

MASTER OF INFORMATION TECHNOLOGY PROGRAM

หลักสูตรเทคโนโลยีสารสนเทศมหาบัณฑิต

Philosophy and Objectives**1. Philosophy**

It is generally agreed that any organization not using or not planning to use computer and the Internet cannot survive. Any person who does not know how to use or intend not to learn how to use computer and the Internet cannot find or remain in a good job. There are all kinds of attractive positions available both locally and abroad for a person with a degree in the field of Computer and the Internet.

2. Objectives

With a bachelor's degree in any field, a student can apply for admission into the master's degree programs with any of the following concentrations.

1. Computer Information System (CIS) concentration will prepare the graduate to be a computer professional, especially well versed in systems analysis and design.
2. Computer and Engineering Management (CEM) concentration will prepare the graduate to contribute significantly in IT applications in the factories.
3. Internet and E-Commerce (IEC) concentration will prepare the graduate to play a major role in Internet-related areas such as eCommerce, eGovernment, eEntertainment, etc.
4. Software Engineering (SWE) concentration will prepare the graduate to serve the demand of the country as we need more than 50,000 software experts but all universities combined can produce only a few hundreds per year.

3. Admission Qualifications

- Graduated with a bachelor's degree in computer or related field with a 2.5 GPA and above from an accredited university or college or has a two year experience in computer or related field. Non-qualified applicant must take the computer foundation course.
- Graduated with a bachelor's degree in business or related field with a 2.5 GPA and above from an accredited university or college or has a two year experience in business or related field. Non-qualified applicant must take the business foundation course.
- Obtain 90% in analytical part of GMAT or 90% in analytical part and quantitative part of GRE. Non-qualified applicant must take the mathematical foundation course.
- Obtain TOEFL 550 PBT/213 CBT or IELTS 6.0. Non-qualified applicant must take the English foundation course.
- Submit two acceptable letters of recommendation from either former instructors or employers.

4. Selection Criteria

Successfully pass the Master of Information Technology Assumption University entrance examination.

5. Educational Management System

1. Semester System

Each academic year consists of two semesters. The teaching and learning process of each semester takes 15 weeks.

2. Credit values

- Theoretical course: 15 hours of lecture / discussion carries the value of 1 credit.
- Project: 45 hours of project work carries the value of 1 credit.
- Thesis: 45 hours of thesis work carries the value of 1 credit.

3. Medium of Instruction

The program is offered in English.

6. Duration of Study

Each student must fulfill all requirements for the degree within 5 years from the first date of enrollment.

7. Registration

Students can register for a maximum of 15 credits per semester.

8. Evaluation Criteria

1. Grading System

Letter grades are used to show the academic standing of all students with the following meanings and values.

Letter	Meaning	Value
A	Excellent	4.00
A-	Almost Excellent	3.75
B+	Very Good	3.25
B	Good	3.00
B-	Fairly Good	2.75
C+	Fair	2.25
C	Satisfactory	2.00
C-	Minimum Satisfactory	1.75
D	Poor	1.00
F	Failure	0.00
R	Course repeated later	--
S	Satisfactory	--
U	Unsatisfactory	--
W	Withdrawal with Permission	--
WF	Withdrawal with F	0
AU	Audit and non-credit	--
I	Incomplete	--
WP (IP)	Work in Progress	--
NR	No Report	
TR	Transferred Credits	--

- Grade for any and all classes must be recorded in the student's transcripts.
- Students may be accepted as transfer students from other accredited Master's programs provided the grades earned are at least "B". The total number of transferred credits cannot exceed 12.

2. Evaluation

Evaluation of student's performance in each course is based on examinations, tests, reports, and/ or presentations.

3. A Minimum Grade Requirements

- A student attaining a grade below "B" in any course must re-take that course until a grade of at least "B-" is obtained.
- If and when undergraduate courses are required as remedial courses, the grade of "B-" or better is equivalent to "S".

