

APPLIED COMPUTER SCIENCE (ACS)

Updated March 15, 2013

Note: The department/program code ACS replaces the former codes 92 and 91. Students cannot hold credit in ACS-xxxx and the former 92.xxxx or 91.xxxx having the same course number (e.g., ACS-1803(3) and 92.1803(3) or 91.1803(3)).

Chair: Professor S. Liao; Professors: Y. Chen, S. Ramanna; Associate Professor: P. Atrey; Assistant Professors: C. Henry, R. McFadyen; Instructors: J. Deng, E. Kaluzniacký.

<http://www.acs.uwinnipeg.ca>

DEGREES/PROGRAMS OFFERED

3-Year BA

4-Year BA

3-Year BA (Information Systems Stream)

3-Year BA (Health Informatics Stream)

3-Year BSc

4-Year BSc

Honours BSc

3-Year BSc (Information Systems Stream)

3-Year BSc (Health Informatics Stream)

Master of Science (MSc)

INTRODUCTION

The Applied Computer Science major is designed to prepare students in the following core areas: Programming Fundamentals (object-oriented, event driven, algorithms), Information Management (database systems, data modeling, data warehousing, relational databases, query languages), Software Engineering (software requirements and design, software process, software project management), Operating Systems, Net-Centric Computing (internet programming, networks, security), Human Computer Interaction (GUI Design and Programming), Intelligent Systems (Machine Learning).

Our team-oriented courses are meant to strengthen communication skills, experience group dynamics, and foster self-confidence. The 4-year major includes the development of a team-based software project for a local IT organization. Our program will help develop analytical thinking and applied skills by blending theoretical and practical aspects of computer science.

The Applied Computer Science program can lead to a Bachelor of Science (3-year, 4-year, or Honours) or a Bachelor of Arts (3-year or 4-year). This major is focused in theories, professionalism, and fundamental computing knowledge. We recommend the four-year degree programs due to the greater depth of study. Additionally, there are two streams: Information Systems and Health Informatics. The Applied Computer Science major is designed to provide an excellent basis for graduate studies in either computer science or applied computing.

The **Information Systems stream** leads to a Bachelor of Science (3-year) or a Bachelor of Arts (3-year). The Information Systems (IS) stream is aimed at students interested in focusing on information and business needs of IT industry. The new stream is intended to prepare students in information oriented courses, and also in system and internet based technologies.

The **Health Informatics stream** leads to a Bachelor of Science (3-year) or a Bachelor of Arts (3-year). The Health Informatics (HI) stream provides students with more focused courses in Health information needs, infrastructure, standards, and jurisdiction. The HI stream complements offerings of the ACS department, and gives students flexibility of combining all three areas of IT, Business, and Health.

Students pursuing a 3-year or 4-year BSc in Applied Computer Science, including the IS and HI Streams, have the opportunity to take a **Business Stream** (see the "Science with a Business Stream" section of this Course Calendar).

The Applied Computer Science program is designed to provide an excellent basis for graduate studies in computer science, information sciences, or interdisciplinary areas such as Biostatistics.

The Department offers a **Masters Degree in Applied Computer Science and Society**.

REQUIREMENTS FOR A 3-YEAR BA/BSc IN APPLIED COMPUTER SCIENCE

ADMISSION REQUIREMENT Pre-Calculus Mathematics 40S or Applied Mathematics 40S.

GRADUATION REQUIREMENT 90 credit hours

RESIDENCE REQUIREMENT

Degree: Minimum 30 credit hours
Major: Minimum 18 credit hours

GENERAL DEGREE REQUIREMENT

Humanities: 12 credit hours in Humanities
Science: 6 credit hours in Science for BA
18 credit hours in Science for BSc
Writing: Minimum 3 credit hours of Academic Writing.
Maximum Introductory Courses: Students may use a maximum of 42 credit hours at the 1000 level. Of these, a maximum of 6 credit hours may be below the 1000 level.
Distribution: Minimum three (3) credit hours from each of five (5) different subjects.

MAJOR REQUIREMENT

Single Major: Minimum 36 credit hours/Maximum 48 credit hours in the Major subject.
Major courses are those in Required Courses and Electives.
Double Major: 36 credit hours in ACS, plus number of credit hours specified by other Major subject or program

Required courses:

MATH-1401(3) Discrete Mathematics	ACS-2913(3) Software Requirements Analysis and Design
STAT-xxxx(3) 3 credit hours from Statistics	ACS-2914(3) Relational Database Application Development
Either	ACS-2941(3) Unix
ACS-1903(3) Programming Fundamentals I and	OR
ACS-1904(3) Programming Fundamentals II	ACS-3911(3) Computer Networks
OR	OR
ACS-1905(3) Programming Fundamentals and one of the courses from the electives listed below.	ACS-3931(3) Principles of Operating Systems
ACS-2906(3) Computer Architecture and System Software	ACS-2947(3) Data Structures and Algorithms
ACS-2909(3) Internet Programming	ACS-3902(3) Database Systems
	ACS-3913(3) Software Design and Architecture

Electives: Students wishing to take further courses towards the General degree with the Applied Computer Science Major should take up to 12 credit hours from the following:

ACS-1803(3) Introduction to Information Systems	ACS-3916(3) Human Computer Interaction
ACS-2102(3) Scientific Computing I: Programming Fundamentals in C	ACS-3921(3) / 4921(3) Computer Security and Privacy
ACS-2916(3) Business Application Systems	ACS-3923(3) Technical Writing
ACS-2951(3) System Administration and Networking	ACS-3930(3) Topics in Applied Computer Science
ACS-3901(3) Principles of Software Project Management	ACS-3941(3) Implementation Issues in Object Oriented Languages
ACS-3907(3) eCommerce	ACS-3947(3) Algorithm Design
ACS-3908(3) Introduction to Perl	ACS-4904(3) Data Warehousing
ACS-3909(3) Advanced Internet Programming	ACS-4953(3) Introduction to Machine Learning
	BUS-2002(3) Introduction to Financial Accounting

Combined Major: Minimum 48 credit hours from two (2) different majors with not less than 18 credit hours from each major subject.

Required courses:

ACS-1903(3) Programming Fundamentals I
ACS-1904(3) Programming Fundamentals II
ACS-2814(3) Application of Database Systems
ACS-2909(3) Internet Programming
ACS-2913(3) Software Requirements Analysis and Design

Additional Information:

Students are strongly advised to take more than 36 credit hours in Applied Computer Science.
Students who wish to strengthen their business background are advised to take courses in Administrative Studies.

