

# KANSAS STATE UNIVERSITY

## 1990 GUIDE TO REQUIREMENTS

### FOR

## MAJORS IN COMPUTER SCIENCE & INFORMATION SYSTEMS

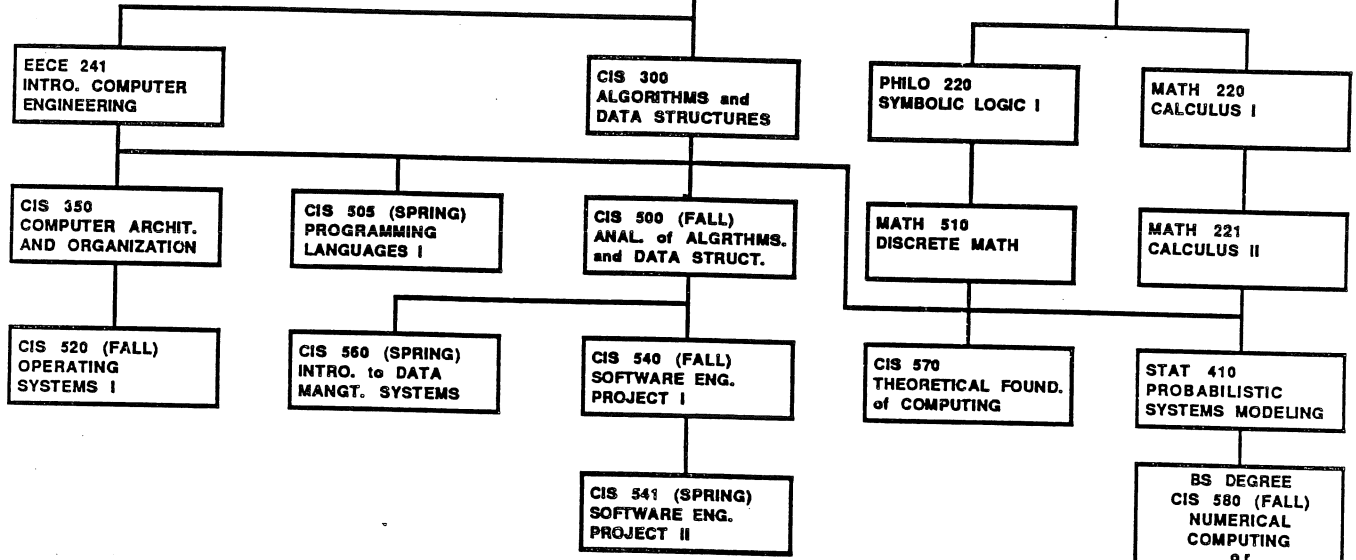
To major in computer science or information systems you must meet the general requirements of the University, the requirements of the College of Arts and Sciences, and the requirements of the Department of Computing and Information Sciences (all of which are listed in the General Catalog). The requirements for the BS and BA degrees are outlined on the sample curriculum guide check sheets. An up-to-date copy of the curriculum guide should be kept in your folder in the CS office for your use during advising. Please update your guide form when you pick up your enrollment permit and take the updated version with you when you see your advisor. Please return it to the CS office - Nichols Hall 234 - after you have been advised.