Graduation Requirements

Assumption University confers the degree of Master of Information Technology upon students who meet all the requirements as follows:

1. Thesis
 - Complete at least 36 credit hours approved for the MIT.
 - Earn the cumulative GPA of at least 3.00.
 - Obtain a grade of at least "B-" in all courses.
 - Pass the thesis defense.
 - Have the thesis published or obtain an acceptance of publication in a recognized journal or academic publication or present the thesis at a conference which has the proceedings.
 - Library and financial clearance with the University.
 - Good behavior and discipline.

2. Non-Thesis
 - Complete at least 36 credit hours approved for the MIT.
 - Earn the cumulative GPA of at least 3.00.
 - Obtain a grade of at least "B-" in all courses.
 - Pass the comprehensive examination.
 - Pass the master project defense.
 - Library and financial clearance with the University.
 - Good behavior and discipline.

9. Curriculum

1. Number of Credits

The total number of credits of the program is 36 credits, with two options, thesis and non-thesis.

2. Curriculum Structure

Thesis option	
Foundation Courses	Non Credits
Core Courses	12 Credits
Concentration Courses	12 Credits
Master's Thesis	12 Credits
Non-Thesis option	
Foundation Courses	Non Credits
Core Courses	12 Credits
Concentration Courses	12 Credits
Concentration Elective Courses	9 Credits
Master's Project	3 Credits
Comprehensive Examination*	

*The Comprehensive examination comprises of five core comprehensive papers, and an oral comprehensive examination for the master project.

3. Course Codes

First Two Letters

- CE stands for Computer and Engineering Management
- CS stands for Computer Information Systems
- IC stands for Internet and E-Commerce Technology
- IT stands for Information Technology
- SE stands for Software Engineering

Course Numbering

- 5,000 – 5,999 stand for Foundation Courses
- 6,000 – 6,999 stand for Master's Level Courses
- 7,000 stands for Thesis

4. Courses

Foundation Course

- CS 5900 Technical English
- SE 5000 Computer Concept and Programming

Non-Credits

- Non Credits
- Non Credits

Core Courses

12 credits

Credits

CE 6404 Systems Analysis and Design	3 (3-0-0)
CS 6102 Management Information Systems	3 (3-0-0)
IC 6301 Internet Marketing	3 (3-0-0)
SE 6103 Programming Language	3 (3-0-0)

Concentration Courses 12 Credits

A student must select one of the following concentrations and take 12 credits from the selected concentration.

Computer Information Systems

CS 6101 Program and File Structures	3 (3-0-0)
CS 6103 Database Systems	3 (3-0-0)
CS 6403 Information Systems Development Methodology	3 (3-0-0)
CS 6602 Data Communication and Networking	3 (3-0-0)

Computer and Engineering Management (with business background)

CE 6514 Customer Relationship Management	3 (3-0-0)
CE 6624 Supply Chain Management	3 (3-0-0)
CE 6705 Quantitative Analysis	3 (3-0-0)
CE 6710 Enterprise Resource Planning	3 (3-0-0)

Computer and Engineering Management (with non-business background)

CE 6505 Financial Management	3 (3-0-0)
CE 6511 Marketing Management	3 (3-0-0)
CE 6620 Production/Operation Management	3 (3-0-0)
CE 6711 Strategic Management	3 (3-0-0)

Internet E-Commerce Technology

IC 6001 Internet and E-Commerce Technology	3 (3-0-0)
IC 6021 Database System for Internet Application	3 (3-0-0)
IC 6111 Web Application Development	3 (3-0-0)
IC 6403 Information Security	3 (3-0-0)

Software Engineering

SE 6201 Advanced Programming Language	3 (2-2-0)
SE 6401 Software Testing and Quality Assurance	3 (3-0-0)
SE 6403 Enterprise Applications Development	3 (3-0-0)
CS 6210 Software Engineering	3 (3-0-0)

Concentration Elective Courses 9 Credits

A student with non-thesis option must select additional 9 credits as concentration elective courses from the selected concentration.