Red River College

The Department of Applied Computer Science welcomes the transfer of Red River College students into the 3-Year Applied Computer Science program. The University of Winnipeg will grant a total of 30 credit hours in transfer credits to Red River College students who have successfully completed the Computer Analyst/Programmer (CAP) or the Information Systems Technology (IST)

2-year Diploma programs with an average of C+ (2.5 GPA) or better. These credits can be applied to either a Science or an Arts degree. Further details regarding the transfer of credits and course requirements are available from the Department of Applied Computer Science or from Student Services at the University of Winnipeg. Those who wish to pursue a 4-year major need to consult the Chair of the department.

REQUIREMENTS FOR A 3-YEAR BA/BSc (INFORMATION SYSTEMS STREAM)

ADMISSION REQUIREMENT Essential/Consumer Math, Pre-Calculus Math 40s or Applied Math 40s.

GRADUATION REQUIREMENT 90 credit hours

RESIDENCE REQUIREMENT

Degree: Minimum 30 credit hours
Major: Minimum 18 credit hours

GENERAL DEGREE REQUIREMENT

Humanities: 12 credit hours in Humanities
Science: 6 credit hours in Science for BA
18 credit hours in Science for BSc
Writing: Minimum 3 credit hours of Academic Writing.
Maximum Introductory Courses: Students may use a maximum of 42 credit hours at the 1000 level. Of these, a maximum of 6 credit hours may be below the 1000 level.
Distribution: Minimum three (3) credit hours from each of five (5) different subjects.

MAJOR REQUIREMENT

Single Major: Minimum 36 credit hours/Maximum 48 credit hours in the Major subject.
Major courses are those in Required Courses and Electives.
Double Major: 30 or 36 credit hours in each Major subject or program, as specified.

Required courses:

Year 1 courses: 9 credit hours

ACS-1803(3) Introduction to Information Systems
ACS-1805(3) Introduction to Programming **and**
ACS-1903(3) Programming Fundamentals I
OR
ACS-1903(3) Programming Fundamentals I **and**
ACS-1904(3) Programming Fundamentals II
OR
ACS-1905(3) Programming Fundamentals **and** one of the ACS courses at 2000 level or above

Year 2 courses: 12 credit hours

ACS-2814(3) Applications of Database Systems
OR
ACS-2914(3) Relational Database Application Development
ACS-2909(3) Internet Programming
ACS-2913(3) Software Requirements Analysis and Design
ACS-2916(3) Business Application Systems

Year 3 courses: 15 credit hours

ACS-3801(3) Principles in Information Systems
OR
ACS-3901(3) Principles of Software Project Management
ACS-3811(3) Telecommunications
OR
ACS-3911(3) Computer Networks
ACS-3816(3) User Interfaces for Information Systems
OR
ACS-3916(3) Human Computer Interaction
ACS-3907(3) eCommerce
ACS-3923(3) Technical Writing
OR
ACS-3830(3) Topics in Information Systems
OR
ACS-3902(3) Database Systems

Electives: Students wishing to take further ACS courses towards the General degree with the Information Systems stream may take a maximum of 12 credit hours from the following:

ACS-2941(3) Unix
ACS-3830(3) Topics in Information Systems
ACS-3902(3) Database Systems
ACS-3909(3) Advanced Internet Programming
ACS-3913(3) Software Design and Architecture

Additional Electives: The following courses may also be of interest to students in this program:

Business and Administration

BUS-1201(3) Introduction to Business I
BUS-1202(3) Introduction to Business II
BUS-2002(3) Fundamentals of Financial Accounting
BUS-2003(3) Introduction to Managerial Accounting
BUS-2103(3) Fundamentals of Organizational Behaviour
BUS-2210(3) Fundamentals of Marketing
BUS-2501(3) Fundamentals of Production and Operational Management

Economics

ECON-1104(3) Introduction to Economic Theory

Mathematics and Statistics

MATH-1102(3) Basic Calculus
MATH-1201(3) Linear Algebra I
MATH-1401(3) Discrete Mathematics
STAT-xxxx(3) any course in Statistics

REQUIREMENTS FOR A 3-YEAR BA/BSc (HEALTH INFORMATICS STREAM)

ADMISSION REQUIREMENT Essential/Consumer Math, Pre-Calculus Math 40s or Applied Math 40s

GRADUATION REQUIREMENT 90 credit hours

RESIDENCE REQUIREMENT

Degree: Minimum 30 credit hours
Major: Minimum 18 credit hours

GENERAL DEGREE REQUIREMENT

Humanities: 12 credit hours in Humanities
Science: 6 credit hours in Science for BA
18 credit hours in Science for BSc
Writing: Minimum 3 credit hours of Academic Writing.
Maximum Introductory Courses: Students may use a maximum of 42 credit hours at the 1000 level. Of these, a maximum of 6 credit hours may be below the 1000 level.
Distribution: Minimum three (3) credit hours from each of five (5) different subjects.

MAJOR REQUIREMENT

Single Major: Minimum 36 credit hours/Maximum 48 credit hours in the Major subject.
Major courses are those in Required Courses and Electives.
Double Major: 30 or 36 credit hours in each Major subject or program, as specified.

Required courses:

Year 1 courses: 12 credit hours

ACS-1803(3) Introduction to Information Systems
ACS-1805(3) Introduction to Programming **and**
ACS-1903(3) Programming Fundamentals I
OR
ACS-1903(3) Programming Fundamentals I **and**
ACS-1904(3) Programming Fundamentals II
OR
ACS-1905(3) Programming Fundamentals **and**
one of the ACS courses at 2000 level or above
ACS-1809(3) Web Design and Development

Year 2 courses: 12 credit hours

ACS-2814(3) Applications of Database Systems
OR
ACS-2914(3) Relational Database Application
Development
ACS-2816(3) Health Information Systems
ACS-2909(3) Internet Programming

ACS-2913(3) Software Requirements Analysis and
Design

Year 3 courses: 12 credit hours

ACS-3801(3) Principles in Information Systems
(Health Centric)
OR
ACS-3901(3) Principles of Software Project
Management
ACS-3816(3) User Interfaces for Information Systems
OR
ACS-3916(3) Human Computer Interaction
ACS-3830(3) Topics in Information Systems
(Health Centric)
OR
ACS-3700(3) Health Internship
ACS-3923(3) Technical Writing
OR
ACS-3901(3) Database Systems

Electives: Students wishing to take further ACS courses towards the General degree with the Health Information Systems stream may take a maximum of 12 credit hours from the following. Please note that some of these courses may have additional prerequisites.