**COMPUTER SCIENCE REQUIREMENTS**

**PROGRAM ENTRY REQUIREMENTS:**  
2 UNITS HS ALGEBRA or  
COLLEGE ALGEBRA

CIS 200  
FUNDAMENTALS OF COMP. PROGRAMMING  
CIS 203  
FUNDAMENTALS LANGUAGE LABORATORY

MATH 100  
COLLEGE ALGEBRA  
and/or  
MATH 150  
TRIGONOMETRY

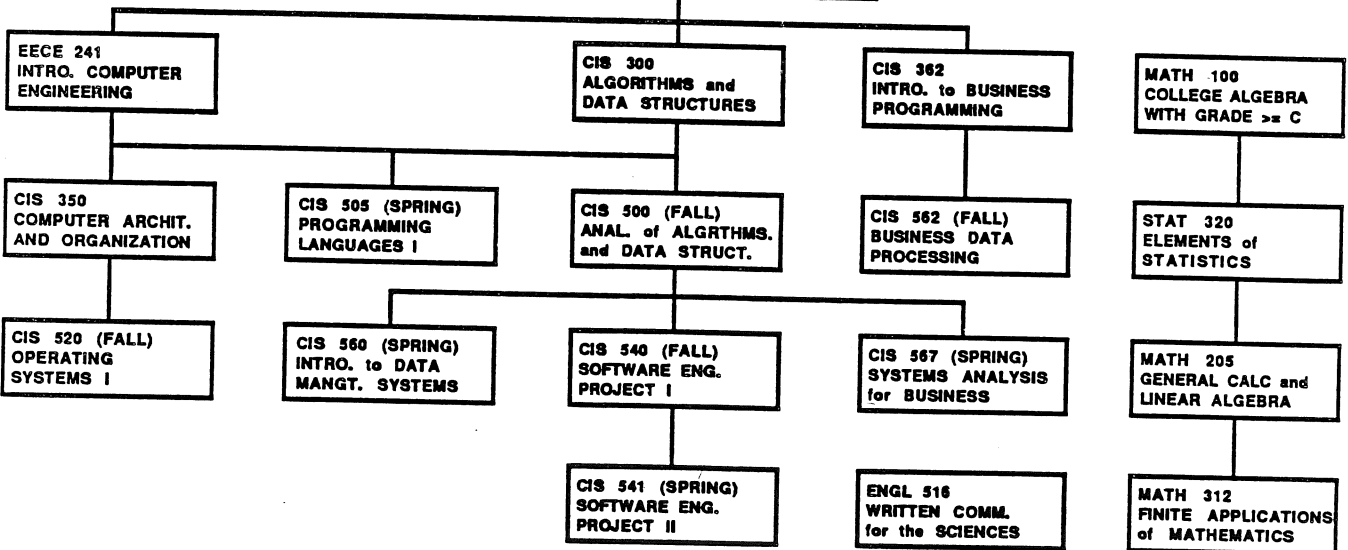


**TECHNICAL ELECTIVES APPROVED BY ADVISOR**  
6 HOURS for BA, 9 HOURS for BS

**INFORMATION SYSTEMS REQUIREMENTS**

**PROGRAM ENTRY REQUIREMENTS:**  
2 UNITS HS ALGEBRA or  
COLLEGE ALGEBRA

CIS 200  
FUNDAMENTALS OF COMP. PROGRAMMING  
CIS 203  
FUNDAMENTALS LANGUAGE LABORATORY



**TECHNICAL ELECTIVES APPROVED BY ADVISOR**  
6 HOURS for BA, 12 HOURS for BS

LIST OF COURSES THAT FULFILL DEGREE REQUIREMENTS  
AS OF AUGUST, 1989

English Composition I & II  
Public Speaking (or Argumentation & Debate)  
Principles of Physical Fitness

Humanities: 4 courses 11 hrs. minimum

One course from each of the 4 areas. They may be used at the same time to count toward the major.

No course may be used to satisfy more than 1 specific requirement in this section. Only courses taken for 2 or more credit hrs. satisfy these requirements. (Exception: Music-Studio Performance areas 252-799=1+1) (MUSIC LESSONS)

1. FINE ARTS: 1 COURSE

Anthropology -- Creativity & Culture 515, Afro-American Music & Culture 517

Art technique courses -- 200-799, art history, or Intro. to Museum Studies 305, Computer Imaging Art 400

Dance technique courses -- 323, 324, 325, 326, 371, or Dance as an Art Form

History of Dance 459

\* Music courses -- 200, 201, 245, 250, 310, 385, 420, 422, 424, 555, 570, 601, 602, 650, or Studio Perfor. areas 252-799 (MUSIC LESSONS)

Theatre courses -- 260-799

2. PHILOSOPHY: 1 COURSE

Except Logic courses -- 110, 220, & 510 and Comp. Religion 310

3. WESTERN HERITAGE: 1 COURSE

American Ethnic Studies -- DAS 160

\* History courses in Greco-Roman, Western European or No. Amer. Fields

Women's Studies -- DAS 105 or 405

Humanities (English) Courses -- 230, 231, 233, 234

Modern Language Courses -- 514, 530, 565, 566

Constitutional Law (Pol. Science) Courses -- 613, 614, 615, 616, 799

Music -- Introduction to American Music 245

Political Thought (Pol. Science) Courses -- 301, 661, 663, 667, 671, 675, or (Sociology) 709

4. LITERARY OR RHETORICAL ARTS: 1 COURSE

\* English courses in literature or creative writing 250-799 except 301, 400, 401, 405, 415, 492, 499, 520, 530, 796

\* Modern Language literature courses including literature in translation

Speech -- 330, 335, 430, 432, 434, 460, 725, 730, 732, 733

Theatre courses -- 562, 764, 770, 771, 772, 773, 774, 776

BS Degree only: Levels I & II in the same foreign language will satisfy the requirements of 3 & 4.

Social Sciences: 4 courses from 3 disciplines 12 hours minimum.

Up to 2 courses from a single department may be used to fulfill the distribution requirements set forth in this section. They may be used at the same time to count toward the major. One course must be 500-799 level or carry a prerequisite in the same department.

At least 3 of the 4 courses must be from: Psychology, Sociology, Cultural Anthropology, (including Archaeology), Economics, Political Science, History, Geography (except Environmental I 220 & II 221)

The 4th course must be from 1 of the above or from the following:

Women's Studies -- Intro. 105, Sr. Sem. 405

Gerontology -- Intro. 315, Sr. Sem. 415

Physical Education -- Soc. Dimen. 340, Motor Dev. & Learn. 320, or 435 Sport & Contemp. Society

Speech -- Anal. of Experimental Res. Lit. in Speech

520, Non-Verb. Comm. 323, Perspec. on Comm. 720, Sem. in Persuasion 726, Linguistics except Gen.

Phonetics 601, Political Communication 435

Journalism & Mass Communications -- Intro. to Mass

Comm. 235, Women and the Media 612, Minority

Press in America 645, Hist. of Journalism 660,

Law of Mass Comm. 665, The Mass Communicator:

Ethics & Issues 685

Radio-Television -- Hist. of Telecomm. 660 or RTV

Crit. 675, Radio-Television and Society 300

Natural Sciences: BS Degree -- 4 courses/14 hr. min.

BA Degree -- 3 courses/11 hr. min.