Computer Information Systems

CS 6001 Computer Systems Concepts	3 (3-0-0)
CS 6310 Computer Architecture and Interface	3 (3-0-0)
CS 6921 DBMS & SQL	3 (3-0-0)
CS 6922 Advanced Database	3 (3-0-0)
SE 6101 Principles of Programming Languages	3 (3-0-0)
CS 6210 Introduction to Software Engineering	3 (3-0-0)
CS 6701 Artificial Intelligence Concepts	3 (3-0-0)
CS 6942 Business Data Communications	3 (3-0-0)
CS 6601 Computer Network	3 (3-0-0)
CS 6935 Local Area Network	3 (3-0-0)
CS 6951 Wireless Data Network	3 (3-0-0)
CS 6916 Telecommunication System & Internet Technology	3 (3-0-0)
CS 6913 Client/Server Information Systems	3 (3-0-2)
CS 6501 Computerized Decision Support Systems	3 (3-0-2)

CS 6740 Expert System	3 (3-0-2)
CS 6502 Management Information Systems Policy	3 (3-0-0)
CS 6503 Computer Profession	3 (3-0-0)
CS 6917 Information Systems Management	3 (3-0-0)
CS 6912 Information Systems Audit	3 (3-0-0)
CS 6401 Information Systems Analysis	3 (3-0-0)
CS 6402 Information Systems Design	3 (3-0-0)
CS 6800 Computer-Assisted Education	3 (3-0-2)
CS 6810 Office Automation	3 (3-0-2)
CS 6820 Factory Automation	3 (3-0-2)
CS 6900 Electronic Banking	3 (3-0-2)
CS 6945 Computer Applications in Agriculture	3 (3-0-2)
CS 6950 Computer Applications in Medical Sciences	3 (3-0-2)
CS 6955 Computer Applications in Airlines	3 (3-0-2)
CS 6960 Computer Applications in Insurance	3 (3-0-2)
CS 6965 Computer Applications in Public Utilities	3 (3-0-2)
CS 6970 Computer Applications in Law Enforcement	3 (3-0-2)
CS 6975 Computer Applications in Hotel	3 (3-0-2)
CS 6910 Current Topics in Computer Information Systems	3 (3-0-0)
CS 6920 Advanced Topics in Computer Information Systems	3 (3-0-0)
CS 6930 Selected Topics in Computer Information Systems	3 (3-0-0)
CS 6940 Seminar in Computer Information Systems	3 (3-0-0)

Computer and Engineering Management

CE 6401 Management of Information Services	3 (3-0-0)
CE 6402 Management and Information Services	3 (3-0-0)
CE 6403 Computer and Internet Security	3 (3-0-0)
CE 6500 Principles of Engineering Management	3 (3-0-0)
CE 6503 Accounting for Engineering Management	3 (3-0-0)
CE 6504 Cost Accounting	3 (3-0-0)
CE 6505 Financial Management	3 (3-0-0)
CE 6506 Investment Analysis	3 (3-0-0)
CE 6507 Engineering Economy	3 (3-0-0)
CE 6508 Human Relations in Technical Management	3 (3-0-0)
CE 6509 Human Resource Management	3 (3-0-0)
CE 6510 Industrial Marketing Systems Analysis	3 (3-0-0)
CE 6511 Marketing Management	3 (3-0-0)
CE 6512 Case Studies in General Management	3 (3-0-0)
CE 6513 Operations in Service Industries	3 (3-0-0)
CE 6611 Computer Integrated Manufacturing Systems Management	3 (3-0-0)
CE 6612 Computer-Aided Design	3 (3-0-0)
CE 6613 Industrial Automation	3 (3-0-0)
CE 6614 Packaging Management	3 (3-0-0)
CE 6615 Packaging Materials	3 (3-0-0)
CE 6617 Business Logistics System Analysis	3 (3-0-0)
CE 6618 Work Analysis and Design	3 (3-0-0)
CE 6619 Methods of Industrial Engineering	3 (3-0-0)
CE 6620 Production/ Operations Management	3 (3-0-0)
CE 6621 Inventories Strategies	3 (3-0-0)
CE 6622 Facilities Layout Planning & Material Flows Systems	3 (3-0-0)
CE 6623 Productivity Engineering and Management	3 (3-0-0)
CE 6624 Supply Chain Management	3 (3-0-0)
CE 6701 Statistical Process Control	3 (3-0-0)
CE 6702 Management of Quality Assurance	3 (3-0-0)
CE 6703 Experimental Design	3 (3-0-0)
CE 6704 Maintenance Management	3 (3-0-0)
CE 6705 Operations Research	3 (3-0-0)
CE 6707 System Simulation	3 (3-0-0)
CE 6708 Sociotechnical System	3 (3-0-0)
CE 6709 Systems Theory and Cybernetics	3 (3-0-0)
CE 6803 Technology, Policy and Society	3 (3-0-0)