ACS-2916(3) Business Application Systems
ACS-2941(3) UNIX
ACS-3902(3) DataBase Systems
ACS-3907(3) eCommerce
ACS-3909(3) Advanced Internet Programming
ACS-3811(3) Telecommunications
OR
ACS-3911(3) Computer Networks
ACS-3913(3) Software Design and Architecture

Additional Electives: The following courses may also be of interest to students in this program:

Business and Administration

BUS-2002(3) Fundamentals of Financial Accounting
BUS-2003(3) Introduction to Managerial Accounting
BUS-2103(3) Fundamentals of Organizational
Behaviour
BUS-2210(3) Fundamentals of Marketing
BUS-2501(3) Fundamentals of Production and
Operational Management

Economics

ECON-1104(3) Introduction to Economic Theory

Geography

GEOG-1102(3) Introductory Human Geography –
People, culture and environment

Kinesiology		SOC-2125(3)	Introduction to Research Design and Qualitative Research
KIN-2304(3)	Scientific Principles of Fitness and Conditioning		
KIN-2501(3)	Nutrition for Health and Wellness	Statistics	
		STAT-1501(3)	Elementary Biological Statistics I
Psychology		Conflict Resolution Studies	
PSYC-2700(3)	Introduction to Clinical Psychology	CRS-1200(6)	Introduction to Conflict Resolution Studies
		CRS-2210(3)	Conflict Theory and Analysis
Sociology			

REQUIREMENTS FOR A 4-YEAR BA IN APPLIED COMPUTER SCIENCE

ADMISSION REQUIREMENT	Students must consult with the Department 4-Year Advisor in planning their studies. Students must have minimum 30 credit hours completed previously.
GRADUATION REQUIREMENT	120 credit hours
RESIDENCE REQUIREMENT	
Degree:	Minimum 60 credit hours
Major:	Minimum 30 credit hours
GENERAL DEGREE REQUIREMENT	
Humanities:	12 credit hours
Science:	6 credit hours
Social Science:	12 credit hours
Writing:	Minimum 3 credit hours of Academic Writing.
Maximum Introductory Courses:	Students may use a maximum of 42 credit hours at the 1000 level. Of these, a maximum of 6 credit hours may be below the 1000 level.
Distribution:	Minimum three (3) credit hours from each of five (5) different subjects.
MAJOR REQUIREMENT	
Single Major:	Minimum 57 credit hours/Maximum 66 credit hours. Major courses are those listed in Groups I and II in below.
Cognates:	Minimum of 18 credit hours, maximum of 36 credit hours from Group III. Maximum total of cognate and major courses is 84 credit hours combined.
Required/Electives courses:	Group I. See the 4-Year BSc Requirements. Group II. See the 4-year BSc Requirements. Group III. A total of 18 credit hours must be chosen from at most three departments that offer a BA. Of these, 6 credits must be at least at the 2000 level or above. You are strongly advised to consult the Chair or the 4-Year Advisor prior to taking any Group III courses.
Combined Major:	Minimum 60 credit hours from two different majors with not less than 24 credit hours from each major subject.
Prescribed courses:	
ACS-1903(3)	Programming Fundamentals I
ACS-1904(3)	Programming Fundamentals II
ACS-2814(3)	Applications of Database Systems
ACS-2909(3)	Internet Programming
ACS-2913(3)	Software Requirements Analysis and Design

REQUIREMENTS FOR A 4-YEAR BSc IN APPLIED COMPUTER SCIENCE

ADMISSION REQUIREMENT	Students must consult with the Department 4-Year Advisor in planning their studies. Students must have minimum 30 credit hours completed previously.
GRADUATION REQUIREMENT	120 credit hours, that is, 90 credit hours meeting the requirements for the BA or BSc General plus 30 credit hours of additional credit hours.
RESIDENCE REQUIREMENT	
Degree:	Minimum 60 credit hours
Major:	Minimum 30 credit hours
GENERAL DEGREE REQUIREMENT	
Humanities:	12 credit hours
Science:	6 credit hours
Writing:	Minimum 3 credit hours of Academic Writing.
Maximum Introductory Courses:	Students may use a maximum of 42 credit hours at the 1000 level. Of these, a maximum of 6 credit hours may be below the 1000 level.
Distribution:	Minimum three (3) credit hours from each of five (5) different subjects.

MAJOR REQUIREMENT

Single Major:

Minimum 57 credit hours/Maximum 78 credit hours.
Major courses are those listed in Groups I and II below.
18 credit hours in Group III.

Required courses:

Group I:

MATH-1401(3) Discrete Mathematics
STAT-xxxx(3) 3 credit hours from Statistics

Either

ACS-1903(3) Programming Fundamentals I **and**

ACS-1904(3) Programming Fundamentals II

OR

ACS-1905(3) Programming Fundamentals **and**
one of the courses at 2000 level or above from the Group
II electives.

ACS-2906(3) Computer Architecture and System
Software

ACS-2909(3) Internet Programming

ACS-2913(3) Software Requirements Analysis and
Design

ACS-2914(3) Relational Database Application
Development

ACS-2947(3) Data Structures and Algorithms

ACS-3901(3) Principles of Software Project
Management

ACS-3902(3) Database Systems

ACS-3911(3) Computer Networks

OR

ACS-3931(3) Principles of Operating Systems

ACS-3913(3) Software Design and Architecture

ACS-3916(3) Human Computer Interaction

ACS-4901(6) Senior Systems Development Project

Select 9 credits from the following list:

ACS-3909(3) Advanced Internet Programming

ACS-4902(3) Advanced Database Systems

ACS-4904(3) Data Warehousing

OR

ACS-4906(3) Conceptual Modelling

ACS-4953(3) Introduction to Machine Learning

ACS-4954(3) Introduction to Distributed Systems

Group II Electives: Students wishing to take further courses towards the 4-Year Degree should take up to 21 credit hours from the following:

MATH-1201(3) Linear Algebra 1

ACS-1803(3) Introduction to Information Systems

ACS-1805(3) Introduction to Programming

ACS-2916(3) Business Application Systems

ACS-2941(3) Unix

ACS-2951(3) System Administration and Networking

ACS-3907(3) eCommerce

ACS-3908(3) Introduction to Perl

ACS-3921(3) /

4921(3) Computer Security and Privacy

ACS-3923(3) Technical Writing

ACS-3930(3) Topics in Applied Computer Science

ACS-3941(3) Implementation Issues in Object-

Oriented Languages

ACS-3947(3) Algorithm Design

ACS-4930(6) Research Project in Applied Computer
Science

ACS-4931(3) Research Project in Applied Computer
Science

Group III Other Courses: A total of 18 credit hours must be chosen from at most three of the following departments: Business and Administration, Biology, Chemistry, Geography, Physics, Mathematics and Statistics. Of these, 6 credits must be at least at the 2000 level or above. You are strongly advised to consult the Chair or the 4-Year Advisor prior to taking any Group III courses.