Courses that fulfill this requirement may be used at the same time to count toward the major. No courses may be used to satisfy more than 1 specific

requirement in this section. Only courses taken for 2 or more credit hours satisfy these requirements &

courses in excess of 5 credit hours count as 2 courses.

1. A Life Science with Lab

2. A Physical Science with Lab

3. A Life or Physical Science

Life Sciences: Biology, Biochem., Paleobiology

(Geol) 581, Paleocology 704, Intro. Phys.

Anthro. 280, 281, Fossil Man & Evol. 688,

Primatology 691, Osteology 694, Ost. Lab 695

Physical Sciences: Physics, Chemistry, Envir. Geog.

I 220 & II 221 only, Geol. except Paleobiol. 581,

Paleocol. 704

4. BS Degree only: 1 course (3 cr. hr. min.) with

a prerequisite in the same dept. chosen from the

following: Life or Physical Sci. listed in #3,

Biochem. courses with a chem. prerequisite, Phys.

Ed.-Kinesiology 330, Physio. of Exercise 335,

Psych.-Psychobiology 470, Fund. of Percep. &

Sensation 480, Comp. Psych. 616

(OVER)

QUANTITATIVE AND ABSTRACT FORMAL REASONING:

BS DEGREE ONLY

Courses used for this requirement may also satisfy any major requirement for which it qualifies.

Select one of the following three options:

1. Three courses from:

Math, Statistics, Logic (Philosophy),  
Computer Science (note: CNPSC 200 requires  
201, 202, 206, or 207 and is equivalent to  
one required course)

2. One of the following pairs:

- General Physics I 113 & Trig. 150
- Quantitative Analysis in Geog. 700 &  
Stat. I level course
- Methods in Social Research 520 & Stat. I  
level course
- Methods of Social Work Research 519 & Stat. I  
level course
- Intermed. Quantitative Methods 725 & Stat. I  
level course
- Measurement & Evaluation in PE 710 & Stat. I  
level course

3. Level II: 2 courses

- Math -- Plane Trig. 150; Elem.  
Applied Math 201, General Calc. & Lin.  
Algebra 205
- Statistics -- Elem. of Statistics 320, Elem.  
Statistics for the Social Sciences 330,  
Biometrics I 340, Business & Econ.  
Stat. I 350, Stat. Methods for Social Sciences  
702, Stat. Methods for Nat. Sciences 703
- Philosophy -- Symbolic Logic II 510
- Computer Science -- Fund. of Comp. Prog. 200 &  
one of the following: Fortran 201, Basic 206,  
Pascal 207, Fortran/Engg. 211

--OR--

Level III: 1 course

- Math -- Technical Calculus I 210, Analy. Geometry  
& Calc. I 220, Anal. Geom. & Calc. I-S 225
- Statistics -- Biometrics II 341, Business  
& Econ. Stat. II 351, Analy. of Variance &  
Covariance 704, Regression & Correlation  
Analy. 705
- Philosophy -- Topics in Metalogic 701
- Computer Science -- Algorithmic & Data Structures  
300, Comp. Organ. & Prog. IA 305

BA DEGREE ONLY

Foreign Language: 4 courses 15 hrs.

One of the foreign language sequences  
offered by the Dept. of Modern Languages  
or equivalent competency.

Mathematics: 1 course 3 hours

100-799 level course offered by the Dept. of  
Mathematics, or any other course for which there is  
a mathematical prerequisite. Any course used to  
satisfy this requirement cannot be used to satisfy  
any other general education requirement.

INTERNATIONAL OVERLAY:

This course may also satisfy a requirement in

the major, social sciences, or humanities.  
The 4th course in a single foreign language  
sequence (other than Latin) will satisfy this  
requirement.

Anthropology -- Intro. Cultural 200, Intro. to Ling.

Anthro. 220, Intro. to Archaeology 260, Civ.  
of South Asia I 505, Civ. of South Asia II 506,  
Folk Cultures 507, Male & Female 508, Cultural  
Ecology & Econ. 511, Pol. Organ. in Folk &  
Nonliterate Cultures 512, Creativity & Culture  
515, Afro-Amer. Music & Cult. 517, Black Cultures  
of the Americas 536, Cultures of India & Pakistan  
545, Cultures of Africa 550, Culture &  
Personality 604, Religion in Culture 618, Music &  
Culture 616, Indians of No. Amer. 630, Indian  
Cultures of So. Amer. 634, Precolumbian Civ. of  
Mexico & Guatemala 673, Archaeology of the Old  
World 676

Economics -- Civ. of So. Asia I 505, Civ. of So.  
Asia II 506, Capitalism & Socialism 636,  
Intern'l Trade 681, Underdeveloped Countries 682

Geography -- World Regional 100, Human Geography  
200, Civ. of So. Asia I 505, Civ. of So. Asia II  
506, Latin America 620, Europe 640, Soviet Union  
650, Geography of Hunger 710, World Population  
Patterns 715

History -- Russian Cult. & Civ. 250, Gandhi & Indian  
Revol. 350, Hist. of Hinduism 504, Civ. of So.  
Asia I 505, Civ. of So. Asia II 506, World War II  
514, U.S. & World Affairs 1776-Present 543, U.S.  
& Soviet Relations since 1917 544, War in 20th  
Cent. 545, Colonial Hispanic Amer. 561, Mod.  
Mexico 562, Russian Revol. & Soviet Sys. 564,  
European Diplo. Hist. to Napoleon 576, European  
Diplo. Hist. since Napoleon 577, Russia to 1801  
591, Grandeur & Decline of Imperial Russia 592,  
Topics in Non-Western Hist. 598