CE 6804 Energy Management	3 (3-0-0)
CE 6805 Environmental Management	3 (3-0-0)
CE 6950 Current Topics in CEM	3 (3-0-0)
CE 6955 Advanced Topics in CEM	3 (3-0-0)
CE 6960 Selected Topics in CEM	3 (3-0-0)
CE 6965 Seminar in CEM	3 (3-0-0)
CE 6970 Directed Study in CEM	3 (3-0-0)

Internet and E-Commerce Technology

IC 6012 Web Publishing and Design	3 (3-0-0)
IC 6016 Programming and Designing with Java Script	3 (2-2-0)
IC 6017 Learning Java on the Web	3 (2-2-0)
IC 6018 Developing Secure Commerce Applications	3 (3-0-0)
IC 6019 Learning VBScript and ActiveX	3 (2-2-0)
IC 6021 Internet Programming with Databases	3 (2-2-0)
IC 6022 TCP/IP Network Administration	3 (3-0-0)
IC 6201 Computer Networking	3 (3-0-0)
IC 6401 Banking and E-Payment Systems	3 (3-0-0)
IC 6444 System Reliability	3 (3-0-0)
IC 6501 Managerial Economics	3 (3-0-0)
IC 6510 Finance and Financial Accounting	3 (3-0-0)
IC 6601 Applied Data Analysis	3 (3-0-0)
IC 6612 Information Retrieval	3 (3-0-0)
IC 6666 Human-Computer Interaction	3 (3-0-0)
IC 6777 Competitive Strategy	3 (3-0-0)
IC 6801 E-Commerce Laws and Regulations	3 (3-0-0)
IC 6910-6919 Current Topics in Internet and E-Commerce	3 (3-0-0)
IC 6920-6929 Advanced Topics in Internet and E-Commerce	3 (3-0-0)
IC 6930-6939 Selected Topics in Internet and E-Commerce	3 (3-0-0)
IC 6940 Seminar in Internet and E-Commerce	3 (3-0-0)