Additional Courses:

- Students wishing to take further courses towards the 4-Year degree may select additional Applied Computer Science courses not already taken from Group II listed above.
- Students are encouraged to take more than 57 credit hours in Applied Computer Science.
- Students wishing to take ACS-2916(3) Business Application Systems must complete ACS-1803(3).
- Students wishing to take ACS-4954(3) Introduction to Distributed Systems are encouraged to take ACS-2941(3) or ACS-2951(3).
- Students wishing to pursue the 4-Year degree must consult with the Chair of Applied Computer Science and complete a 4-Year declaration form before registering for their eleventh course (63rd credit hour).

Combined Major:

Minimum 60 credit hours from two different majors with not less than 24 credit hours from each major subject.

Prescribed courses:

ACS-1903(3) Programming Fundamentals I

ACS-1904(3) Programming Fundamentals II

ACS-2814(3) Applications of Database Systems

ACS-2909(3) Internet Programming

ACS-2913(3) Software Requirements Analysis and Design

REQUIREMENTS FOR THE BSc (HONOURS) IN APPLIED COMPUTER SCIENCE

ADMISSION REQUIREMENT

Students must consult with and have the approval of the Department Chair or Chair-designate in planning their studies.
Students must have completed 30 credit hours.

GRADUATION REQUIREMENT 120 credit hours.

GRADUATION GPA REQUIREMENT To graduate with a BSc (Honours), students must have a minimum GPA of 3.0 in all major (Applied Computer Science) courses which will be calculated on all course attempts in the major, and a minimum GPA of 2.75 in all non-major courses which will be calculated as for the general degree.

RESIDENCE REQUIREMENT

Degree: Minimum 60 credit hours
Honours: Minimum 30 credit hours, including 18 credit hours at the upper level (3000/4000) of which a minimum of 9 credit hours are at the 4000 level.

GENERAL DEGREE REQUIREMENT

Humanities: 12 credit hours
Writing: Minimum 3 credit hours of Academic Writing.
Maximum Introductory Courses: Students may use a maximum of 42 credit hours at the 1000 level. Of these, a maximum of 6 credit hours may be below the 1000 level.
Minimum three (3) credit hours from each of five (5) different subjects.

HONOURS REQUIREMENT

Single Honours: Minimum 60 credit hours in the Major.
Minimum 30 credit hours in the courses listed in Groups I at the upper level (3000/4000) of which a minimum of 15 credit hours must be at the 4000 level.

Required courses:

Group I:

MATH-1401(3) Discrete Mathematics
STAT-xxxx(3) 3 credit hours from Statistics

Either

ACS-1903(3) Programming Fundamentals I and
ACS-1904(3) Programming Fundamentals II

OR

ACS-1905(3) Programming Fundamentals and one of the courses at 2000 level or above from the Group II electives.
ACS-2906(3) Computer Architecture and System Software
ACS-2909(3) Internet Programming
ACS-2913(3) Software Requirements Analysis and Design
ACS-2914(3) Relational Database Application Development
ACS-2947(3) Data Structures and Algorithms
ACS-3901(3) Principles of Software Project Management

ACS-3902(3) Database Systems
ACS-3911(3) Computer Networks
OR
ACS-3931(3) Principles of Operating Systems
ACS-3913(3) Software Design and Architecture
ACS-3916(3) Human Computer Interaction
ACS-4901(6) Senior Systems Development Project

Minimum 9 credit hours selected from the following courses:

ACS-4902(3) Advanced Database Systems
ACS-4904(3) Data Warehousing
OR
ACS-4906(3) Conceptual Modelling
ACS-4953(3) Introduction to Machine Learning
ACS-4954(3) Introduction to Distributed Systems

Group II Electives

MATH-1201(3) Linear Algebra 1
ACS-1803(3) Introduction to Information Systems
ACS-1805(3) Introduction to Programming
ACS-2102(3) Scientific Computing I: Programming Fundamentals in C
ACS-2916(3) Business Application Systems
ACS-2941(3) Unix
ACS-2951(3) System Administration and Networking
ACS-3907(3) eCommerce
ACS-3908(3) Introduction to Perl
ACS-3909(3) Advanced Internet Programming

ACS-3921(3) / 4921(3) Computer Security and Privacy
ACS-3923(3) Technical Writing
ACS-3930(3) Topics in Applied Computer Science
ACS-3941(3) Implementation Issues in Object-Oriented Languages
ACS-3947(3) Algorithm Design
ACS-4930(6) Research Project in Applied Computer Science
ACS-4931(3) Research Project in Applied Computer Science

Students must complete an Honours BSc degree form available at the department office.

Any additional 3 credit courses in Group I or Group II except first year courses.

GENERAL INFORMATION

Prerequisites

Students are advised to pay attention to the prerequisites for each Applied Computer Science course when planning a program of study. Students can visit the department website for more guidance.

Prerequisites are waived only in the case of clearly demonstrated equivalent knowledge. Only the Department Chair has the authority to grant prerequisite waivers.

Admission to Applied Computer Science Courses

Students are advised that a priority admission procedure may be used in the event that enrolments in Applied Computer Science courses are limited. For all courses, previous overall academic performance may be considered. For 2000-, 3000-, and 4000-level courses, grades achieved in prerequisite courses may also be considered.

Priority for entry into **ACS-4901(6)** will be given to students who require the course for graduation in the 4-Year degree program. Only the Chair of the department has the authority to admit students to courses that are full.

Graduate Studies

Students planning to continue with graduate studies are advised to consult with the Department before entering Year 2 of their studies.

Course Substitutions

Applied Computer Science courses were formerly numbered in the **32(MATH).xxxx** series and **92/91(BUSC).xxxx**. All courses with **32(MATH).xxxx** and **92/91(BUSC).xxxx** numbers may be substituted for corresponding **ACS-xxxx** numbers in meeting degree requirements.

COURSE LISTINGS

Students should consult WebAdvisor or the Timetable on the website for courses to be offered in an upcoming term.