Journalism & Mass Communications -- International  
Communications 670

Management -- Intern'l Business (Bus. Adm.) 690

Marketing -- Intern'l Marketing (Bus. Adm.) 544

Modern Languages -- Russian Culture & Civ. 250,  
Russian Lit. in Translation: 19th Cent. 504,  
Russian Lit. Translation: Soviet Period 508,  
Survey Russian Lit. 552

Philosophy -- Comparative Religion 310

Political Science -- World Politics 333, Civ. of So.  
Asia I 505, Civ. of So. Asia II 506, Contemp.

Chinese Pol. 511, Pol. of Dev. Nations 545,  
Latin Amer. Pol. 622, So. Asian Pol. 623, Mid.  
East Pol. 624, SE Asian Pol. 625, African  
Pol. 626, Soviet-Style Regimes 627, Comp.  
Security Estab. 628, Admin. in Dev. Nations 629,  
Intern'l Relations 541, Intern'l Conflict 642,  
Amer. For. Policy 543, Intern'l Pol. Eur. 645,  
Intern'l Law 647, Intern'l Defense Strag. 649,  
Intern'l Organ. 651, Intern'l Pol. So. Asia 652,  
Intern'l Pol. Mid East 653

Sociology -- Civ. of So. Asia I 505, Civ. of So.  
Asia II 506, Soc. & Change So. Asia

NAME \_\_\_\_\_

MAJOR \_\_\_\_\_

ADDRESS \_\_\_\_\_

DEGREE \_\_\_\_\_

DATE \_\_\_\_\_

Courses for Computer Science			Courses for Information Systems		
Anal Geom & Calc I	M220	4	Elem of Statistics	S320	3
Anal Geom & Calc II	M221	4	Intro Business Prog	CIS362	3
Discrete Math	M510	3	Gen Calc & Lin Alg	M205	3
Symbolic Logic I	P220	3	Finite Applications#	M312	3
Prob System Modeling	S410	3	Business Data Prog*	CIS562	3
Theo. Found of Comp.	CIS570	3	Systems Analysis#	CIS567	3
			Written Comm for Sc	E516	3

**BS Degree Only**

Written Comm for Sc	E516	3
Elem Numerical Anal*	M655	3
or		
Numerical Computing*	CIS580	3

**Courses required for BOTH Majors**

Fund. of Computer Programming	CIS 200	3
Fund. Language Laboratory	CIS 203	1
Intro. to Computer Engineering	EECE 241	3
Algor. & Data Structures	CIS 300	3
Computer Archit. & Prog.	CIS 350	3
Anal of Algorithms & Data Struct*	CIS 500	3
Intro. to Programming Languages#	CIS 505	3
Operating Systems I*	CIS 520	3
Software Engineering Project I*	CIS 540	3
Software Engineering Project II#	CIS 541	3
Intro to Data Management Systems#	CIS 560	3

\* Fall ONLY  
# Spring ONLY

Technical Electives To Be Approved By Advisor:  
(6 hrs for BA degree, 9-12 hours for BS degree)

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_

**Courses for  
Requirements for Both Degrees**

See Current Listing for Courses That Fulfill Requirements

English I	3
English II	3
Oral Communications	2-3
Concepts of PE	1

**Courses for BA Degree**

Courses for BA Degree	Hours	Courses for BS Degree	Hours
<b>Humanities (4 Courses)</b>	12	<b>Humanities (4 Courses)</b>	11
1. Fine Arts	_____	1. Fine Arts	_____
2. Philosophy	_____	2. Philosophy	_____
3. Western Heritage	_____	3. Western Heritage	_____
4. Literary or Rhetorical Arts	_____	4. Literary or Rhetorical Arts	_____
<b>Social Sciences (4 Courses)</b>	12	<b>Social Sciences (4 Courses)</b>	12
1. _____	_____	1. _____	_____
2. _____	_____	2. _____	_____
3. _____	_____	3. _____	_____
4. Courses must be 500-799 or have prereq. in same dept.	_____	4. Course must be 500-799 or have prereq. in same dept.	_____
<b>Natural Sciences (3 Courses)</b>	11	<b>Natural Sciences (4 Courses)</b>	14
1. Life Science w/Lab	_____	1. Life Science w/Lab	_____
2. Physical Science w/Lab	_____	2. Physical Science w/Lab	_____
3. Life or Physical Science	_____	3. Life or Physical Science	_____
	_____	4. Course w/ prereq. in same dept.	_____
<b>Foreign Languages (4 Courses)</b>	15		
1. _____	_____	Quantitative requirement is met by majoring in CMPSC or INSYS	
2. _____	_____		
3. _____	_____		
4. _____	_____		
<b>Math (1 Course)</b>	3	<b>Internat'l Overlay (1 course)</b>	3
1. _____	_____	1. _____	_____

## AREAS OF TECHNICAL ELECTIVES

1990

### COMPUTER SCIENCE MAJORS

BA select 6 hours, BS select 9 hours as follows:

Courses taken to meet the Computer Science major may not be used as technical electives. Technical electives must be Computing and Information Sciences 300 level and above. One course must be from the CIS 600 or CIS 700 levels.

