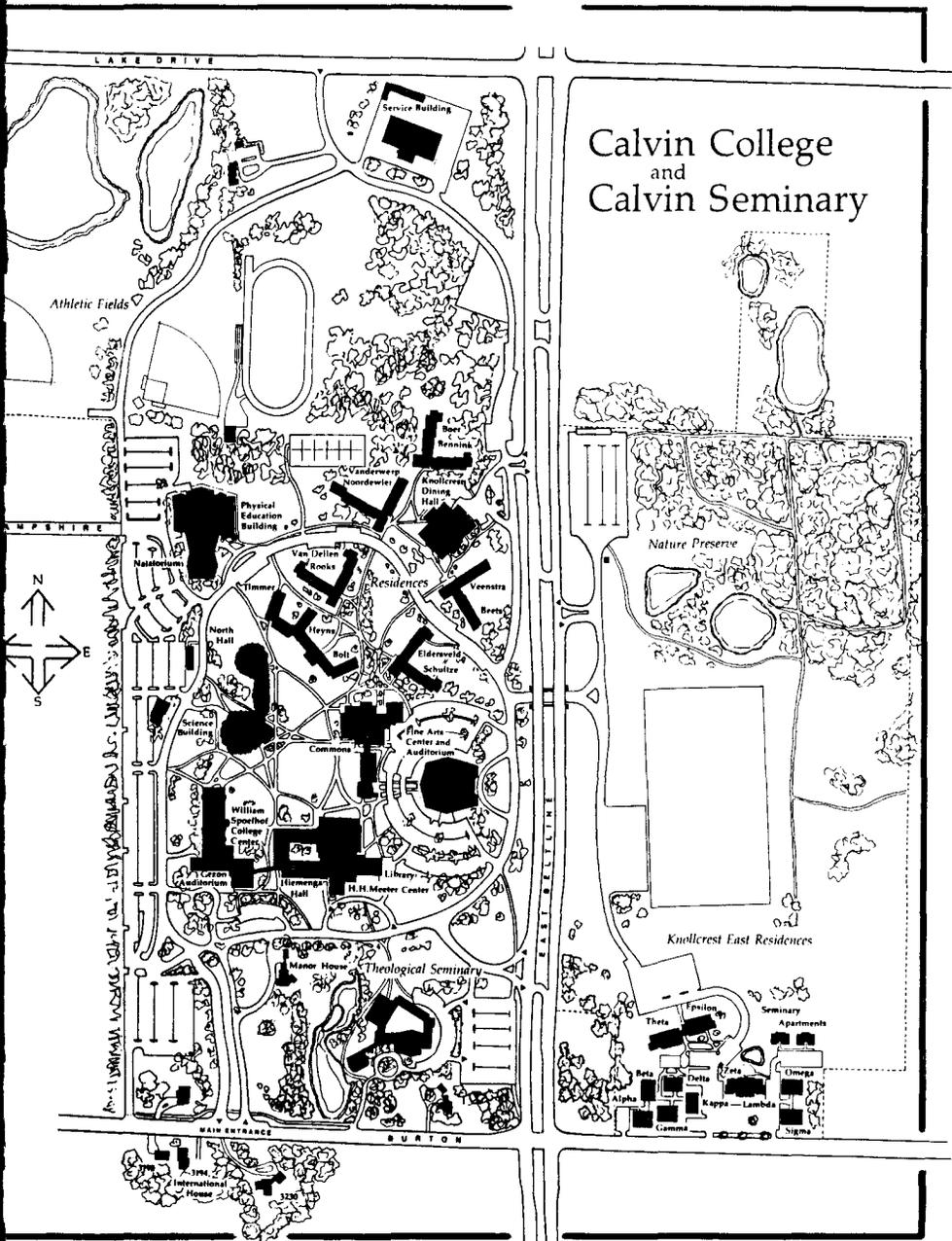
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