ACS-1453(3)	Introduction to Computers	ACS-3902(3)	Database Systems
ACS-1803(3)	Introduction to Information Systems	ACS-3907(3)	eCommerce
ACS-1805(3)	Introduction to Programming	ACS-3908(3)	Introduction to Perl
ACS-1809(3)	Website Design and Development	ACS-3909(3)	Advanced Internet Programming
ACS-1903(3)	Programming Fundamentals I	ACS-3911(3)	Computer Networks
ACS-1904(3)	Programming Fundamentals II	ACS-3913(3)	Software Design and Architecture
ACS-1905(3)	Programming Fundamentals	ACS-3916(3)	Human Computer Interaction
ACS-2102(3)	Scientific Computing I: Programming Fundamentals in C	ACS-3921(3) / 4921(3)	Computer Security and Privacy
ACS-2814(3)	Applications of Database Systems	ACS-3923(3)	Technical Writing
ACS-2816(3)	Health Information Systems	ACS-3930(3)	Topics in Applied Computer Science
ACS-2906(3)	Computer Architecture and System Software	ACS-3931(3)	Principles of Operating Systems
ACS-2909(3)	Internet Programming	ACS-3941(3)	Implementation Issues in Object Oriented Languages
ACS-2913(3)	Software Requirements Analysis and Design	ACS-3947(3)	Algorithm Design
ACS-2914(3)	Relational Database Application Development	ACS-4901(6)	Senior Systems Development Project
ACS-2916(3)	Business Application Systems	ACS-4902(3)	Advanced Database Systems
ACS-2941(3)	Unix	ACS-4904(3)	Data Warehousing
ACS-2947(3)	Data Structures and Algorithms	ACS-4906(3)	Conceptual Modelling
ACS-2951(3)	System Administration and Networking	ACS-4930(6)	Research Project in Applied Computer Science
ACS-3700(3)	Health Internship	ACS-4931(3)	Research Project in Applied Computer Science
ACS-3801(3)	Principles in Information Systems	ACS-4953(3)	Introduction to Machine Learning
ACS-3811(3)	Telecommunications	ACS-4954(3)	Introduction to Distributed Systems
ACS-3816(3)	User Interfaces for Information Systems		
ACS-3830(3)	Topics in Information Systems		
ACS-3901(3)	Principles of Software Project Management		

COURSE DESCRIPTIONS

Students should consult WebAdvisor or the Timetable on the website for courses to be offered in an upcoming term.

ACS-1453(3) INTRODUCTION TO COMPUTERS (Le3)

This course will introduce students to the basic concepts of computers: types of computers, hardware, software, and types of application systems. Students will receive instruction in a variety of software intended for personal use. Software used will include word processing, spreadsheets, databases, charting and graphing tools, and common Internet clients and resources. There will be an extensive laboratory component.

Note: This course does not apply toward the Major in Applied Computer Science.

ACS-1803(3) INTRODUCTION TO INFORMATION SYSTEMS (Le3)

This course examines applications of

information technology to businesses and other organizations. After an introduction to computers and data management, the course outlines various categories of information systems, (e.g., systems for transaction processing, managerial reporting, customer relationship management, decision support, enterprise resource planning, and e-commerce), with examples from current practice. System development, system security, systems consulting, and IT administration are also discussed. Focus is mostly on functional aspects of systems providing a valuable background for students in applied computer science, business and administration, and other disciplines. Students who require an introduction to personal computers and productivity software should take ACS-1453.

ACS-1805(3) INTRODUCTION TO PROGRAMMING (Le3, La1) This course covers elementary procedural programming concepts. Topics include: primitive data types and their manipulation, basic input and output and elementary control structures. In addition, topics related to a specific programming paradigm that is chosen for the course is covered. Students will gain hands-on programming experience in the laboratory component of the course.

ACS-1809(3) WEBSITE DESIGN AND DEVELOPMENT (Le3) This course introduces students to the concepts, programming skills, and tools related to website design and development. The topics include: website layout; creating tables, frames, menus and forms; presenting multimedia on web pages; and Internet Protocols such as HTTP and FTP. Students gain hands-on programming experience in designing websites using HTML and Cascading Style Sheets.

ACS-1903(3) PROGRAMMING FUNDAMENTALS I (Le3, La1) This course introduces fundamental programming concepts using an object-oriented programming language. Topics to be covered include primitive data types and their manipulation, control structures, classes, objects and arrays.
PREREQUISITES: Pre-Calculus Mathematics 40S or Applied Mathematics 40S or a grade of at least C in ACS-1805.

ACS-1904(3) PROGRAMMING FUNDAMENTALS II (Le3, La1) This course examines more advanced programming concepts using an object-oriented programming language. Topics to be covered include inheritance, polymorphism, sorting techniques, string processing, interfaces, files and packages.
PREREQUISITES: A grade of at least C in ACS-1903(3).
RESTRICTIONS: Students may not receive credit in this course and the former 92/91.1902(3).

ACS-1905(3) PROGRAMMING FUNDAMENTALS (Le3, La1) This course assumes that students already have working knowledge of an object-oriented programming language as well as effective use of data types and control structures. This course begins with an overview of the object-oriented programming language and then more advanced topics in order to extend the student's programming skill. Topics to be covered include inheritance, polymorphism, sorting techniques, string processing, interfaces, files and packages.
PREREQUISITES: A minimum grade of 75 (or equivalent) in Computer Science 40S plus one of Pre-Calculus Mathematics 40S, Applied Mathematics 40S or a grade of at least C in ACS-1805.
RESTRICTIONS: Students may not receive credit in this course and in any of ACS-1903(3), ACS-1904(3) or the former 92/91.1901(3) and 92/91.1902(3).

ACS-2102(3) SCIENTIFIC COMPUTING I: PROGRAMMING FUNDAMENTALS IN C (Le3) Many problems arising in science are too difficult to solve analytically, and thus require analysis of some form by a computer. Using the language of C/C++, this course introduces the most common programming constructs used in scientific computing. The critical importance of data structures to represent information is emphasized, which naturally leads to an object-oriented approach to problem solving. The use of external libraries, such as those for numerical analysis, to solve more advanced problems are explored, with attention paid to checks that can be made on the reliability of the results.
CROSS-LISTED: PHYS-2102(3).

ACS-2814(3) APPLICATIONS OF DATABASE SYSTEMS (Le3, La1) This course introduces students with limited

computing experience to the principles of data management. The emphasis is on practical database experience reinforced through assignments and weekly laboratory work. Students learn first to work with a workstation-based database system and subsequently they are introduced to the design of databases and their implementation in relational systems. Topics include tables, queries, forms, reports, importing and exporting data, structured query language, entity relationship models, the relational data model, and normalization of databases. Examples, assignments, and laboratory work are drawn from a variety of different disciplines.
RESTRICTIONS: Cannot be held with ACS-2914(3).