### INFORMATION SYSTEM MAJORS

BA select 6 hours, BS select 12 hours from the suggested coursework for a particular track.

#### DATABASE MANAGER

CIS 600	Microcomputer Software
CIS 761	Data Base Management Systems
MANGT 420	Management Concepts
MANGT 421	Production/Operations Management
MANGT 466	Management Information Systems

#### INFORMATION SYSTEMS ANALYST/DESIGNER

CIS 740	Software Engineering
ACCT 211	Financial Accounting
FINAN 450	Business Finance
MANGT 420	Management Concepts
MANGT 466	Management Information Systems
MKTG 400	Marketing

#### MANAGEMENT INFORMATION SYSTEMS

ACCT 211	Financial Accounting
MKTG 400	Marketing
FINAN 450	Business Finance
MANGT 466	Management Information Systems
CIS 762	Office Automation
PSYCH 560	Industrial Psychology

#### APPLICATIONS PROGRAMMER

CIS 600	Microcomputer Software
CIS 535	Introduction to Computer-Based Knowledge Systems
CIS 636	Computer Graphics
CIS 740	Software Engineering
CIS 745	Software Development Management

#### COMMUNICATIONS ANALYST

CIS 600	Microcomputer Software
CIS 750	Advanced Computer Architecture
CIS 762	Office Automation
CIS 725	Computer Networks
PSYCH 425	Problem Solving and Decision Making

## GUIDELINES

### FOR THE

## MASTER OF SCIENCE DEGREE

### IN THE

## DEPARTMENT OF COMPUTING AND INFORMATION SCIENCES

## KANSAS STATE UNIVERSITY

JANUARY 1989

### GRADUATE STUDIES COMMITTEE

Dr. William J. Hankley—Chair  
Dr. David A. Schmidt  
Dr. Virgil Valentine

#### I. INTRODUCTION

These guidelines describe departmental and university requirements for a Master of Science (M.S.) Degree in Computing and Information Sciences. Students are expected to adhere to these standards. If exceptions are warranted, the student must consult the Graduate Studies Committee to determine alternate means of meeting the standards.

The guidelines stated here are those of the Computing and Information Sciences Department. Certain other regulations are imposed by the Kansas State University Graduate School and are described in the "Student Guide for Masters and Doctoral Degrees," available from the Graduate School Office, and in the "Graduate Student Handbook," published by the Graduate Student Council. It is the student's responsibility to know and satisfy all requirements.

The Graduate Studies Committee will keep each student informed of the committee's view of his or her progress towards the M.S. degree. In keeping with this commitment, an annual review of all graduate students is performed each January, and a written evaluation is transmitted to each student.

Graduate students are expected to participate in the professional activities of the Department. This includes attending seminars and colloquia, suggesting improvements in curriculum (both graduate and undergraduate), and suggesting new teaching techniques.

#### II. ADMISSION

The "Directions for Applying for Graduate Studies in Computer Science" manual gives detailed information about the application process. A student well prepared for graduate study will have a good background in "mainstream computer science." This includes experience with block structured programming languages (e.g., Pascal), "modular" languages (e.g., Modula, Ada, or Smalltalk), and non-procedural languages (e.g., Lisp, Prolog, or ML), and background in computer architecture or assembly programming, data structures, operating systems, database systems, software engineering, and computing-related mathematics (e.g., mathematical logic, discrete mathematics, or calculus). A student who lacks experience in some of these areas may be asked to do specific coursework to resolve the deficiencies.

#### III. REQUIREMENTS FOR THE MASTER OF SCIENCE DEGREE

The M.S. degree requires a minimum of 30 credit hours of graduate level coursework; a limited number of credit hours from other accredited graduate programs can be applied. (Note: a student who chooses the "non-thesis-report" Program Option must take 33 credit hours; see Section II(B).) Each new student is assigned a faculty member to serve as an *Academic Advisor*. The Academic Advisor helps the student select courses and reviews the student's progress until a Major Professor is selected. The coursework must include:

**Background Requirement:** CMPSCT00; this requirement is waived if the student has already taken a course on compiler construction.

**Seminar Requirement:** CMPSOC897. This course is an introduction to the department, general literature in computer science, and technical writing. It must be taken during a student's first year of graduate studies. Based upon the instructor's evaluation of a student's writing skills, the student may be required to take ENGL516.

**Implementation Requirement:** One of the courses: CMPSOC620, 630, 636, 690, or 700. These

courses require the student to complete a substantive software project, including specification, design, testing, and documentation.

**Theory Requirement:** One of the courses: CMPSC675 or 770. These courses cover formal proof techniques.

**Breadth Requirement:** Three of the courses: CMPSC671 (specification and verification), 705 (programming languages), 730 (artificial intelligence), 720 (operating systems), 740 (software engineering), or 761 (database systems). (Note: CMPSC762 may be substituted for CMPSC761, and CMPSC725 may be substituted for CMPSC720.) These courses give the student exposure to a breadth of areas in computing. Other courses numbered CMPSC7xx may be used to satisfy this requirement, provided that permission is granted by the Graduate Studies Committee.

**Specialization Requirement:** One course numbered CMPSC8xx or CMPSC9xx (excluding seminar, projects, and M.S. research courses).