Software Engineering

CS 6220 Compiler Writing	3 (2-2-0)
CS 6230 Business Graphics	3 (2-2-0)
CS 6235 Remote Sensing	3 (2-2-0)
CS 6240 Thai Utilities	3 (2-2-0)
CS 6250 Operating Systems	3 (2-2-0)
CS 6720 Machine Translation	3 (2-2-0)
CS 6730 Image Processing	3 (2-2-0)
CS 6710 Artificial Intelligence Languages	3 (2-2-0)
CS 6933 Hypermedia and Internet Computing	3 (2-2-0)
IC 6016 Programming and Designing with Java Script	3 (2-2-0)
IC 6017 Learning Java on the Web	3 (2-2-0)
IC 6019 Learning VBScript and ActiveX	3 (2-2-0)
IC 6021 Internet Programming with Databases	3 (2-2-0)
SE 6302 Internet Applications Programming	3 (2-2-0)
SE 6303 Mobile Programming	3 (2-2-0)
SE 6101 Principles of Programming Languages	3 (3-0-0)
SE 6102 Software Engineering	3 (3-0-0)
SE 6202 Database System and Design	3 (3-0-0)
SE 6203 Software System Architecture	3 (3-0-0)
SE 6301 Database Engineering	3 (3-0-0)
SE 6910-6919 Current Topics in Software Engineering	3 (3-0-0)
SE 6920-6929 Advanced Topics in Software Engineering	3 (3-0-0)
SE 6930-6939 Selected Topics in Software Engineering	3 (3-0-0)
SE 6940 Seminar in Software Engineering	3 (3-0-0)

A student may select any other Master's level course offered at Assumption University, such as in MIS and MBA programs with approval of the program director of the MIT program.

Master's Project

IS 6998 Master's Project

3 Credits

Credits

3 (0-0-3)

Master's Thesis

IS 7000 Master's Thesis

IS 7001 Master's Thesis

12 Credits

Credits

3 (0-0-3)

9 (0-0-9)

5. **Study Plan**

Computer Information Systems (CIS) Concentration

Thesis Option

First Semester

Course Code	Course Title	Credits
CE 6404	Systems Analysis and Design	3 (3-0-0)
CS 6102	Management Information Systems	3 (3-0-0)
IC 6301	Internet Marketing	3 (3-0-0)
SE 6103	Programming Language	<u>3 (3-0-0)</u>
Total		12 (12-0-0)

Second Semester

Course Code	Course Title	Credits
CS 6101	Program and File Structures	3 (3-0-0)
CS 6103	Database Systems	3 (3-0-0)
CS 6602	Data Communication and Networking	3 (3-0-0)
IS 7000	Master's Thesis	<u>3 (0-0-3)</u>
Total		12 (9-0-3)

Third Semester

Course Code	Course Title	Credits
CS 6403	Information Systems Development Methodology	3 (3-0-0)
IS 7001	Master's Thesis	<u>9 (0-0-9)</u>
Total		12 (3-0-9)

Non-Thesis Option

First Semester

Course Code	Course Title	Credits
CE 6404	Systems Analysis and Design	3 (3-0-0)
CS 6102	Management Information Systems	3 (3-0-0)
IC 6301	Internet Marketing	3 (3-0-0)
SE 6103	Programming Language	<u>3 (3-0-0)</u>
Total		12 (12-0-0)

Second Semester

Course Code	Course Title	Credits
CS 6101	Program and File Structures	3 (3-0-0)
CS 6103	Database Systems	3 (3-0-0)
CS 6602	Data Communication and Networking	3 (3-0-0)
	Concentration Elective Course	<u>3 (3-0-0)</u>
Total		12 (12-0-0)

Third Semester

Course Code	Course Title	Credits
CS 6403	Information Systems Development Methodology	3 (3-0-0)
IS 6998	Master's Project	3 (0-0-3)
	Concentration Elective Courses	<u>6 (6-0-0)</u>
Total		12 (9-0-3)

Computer and Engineering Management (CEM) Concentration with Business background

Thesis Option

First Semester

Course Code	Course Title	Credits
CE 6404	Systems Analysis and Design	3 (3-0-0)
CS 6102	Management Information Systems	3 (3-0-0)
IC 6301	Internet Marketing	3 (3-0-0)
SE 6103	Programming Language	<u>3 (3-0-0)</u>
Total		12 (12-0-0)

Second Semester

Course Code	Course Title	Credits
CE 6514	Customer Relationship Management	3 (3-0-0)
CE 6624	Supply Chain Management	3 (3-0-0)
CE 6705	Quantitative Analysis	3 (3-0-0)
IS 7000	Master's Thesis	<u>3 (0-0-3)</u>
Total		12 (9-0-3)