ACS-2816(3) HEALTH INFORMATION SYSTEMS (Le3) This course provides an overview of the important topics in Health Informatics. It discusses data as the building block for health care information including the basic concepts of data flow, data storage, and health record management within both private and public health care systems. It then addresses important issues such as security, privacy, and standards.
PREREQUISITES: A grade of at least C in ACS-1803(3) or permission of Department Chair.

ACS-2906(3) COMPUTER ARCHITECTURE AND SYSTEM SOFTWARE (Le3, La1) The course begins with discussions of the architecture of computer hardware and progresses to an examination of system software, including its relationship to the hardware, its structure and design, and its impact on application software, system developers, and end-users. Operating system concepts such as memory management, process management, and I/O sub-systems will be covered. Other topics include language processors, system utilities, security issues, and performance management. The course provides students a hands-on experience of programming at different levels such as high level, assembly, and machine code.
PREREQUISITES: A grade of at least C in ACS-1904(3) or ACS-1905(3).
Co-REQUISITES: MATH-1401(3).

ACS-2909(3) INTERNET PROGRAMMING (Le3) This course provides students with an overview of Internet and World Wide Web programming, development tools, resources, utilities, multimedia, and security issues. Students gain hands-on experience in a scripting language such as JavaScript, Rich Internet Applications (RIAs), Web services, and Mobile Application Development. Students not familiar with HTML and CSS are strongly encouraged to take ACS-1809(3).
PREREQUISITES: A grade of at least C in ACS-1903(3) or ACS-1905(3).

ACS-2913(3) SOFTWARE REQUIREMENTS ANALYSIS AND DESIGN (Le3) This course introduces students to the requirements definition phase of software development. It provides coverage of both traditional and object-oriented approaches to requirements analysis and design of software used in business, real-time and embedded applications. Models, notations and processes for requirements elicitation, representation, and design are discussed.
PREREQUISITES: A grade of at least C in ACS-1903(3) or ACS-1905(3).
RESTRICTIONS: Students cannot hold credit in ACS-2913(3) and ACS-2911(3) and/or ACS-2912(3).

ACS-2914(3) RELATIONAL DATABASE APPLICATION DEVELOPMENT (Le3, La1) This course is an introduction to Relational Database Management Systems. It serves to provide students with an overview of the relational model and to give students practical experience using a modern desktop database management system. Students are introduced to topics such as the relational data model, entity-

relationship modelling, business rules, normalization, and database design. The course has a strong focus on practical issues in database application development. Students will gain considerable hands-on experience in application development involving tables, indexes, forms, reports, queries, data entry, updating, event-handling, security, and publishing of data on the Internet.

COREQUISITES: ACS-1904(3) or ACS-1905(3).

RESTRICTIONS: (ineligible students): Cannot be held with ACS-2814(3).

ACS-2916(3) BUSINESS APPLICATION SYSTEMS (Le3, La1) This course firstly presents structured models for business processes and data needed in common transaction processing systems such as order entry, invoicing, accounts receivable and payable, purchasing, inventory and general ledger. Also, system support for manufacturing (e.g., supply chain management, robotics), for marketing (e.g., sales force automation, customer relationship management), and for human resource management (e.g., candidate selection, collective bargaining support) is highlighted, and inter-system interfaces are considered. Large, organization-wide, integrated enterprise resource planning (ERP) systems are discussed in the context of a business case. System controls and security issues are outlined for the systems studied.

PREREQUISITES: A grade of at least C in ACS-1803(3).

ACS-2941(3) UNIX (Le3) This course provides students with advanced concepts and knowledge of Unix, one of the most widely used operating systems. The course introduces students to such topics as shells, filters and pipelines, the Unix file system, processes and job control, and Internet communications. Emphasis is placed on Unix shell programming, which provides valuable tools for developing powerful applications with a minimal amount of written code.

PREREQUISITES: A grade of at least C in ACS-1904(3) or ACS-1905(3) or the former 92/91.1902(3).

ACS-2947(3) DATA STRUCTURES AND ALGORITHMS (Le3, La1) This course introduces fundamental data structures using an object-oriented programming language. Topics to be covered include vectors, multidimensional arrays, linked lists, stacks, queues, trees, graphs, recursion and algorithms.

PREREQUISITES: A grade of at least C in ACS-1904(3) or ACS-1905(3).

CO-REQUISITES: MATH-1401(3).

ACS-2951(3) SYSTEM ADMINISTRATION AND

NETWORKING (Le3, La1) This course covers basic system administration issues of Unix and Windows operating systems (OS), principles of networking, and TCP/IP (the Internet). Students are introduced to topics such as system installation and maintenance, system, and network security and setting up different application servers such as web and SQL. Students will gain considerable hands-on experience in installing, managing, and trouble-shooting networks on the Linux and Windows platforms.

PREREQUISITES: A grade of at least C in ACS-2941(3).

ACS-3700(3) HEALTH INTERNSHIP (A,V) Health Internship is internship in a healthcare environment. The course facilitates professional working experience in a sponsoring health-related organization. Students will be evaluated by both the sponsor and a faculty member. Approval must be obtained from the supervising faculty member as well as from the Department Chair before enrolment.

PREREQUISITES: Students should normally have completed 30 credit hours in the Health Informatics Stream.

ADDITIONAL REQUIREMENTS: Department Chair's permission.

ACS-3801(3) PRINCIPLES IN INFORMATION SYSTEMS

(Le3) This course is the final course for the 3 year degree in the Information Systems stream. The course can provide integration (e.g., project management), or provide more depth in specific areas of Information Systems in order to address specific thematic needs.

PREREQUISITES: A grade of at least C in each of ACS-2814(3) or ACS-2914(3), ACS-2909(3), ACS-2913(3) and ACS-2916(3).

RESTRICTIONS: Students cannot hold credit in ACS-3901(3).

ADDITIONAL REQUIREMENT: Department Chair's permission.

ACS-3811(3) TELECOMMUNICATIONS (Le3) This course covers both analog and digital networks, including VLAN, LAN, WAN, Internet, mobile and wireless networks. Important issues like standards, protocols, security, quality of service, network management, and networked services are discussed.

PREREQUISITES: A grade of at least C in ACS-2913(3).

RESTRICTIONS: Students cannot hold credit in ACS-3911(3).