The student must receive a grade of "B" or better for each course used to satisfy the above requirements.

### IIIa. Advisor and Supervisory Committee

By the end of the first year as a graduate student, a student must select a *Major Professor*. The Major Professor helps the student choose a *Supervisory Committee*, pick a *Program Option*, and formulate a *Program of Study*. The Supervisory Committee is a group of three faculty members (including the Major Professor) that approves the student's Program of Study and Program Option and gives final approval for the student's degree. The final approval is granted at the *Oral Examination*, which is held when all other requirements are met for the degree. The Oral Examination is described in Section IIIc. The Program Option is described in Section IIIb. The Program of Study lists the courses that the student takes to satisfy the coursework requirements for the M.S. degree. A student must obtain a *Program of Study Form* from the Graduate School, list the courses on it, have the Supervisory Committee sign it, and return it to the Graduate School. The Program of Study Form should be completed by the end of the student's first year of studies.

### IIIb. The Program Option

The Program Option can take one of three forms:

**Non-thesis-report Option:** Write a major paper, for example, as part of a CMPSC8xx course. This option requires 33 credit hours for a M.S. degree.

**Report Option:** Undertake a project that culminates in a written report; 2 credit hours for CMPSC898 are awarded for the work. Project work satisfying the Implementation Requirement can be used, subject to the approval of the Major Professor. This option requires 30 credit hours for a M.S. degree.

**Thesis Option:** Perform original research that culminates in a written thesis; 6 credit hours for CMPSC899 can be awarded for the work. This option requires 30 credit hours for a M.S. degree.

The document written to satisfy the Program Option should represent the best possible writing by the student; it is not to be written or extensively edited by the Major Professor. Students should begin their writing early enough so there will be time for review by the Major Professor and rewriting by the student prior to the Oral Examination. Once the student has completed the docu-

ment, the student must visit the Graduate School and obtain the Graduate School's Approval Form. The Supervisory Committee members sign the Approval Form, and the student returns it to the Graduate School.

If a student chooses either the thesis or report options, the thesis or report must meet the Graduate School's standards. Tentative copies of the thesis or report are due in the Major Professor's office approximately two months prior to graduation. The Graduate School requires three copies of the thesis or report, which are submitted after the Oral Examination.

### IIIc. The Oral Examination

Once the Supervisory Committee members have signed the Graduate School's Approval Form, the student returns the form and tells the Graduate School the time, date, and place of the Oral Examination. The examination should take place approximately one month before graduation, and it must occur no sooner than one week after the Approval Form is returned.

The Oral Examination is a presentation of the student's Program Option work and a defense of the student's scholarly effort. The exact format of the Oral Examination is decided by the Supervisory Committee, and the student must consult the Major Professor prior to the examination to establish the format.

A student can either pass or fail the Oral Examination, subject to a vote by the Supervisory Committee. If the student fails, a second attempt of the Oral Examination cannot be retaken in less than two weeks nor more than twelve months after the failed examination, unless an extension is granted by the Dean of the Graduate School. No third try is allowed.

### IV. NORMAL PROGRESS

Each semester of enrollment, a student must make *normal progress* towards the M.S. degree. Normal progress is considered to be the following:

- a grade point average that is 3.00 or better.
- a Major Professor selected and a Program of Study filed with the Graduate School by the end of the first year in attendance.
- a coursework load of at least 9 credit hours per semester.

### V. UNRESOLVED ISSUES

Any issues not covered in this document shall be resolved by the Graduate Studies Committee in consultation with the faculty of the Department of Computing and Information Sciences.



GUIDELINES  
FOR THE  
DOCTOR OF PHILOSOPHY DEGREE  
IN THE  
DEPARTMENT OF COMPUTING AND  
INFORMATION SCIENCES

KANSAS STATE UNIVERSITY  
January 1989

GRADUATE STUDIES COMMITTEE  
Dr. William J. Hankley—Chair  
Dr. David A. Schmidt  
Dr. Virgil Wallentine

**1. INTRODUCTION**

1a. These guidelines give departmental and university standards for attainment of a Doctor of Philosophy (PhD) Degree in Computing and Information Sciences. You are expected to adhere to these standards. If exceptions are warranted, your advisor and the Graduate Studies Committee must be consulted to determine alternate means of meeting the standards.

1b. The guidelines stated herein are those of the faculty of the Computing and Information Sciences Department at Kansas State University. Certain other regulations are imposed by the Kansas State University Graduate School and are described in the "Student Guide for Masters and Doctoral Degrees," which is available from the Graduate School Office, and in the "Graduate Student Handbook," published by the Graduate Student Council. It is your responsibility to know and satisfy all requirements. 1c. The PhD program in Computing and Information Sciences is offered jointly by Kansas State University in Manhattan and the University of Kansas in Lawrence. Acceptance into the program implies acceptance by both departments. You may elect to fulfill residency and other requirements at either school. You may select courses from offerings at both schools.

**2. ADMISSION**

2a. In the usual case, you must first complete a Master's degree in computer science or a related field.

2b. You must take the Graduate Record Exam (GRE). Successful applicants have a combined GRE Verbal plus Quantitative score of at least 1200.

2c. If you are an international student and you received your Bachelor's degree abroad, you must take the Test of English as a Foreign Language (TOEFL) and achieve a score of at least 575. (The exam is waived in certain cases, e.g., for an applicant from Canada or Britain.)