Third Semester

Course Code	Course Title	Credits
CE 6710	Enterprise Resource Planning	3 (3-0-0)
IS 7001	Master's Thesis	<u>9 (0-0-9)</u>
Total		12 (3-0-9)

Non-Thesis Option

First Semester

Course Code	Course Title	Credits
CE 6404	Systems Analysis and Design	3 (3-0-0)
CS 6102	Management Information Systems	3 (3-0-0)
IC 6301	Internet Marketing	3 (3-0-0)
SE 6103	Programming Language	<u>3 (3-0-0)</u>
Total		12 (12-0-0)

Second Semester

Course Code	Course Title	Credits
CE 6514	Customer Relationship Management	3 (3-0-0)
CE 6705	Quantitative Analysis	3 (3-0-0)
CE 6624	Supply Chain Management	3 (3-0-0)
	Concentration Elective Course	<u>3 (3-0-0)</u>
Total		12 (12-0-0)

Third Semester

Course Code	Course Title	Credits
CE 6710	Enterprise Resource Planning	3 (3-0-0)
IS 6998	Master's Project	3 (0-0-3)
	Concentration Elective Courses	<u>6 (6-0-0)</u>
Total		12 (9-0-3)

Computer and Engineering Management (CEM) Concentration with Non-Business background

Thesis Option

First Semester

Course Code	Course Title	Credits
CE 6404	Systems Analysis and Design	3 (3-0-0)
CS 6102	Management Information Systems	3 (3-0-0)
IC 6301	Internet Marketing	3 (3-0-0)
SE 6103	Programming Language	<u>3 (3-0-0)</u>
Total		12 (12-0-0)

Second Semester

Course Code	Course Title	Credits
CE 6505	Financial Management	3 (3-0-0)
CE 6511	Marketing Management	3 (3-0-0)
CE 6620	Production/Operation Management	3 (3-0-0)
IS 7000	Master's Thesis	<u>3 (0-0-3)</u>
Total		12 (9-0-3)

Third Semester

Course Code	Course Title	Credits
CE 6711	Strategic Management	3 (3-0-0)
IS 7001	Master's Thesis	<u>9 (0-0-9)</u>
Total		12 (3-0-9)

Non-Thesis Option

First Semester

Course Code	Course Title	Credits
CE 6404	Systems Analysis and Design	3 (3-0-0)
CS 6102	Management Information Systems	3 (3-0-0)
IC 6301	Internet Marketing	3 (3-0-0)
SE 6103	Programming Language	<u>3 (3-0-0)</u>
Total		12 (12-0-0)

Second Semester

Course Code	Course Title	Credits
CE 6505	Financial Management	3 (3-0-0)
CE 6511	Marketing Management	3 (3-0-0)
CE 6620	Production/Operation Management	3 (3-0-0)
	Concentration Elective Course	<u>3 (3-0-0)</u>
Total		12 (12-0-0)

Third Semester

Course Code	Course Title	Credits
CE 6711	Strategic Management	3 (3-0-0)
IS 6998	Master's Project	3 (0-0-3)
	Concentration Elective Course	<u>6 (6-0-0)</u>
Total		12 (9-0-3)

Internet and E-Commerce Technology (IEC) Concentration

Thesis Option

First Semester

Course Code	Course Title	Credits
CE 6404	Systems Analysis and Design	3 (3-0-0)
CS 6102	Management Information Systems	3 (3-0-0)
IC 6301	Internet Marketing	3 (3-0-0)
SE 6103	Programming Language	<u>3 (3-0-0)</u>
Total		12 (12-0-0)

Second Semester

Course Code	Course Title	Credits
IC 6021	Database System for Internet Application	3 (3-0-0)
IC 6111	Web Application Development	3 (3-0-0)
IC 6403	Information Security	3 (3-0-0)
IS 7000	Master's Thesis	<u>3 (0-0-3)</u>
Total		12 (9-0-3)