ACS-3816(3) USER INTERFACES FOR INFORMATION SYSTEMS (Le3)

This course introduces students to the principles of user interface design and provides an integrated design and development environment to implement the learned principles in an information system component. Topics include different types of input/output interfaces, user cognitive aspects, interface design, prototyping, and evaluation in an information system. A popular user interface development tool is introduced to illustrate the design concepts. Students obtain hands-on experience in this course through a course-end project.

PREREQUISITES: A grade of at least C in each of ACS-2814(3) and ACS-2909(3), or ACS-2909(3) and ACS-2914(3).

RESTRICTIONS: Cannot be held with ACS-3916(3).

ACS-3830(3) TOPICS IN INFORMATION SYSTEMS (Le3)

This course treats specific topics in various areas of Information Systems of interest to the students, faculty members, and industry partners. This course integrates practical experience with the study of information systems in large organizations. The course is specifically designed for Information Systems stream students entering the work force. Students learn the strict professional requirements like quality assurance, standard compliances, risk containments, and integration issues. The industry partner provides students with organizational level requirements and input.

PREREQUISITES: A grade of at least C in each of ACS-2814(3), ACS-2909(3), ACS-2913(3) and ACS-2916(3).

RESTRICTIONS: Students cannot hold credit in ACS-3901(3).

ADDITIONAL REQUIREMENT: Department Chair's permission.

ACS-3901(3) PRINCIPLES OF SOFTWARE PROJECT MANAGEMENT (Le3)

This course covers principles and techniques of software project management, with emphasis on the theoretical underpinnings of the competencies that are associated with software project management. The key concepts of project planning, organization, and control are covered. Specific topics covered include task breakdown; estimating, scheduling, and tracking; process and project metrics; change control; risk analysis and management; software quality and reliability models; quality assurance; and configuration management.

PREREQUISITES: A grade of at least C in ACS-1904, ACS-2913(3), (or the previous ACS-2911(3) and ACS-2912(3)) and ACS-2914(3).

RESTRICTIONS: Students with standing in the former 92/91.3920(6) may not hold credit for ACS-3901(3).

ACS-3902 (3) DATABASE SYSTEMS (Le3) This course introduces the theory of relational, network, and hierarchical

models. It covers in detail the techniques utilized in various stages of a relational database software development life cycle. These techniques include ERDs, relational models, functional dependencies, normalization, and physical data storage mechanisms. Query language fundamentals including relational algebra and SQL are also covered. A project involving the design and implementation of a database is required.

PREREQUISITES: A grade of at least C in ACS-2913(3) (or the previous ACS-2911(3) and ACS-2912(3)) and ACS-2914(3).

ACS-3907(3) eCOMMERCE (Le3) In this course our students will explore new opportunities, risks, and technologies related to electronic commerce. Both business and technical issues will be addressed. Business issues will include the role of eCommerce in the marketing plan and organizational strategy in both business-to-customer and business-to-business contexts. Technical topics will include architecture, application models, payment strategies and security. This course is designed for double majors in Applied Computer Science and Business and Administration.
PREREQUISITES: A grade of at least C in ACS-1803(3) and ACS-2909(3).

ACS-3908(3) INTRODUCTION TO PERL (Le3, La1) This course introduces the basic concepts of the Perl language and the Common Gateway Interface (CGI) that enables web browsers to exchange data with computer programs located on a web server. Students develop skill in script programming in Perl and building dynamic web pages with CGI. Topics include variables, control structures, file I/O, functions, arrays, using modules, and object-oriented programming.

PREREQUISITES: A grade of at least C in ACS-2941(3).

ACS-3909(3) ADVANCED INTERNET PROGRAMMING (Le3) This course provides students with a thorough knowledge of server-side web programming. Topics include n-tiered systems, session tracking, interfaces and stereotypes, dynamic web page design, database connections, and XML processing. Students gain considerable knowledge and experience by learning important features needed for e-commerce, applying advanced web application techniques, and utilizing web databases.

PREREQUISITES: A grade of at least C in ACS-2909(3), ACS-2914(3) and ACS-2947(3).

ACS-3911(3) COMPUTER NETWORKS (Le3) This course covers the principles, technology, protocols, and algorithms of computer networks. The layers of the network stack are discussed, with particular focus on the internet network stack. Topics of discussion include network technologies, simple and sliding window protocols, routing and routing algorithms, congestion control, quality of service, security, and network applications.

PREREQUISITES: A grade of at least C in ACS-2906(3), ACS-2913(3) (or the previous ACS-2911(3) and ACS-2912(3)) and ACS-2947(3).
RESTRICTIONS: Students cannot hold credit in ACS-3911(3) and ACS-3811(3).

ACS-3913(3) SOFTWARE DESIGN AND ARCHITECTURE (Le3) This is an advanced course in software design that examines recent advances in the design of larger application systems. Topics include software architecture, object-oriented analysis and design, software patterns, and the Unified Modeling Language (UML).

PREREQUISITES: A grade of at least C in ACS-2913(3) (or the previous ACS-2911(3) and ACS-2912(3)) and ACS-2947(3).

ACS-3916(3) HUMAN COMPUTER INTERACTION (Le3)

This course covers the fundamentals and concepts of design, implementation, and evaluation of human-computer interfaces. Topics include human cognitive aspects; user-centred design; design goals and principles; interface and interaction types; prototyping and construction; and evaluation methods. The design concepts are demonstrated using a state-of-the-art interface development tool. In order to make a balance between theory and practice, emphasis is placed on a course-end project involving design, implementation and evaluation of the user interface for a specific application.

PREREQUISITES: A grade of at least C in ACS-2914(3).

RESTRICTIONS: Students cannot hold credit in ACS-3916(3) and ACS-3816(3).

ACS-3921(3) / ACS-4921(3) COMPUTER SECURITY AND PRIVACY (Le3)

This course introduces students to the security and privacy issues in computer systems. It covers the fundamental computer security techniques such as encryption methods, public key cryptography, hash function and signature schemes, key exchange protocols, authentication and access control models. The course also examines the applications of these techniques for multimedia security, intrusion detection, copyright and password protection, and protection from malicious programs. Privacy preserving techniques such as data aggregation, perturbation, k-anonymity and l-diversity, and ethical issues are also discussed. Students at the 4921 level additionally undertake a comprehensive project on a topic related to computer security and privacy.

PREREQUISITES: A grade of at least C in both ACS-2906(3) and ACS-2947(3), or permission of Chair.

RESTRICTIONS: Students who have taken ACS-3921 will not be eligible to take ACS-4921.