2d. You must possess a grade point average of 3.50 (on a scale where an "A" is 4.00) for your Master's level coursework. Your Master's degree work must include material called the *Core Courses*. The *Core Courses* are:

- a compiler construction course
- a course in theoretical computer science (formal language theory or analysis of algorithms)
- three courses in "breadth areas" (artificial intelligence, database systems, operating systems, programming languages, software engineering, or systems specification)

If your Master's degree studies do not include this material, you may still apply. The Graduate Studies Committee may choose to admit you with the requirement that you take specific course material to remedy deficiencies.

**3. GENERAL REQUIREMENTS**

3a. The PhD degree requires at least 90 semester hours of graduate-level credit, typically distributed as 30 hours of Master's work, 30 hours of PhD level coursework and 30 hours of PhD research, culminating in a PhD dissertation. (See Section 4.1 below.) All work must be completed within seven years. At least one full year must be spent in residence at Kansas State University.

- 3b. You must maintain a 3.00 grade point average in all coursework.
- 3c. You must make regular progress toward completion of the degree. Progress of graduate students is reviewed each year in January by the Graduate Studies Committee. A written evaluation is sent to you and placed in your permanent file. Any student who does not maintain an adequate grade point average or who does not respond to a warning of inadequate progress will be placed on probation, with written notice from the Graduate School. A student on probation must correct deficiencies within the time limit indicated in the written notice or be dismissed from the graduate program.
- 3d. If you are employed by the department, you must enroll in at least 9 hours of graduate-level courses each Fall and Spring term of employment. (Students new to Kansas State University may request to enroll in only 6 hours of courses during their first semester.)
- 3e. Sometime in your graduate career you must participate in teaching within the Department, either as an assigned instructor or by special arrangement.
- 3f. You are expected to participate in the professional activities of the Department. You must attend seminars and colloquia offered by the Department and by the professional societies within the Departments.

#### 4. SPECIFIC REQUIREMENTS FOR THE PHD DEGREE

- 4a. Upon admission to the PhD program, you are assigned an *academic advisor*, who remains your supervisor until you obtain your *major professor* (see Section 4d.). You and your advisor complete a *Declaration of Intent* form and give it to the departmental secretary. You must also consult with your advisor to formulate an initial research paper (see Paragraph 4b), a plan of study and an agreement with a research advisor (see Paragraph 4d).
- 4b. During your first year in the program, your academic advisor will assign you an *initial research paper* on some topic of the advisor's choosing. The paper you write must display sound organization, clear exposition, evidence of background research, and conceptual understanding of the topic. The paper does not need to be a research proposal or a new research result. The paper might relate to or be supported by a course you are taking. It should represent from 1 to 3 credit hours of work. (In some cases, you can receive CMFSC999 credit for your work.) The paper must not be edited or organized by any member of the faculty.
- 4c. The initial research paper will be evaluated by your academic advisor in consultation with the Graduate Studies Committee. *You will not be allowed to proceed to the second year of your PhD studies if your initial research paper is not accepted by your academic advisor and the Graduate Studies Committee.*
- 4d. At the end of your first year of PhD studies, you should seek a *research advisor*, also known as your *major professor*. Your research advisor must be a member of the Graduate Faculty. (See the "Kansas State University General Catalog" for further information.) Since the research advisor organizes and directs your research, you should choose an advisor carefully. How do you find an advisor? Talk to faculty members. Take some of the 800-level or 900-level research-oriented courses. Read current survey and research papers in computer science journals and magazines. *It is your responsibility to obtain a research advisor.* You may not enroll in CMFSC999 (Research in Computer Science) until you have permission of your research advisor to do so.
- 4e. In consultation with your research advisor, you must compose a *supervisory committee*. The supervisory committee must include three members of the Graduate Faculty in the Computing and

Information Sciences Department. Another member must be from the graduate faculty of the Computer Science Department at the University of Kansas. Another member must be a Kansas State University Graduate Faculty member from a department other than Computing and Information Sciences. All committee members must be chosen for their appropriateness to your planned research topic. In addition, the Graduate School will appoint an examination chairperson from outside of the Computing and Information Sciences Department.

4f. You must consult regularly with your research advisor.

#### 4.1. The Program of Study

4.1a. You must meet with the members of your supervisory committee and formulate a *Program of Study*. (Obtain the Program of Study forms from the Graduate School.)

4.1b. The Program of Study contains the following information:

4.1b.i. major professor (that is, the research advisor)

4.1b.ii. members of the supervisory committee

4.1b.iii. general area of research

4.1b.iv. three preliminary examination areas (See Paragraph 4.2c.)

4.1b.v. all graduate course credits (at least 90 hours)

4.1c. The graduate course credits must include the following:

4.1c.i. The Core Courses stated in Paragraph 2d. Equivalent courses taken at another institution are acceptable. The Graduate Studies Committee reserves the right to determine equivalency. Alternatively, Core Courses can be omitted if you elect to take and pass the comprehensive exam. (See Paragraph 4.2b.)

4.1c.ii. At least 24 hours of course credit at Kansas State University beyond the Master's degree.

4.1c.iii. At least 30 hours of PhD research.

4.1c.iv. At least 9 hours of CMFSC900-level courses.