ACS-3923(3) TECHNICAL WRITING (Le3) This course will discuss principles, strategies, and techniques of writing in a systems environment. Topics include the writing process; invention, structuring, and drafting strategies; identifying audience and purpose; business and technical correspondence; project documentation; user documentation; presentations, both technical and executive; and the readability of documents, from the high-level structure down to the sentence and word levels. This course will include many practical exercises in course topics.

PREREQUISITES: A grade of at least C in ACS-2913(3) (or the former ACS-2911(3) and ACS-2912(3)).

ACS-3930(3) TOPICS IN APPLIED COMPUTER SCIENCE

(Le3) This course treats specific topics in various areas of applied computer science of interest to the student and faculty member.

PREREQUISITES: A grade of at least C in both ACS-2913(3) (or the previous ACS-2911(3) and ACS-2912(3)) and ACS-2947(3).

ACS-3931(3) PRINCIPLES OF OPERATING SYSTEMS

(Le3) This course covers the principles and design of operating systems. In the first half of the course students are introduced to multiprogramming and become familiar with the process and thread abstractions. Students are introduced to concurrent programming. Topics include: mutual exclusion, synchronization, and inter-process communication. The second half of the course introduces students to the roles and components of operating systems, and how these components interact. Topics include process control, memory management, file systems, and input/output.

PREREQUISITES: A grade of at least C in ACS-2906(3) and ACS-2947(3).

ACS-3941(3) IMPLEMENTATION ISSUES IN OBJECT ORIENTED LANGUAGES (Le3) This course focuses on advanced features of a contemporary OO language. Emphasis is on implementation issues and strengthening programming skills of students.

PREREQUISITES: A grade of at least C in both ACS-2913(3) (or the previous ACS-2911(3) and ACS-2912(3)) and ACS-2947(3).

ACS-3947(3) ALGORITHM DESIGN (Le3) This course focuses on the connection between data structures and the corresponding algorithms, including simple analysis of computational complexity. The emphasis is on comparative study of alternate ways to implement solutions to computing problems.

PREREQUISITES: A grade of at least C in both ACS-2913(3) (or the previous ACS-2911(3) and ACS-2912(3)) and ACS-2947(3).

ACS-4901(6) SENIOR SYSTEMS DEVELOPMENT PROJECT (Le3, P) This course applies the principles and techniques of software project management covered in ACS-3901(3) to a significant systems development project undertaken by students in teams. A project proposal, project plan, regular status reports, and a completion report are required. All work must conform to proper analysis, design, programming, and documentation standards. Each team holds status reviews at appropriate life-cycle milestones. A final presentation and a formal demonstration of the system are required at the end of the project.

PREREQUISITES: A grade of at least C in ACS-2914(3), ACS-3901(3), ACS-3902(3), and ACS-3913(3), and a minimum average GPA of 2.0 in all ACS-xxxx courses previously taken.

RESTRICTIONS: Students may not hold credit in this course and the former 92/91.3920(6).

ACS-4902(3) ADVANCED DATABASE SYSTEMS (Le3) This course is a continuation of ACS-3902(3). It deals with advanced topics in database design, use, and administration. Database design topics include enhanced ER diagrams and object-oriented data modelling. Other topics include transaction processing, concurrency control and recovery, security, and integrity. Object-oriented databases and client-server architectures will also be discussed.

PREREQUISITES: A grade of at least C in both ACS-2947(3) and ACS-3902(3).

ACS-4904(3) DATA WAREHOUSING (Le3) This course explores the role of data warehouses in supporting decision-making in organizations. Topics include definition of a data warehouse; extracting, cleansing, and transforming data; building and maintaining the warehouse; meta data; dimensional analysis and multidimensional modeling; multidimensional data structures; Star schemas; OLAP (On Line Analytical Processing); drilling down and across; and web deployment.

PREREQUISITES: A grade of at least C in all of ACS-2913(3) (or the previous ACS-2911(3) and ACS-2912(3)), ACS-2947(3) and ACS-3902(3).

ACS-4906(3) CONCEPTUAL MODELLING (Le3) This course explores the role of conceptual modelling in the development of information systems. A conceptual model is

an abstraction of reality that serves as a communication mechanism between the stakeholders of a system and its developers. The course covers various approaches proposed for conceptual modelling included UML, EERD, and ORM. Students gain considerable practical experience with pertinent software tools.

PREREQUISITES: A grade of at least C in ACS-3902(3).

ACS-4930(6) RESEARCH PROJECT IN APPLIED COMPUTER SCIENCE (NT) This course is designed to allow a student to conduct a specific research project under the supervision of a faculty member. An essential component of the course is an oral presentation and a written report of the results. Approval for the planned project must be obtained from the supervising faculty member as well as from the Department Chair before enrolment.

PREREQUISITES: Students should normally have completed 30 credits in ACS.

RESTRICTIONS: Students must obtain written permission from the Department Chair to register for the course.

ACS-4931(3) RESEARCH PROJECT IN APPLIED COMPUTER SCIENCE (NT) This course is designed to allow a student to conduct a specific research project under the supervision of a faculty member. An essential component of the course is an oral presentation and a written report of the results. Approval for the planned project must be obtained from the supervising faculty member as well as from the Department Chair before enrolment.

PREREQUISITES: Students should normally have completed 30 credits in ACS.

RESTRICTIONS: Students must obtain written permission from the Department Chair to register for the course.

ACS-4953(3) INTRODUCTION TO MACHINE LEARNING (Le3) This course is an introduction to the broad field of machine learning. Machine learning provides the technical basis for data mining. This course examines the foundations and implementations of several machine learning algorithms. Specific topics include: rule and tree-based classifiers, bayesian models, clustering techniques and numeric prediction. Popular machine learning tool sets will be used to gain practical hands-on experience in i) preparing the data, ii) applying the various learning techniques and iii) interpreting the credibility of the results.

PREREQUISITES: A grade of at least C in each of ACS-3902(3), MATH-1401(3), and one 3 credit hour course offered by the Statistics department.

ACS-4954(3) INTRODUCTION TO DISTRIBUTED SYSTEMS (Le3) This course is an introduction to the broad field of distributed systems. It focuses on introducing students to the benefits, challenges, methods, and implementations of distributed systems. Reasons for deploying distributed systems, such as fault tolerance and agglomeration of computational resources are discussed. Other topics include implementation challenges such as synchronization and replication in the presence of faults. Common system architectures that address some of these challenges are also introduced. Students are expected to implement some of these architectures to reinforce the lecture material.

PREREQUISITES: A grade of at least C+ in all of MATH - 1401(3), ACS-2906(3) and ACS-3911(3).