4.1c.v. One or more courses in theoretical or foundational topics that support your chosen direction of research. The supervisory committee approves the choice of courses for this requirement.

4.1c.vi. Any additional requirements instituted by your supervisory committee. (An example: English 516, "Written Communication for Scientists," is sometimes required for additional writing experience.)

#### 4.2. The Preliminary Exams

4.2a. You must also pass preliminary exams. The exams consist of 4 written exams and one oral exam. *By the end of your second year of studies, you must have passed the preliminary exams.*

4.2b. The first preliminary exam is a *comprehensive exam* over the Core Courses (see Paragraph 2d). *This exam is waived if you complete the Core Courses (either at Kansas State University or at your previous school) with at least a "B" in each course and with a grade point average of 3.50 or greater for all of the courses.* There is no reading list for the comprehensive exam. The exam covers the content of the core

courses. Syllabi for the Core Courses are available from the department's Graduate Studies secretary. By the end of your second year of studies, you must have passed the comprehensive exam or satisfied the core course requirements.

4.2c. You must pass one exam from each of the following three areas:

Software Systems:

- Compilers & Interpreters,
- Distributed Systems,
- Operating Systems,
- Software Engineering

Knowledge and Information Systems:

- Artificial Intelligence,
- Data Base Systems,
- Office Automation

Theory:

- Analysis of Algorithms,
- Autonoma & Computability,
- Programming Language Semantics,
- Specification & Verification

4.2d. The exam areas are defined by reading lists. (See paragraph 4.2e.) You must prepare for the topics specified in the reading lists. The general scope of each area will align with a primary graduate course in each area; however, the reading lists will include some items that go beyond the primary graduate course.

4.2e. Preliminary examinations can be scheduled for either September or January. The reading lists will be available from the Graduate Studies Secretary the preceding April 1st or October 1st. You must make a written request to the Graduate Studies Committee by April 15th or October 15th to schedule your exams for the next September or January.

4.2f. The Graduate Studies Committee specifies the exam formats. Usually, the preliminary exams are 4 hours each, scheduled for 3 successive Saturday mornings. (The comprehensive exam is a five hour, closed-book exam.)

4.2g. The preliminary exams are graded by the respective faculty members who prepared them. An exam may be graded as "pass," "fail," or "conditional pass" subject to further work. If exactly one of the three exams is graded "fail," you must retake and pass that exam the next time that exams are offered. If two or more of the exams are graded "fail," you must retake and pass exams in the same three areas the next time that exams are offered. You are allowed only one retake of an exam. If you fail an exam twice, you must leave the PhD program. (The comprehensive exam can be retaken only once. If the comprehensive exam is failed twice, you must leave the PhD program.)

4.2h. The final phase of the preliminary exams is the oral exam. The oral exam occurs about a month after your written exams are graded. The format of the oral exam is set by your supervisory committee. The oral exam might cover questions of general knowledge in computer science, specific questions from your written exams, or topics in your field of research. The result of your oral exam is decided by the supervisory committee, who can vote "pass" or "fail." The committee may also decide that you must retake the oral exam a second time. You must pass the oral exam by the second try, or you must leave the PhD program.

4.2i. The Graduate School must be informed of the outcome of the preliminary exams. When you have completed two-thirds of your PhD coursework and have taken (or will soon take) your preliminary exams,

ask the Graduate School to issue the ballot for the preliminary exams. The Graduate School will send the ballot to the Department, which then reports the results to the Graduate School. Upon passing the preliminary examinations you are admitted to *candidacy for the PhD degree*.

#### 4.3. The Dissertation Research

4.3a. Once you pass the preliminary exams, you must write a *research proposal* of your dissertation research. Your proposal must present background concepts and literature, it should define the topic and goal of your research, and it should identify how you will evaluate successful completion of the goal. You must meet with your supervisory committee and present your proposal. The committee must approve your proposal.

4.3b. You must work closely with your advisor on your research, and you must write a *dissertation*.

4.3c. You must successfully defend your dissertation, subject to the following conditions:

4.3c.i. You must have been a candidate for the PhD degree for at least seven months.

4.3c.ii. You must obtain a dissertation approval form from the Graduate School. You must give each member of the supervisory committee, including the appointed Chairperson of your final examination, a copy of your dissertation and have each member sign the form.

4.3c.iii. You must allow the committee at least two weeks to read your dissertation prior to your final examination. (See Paragraph 4.3c.iv.)

4.3c.iv. You must schedule your oral presentation and defense of your dissertation (also called the *final examination*) with the Graduate School. (After you give the Graduate School the signed dissertation approval form, they will issue a ballot to the Chairperson of your final exam.)

4.3c.v. You must arrange with the Department secretary to schedule a room and to make public announcement of the time, place, and title of your presentation.

4.3c.vi. You must present the dissertation to your supervisory committee in an open seminar, and the committee votes to "pass" the dissertation. If the committee votes to "fail," then you are allowed one retake of the defense.

4.3c.vii. If you pass the defense, you must submit the required dissertation copies, fees, and address information to the Graduate School.

4.3d. Finally, you must submit for publication at least one paper based upon your research. You must present the paper to the Computing and Information Sciences Department in an open seminar.

#### 5. Unresolved Issues

5a. Any issues not covered in this document will be resolved by the Graduate Studies Committee and the Computing and Information Sciences Faculty.