Third Semester

Course Code	Course Title	Credits
IC 6001	Internet and E-Commerce Technology	3 (3-0-0)
IS 7001	Master's Thesis	<u>9 (0-0-9)</u>
Total		12 (3-0-9)

Non-Thesis Option

First Semester

Course Code	Course Title	Credits
CE 6404	Systems Analysis and Design	3 (3-0-0)
CS 6102	Management Information Systems	3 (3-0-0)
IC 6301	Internet Marketing	3 (3-0-0)
SE 6103	Programming Language	<u>3 (3-0-0)</u>
Total		12 (12-0-0)

Second Semester

Course Code	Course Title	Credits
IC 6021	Database System for Internet Application	3 (3-0-0)
IC 6111	Web Application Development	3 (3-0-0)
IC 6403	Information Security	3 (3-0-0)
	Concentration Elective Course	<u>3 (3-0-0)</u>
Total		12 (12-0-0)

Third Semester

Course Code	Course Title	Credits
IC 6001	Internet and E-Commerce Technology	3 (3-0-0)
IS 6998	Master's Project	3 (0-0-3)
	Concentration Elective Course	<u>6 (6-0-0)</u>
Total		12 (9-0-3)

Software Engineering (SWE) Concentration

Thesis Option

First Semester

Course Code	Course Title	Credits
CE 6404	Systems Analysis and Design	3 (3-0-0)
CS 6102	Management Information Systems	3 (3-0-0)
IC 6301	Internet Marketing	3 (3-0-0)
SE 6103	Programming Language	<u>3 (3-0-0)</u>
Total		12 (12-0-0)

Second Semester

Course Code	Course Title	Credits
SE 6201	Advanced Programming Language	3 (2-2-0)
SE 6401	Software Testing and Quality Assurance	3 (3-0-0)
CS 6210	Software Engineering	3 (3-0-0)
IS 7000	Master's Thesis	<u>3 (0-0-3)</u>
Total		12 (9-0-3)

Third Semester

Course Code	Course Title	Credits
SE 6403	Enterprise Applications Development	3 (3-0-0)
IS 7001	Master's Thesis	<u>9 (0-0-9)</u>
Total		12 (3-0-9)

Non-Thesis Option

First Semester

Course Code	Course Title	Credits
CE 6404	Systems Analysis and Design	3 (3-0-0)
CS 6102	Management Information Systems	3 (3-0-0)
IC 6301	Internet Marketing	3 (3-0-0)
SE 6103	Programming Language	<u>3 (3-0-0)</u>
Total		12 (12-0-0)

Second Semester

Course Code	Course Title	Credits
SE 6201	Advanced Programming Language	3 (2-2-0)
SE 6401	Software Testing and Quality Assurance	3 (3-0-0)
CS 6210	Software Engineering	3 (3-0-0)
	Concentration Elective Course	<u>3 (3-0-0)</u>
Total		12 (12-0-0)

Third Semester

Course Code	Course Title	Credits
SE 6403	Enterprise Applications Development	3 (3-0-0)
IS 6998	Master's Project	3 (0-0-3)
	Concentration Elective Course	<u>6 (6-0-0)</u>
Total		12 (9-0-3)

6. **Course Description**

7.

1. Foundation Courses:

CS 5900 Technical English for MIS

Non-Credits

The objective of this course is to improve student's proficiency level in all the four skills of listening, speaking, reading and writing. The aim is to aid students in their mastering of the English language so that they will be able to study will in the medium of English at master's degree level.

SE 5000 Computer Concept and Programming

Non-Credits

Computer structure, machine language, and assembly languages. Computer architecture and Operating Systems, Operating Environment for application programs.

2. Core Courses:

CE 6404 Systems Analysis and Design

3(3-0-0) Credits

This course provides an understanding and application of system analysis and design processes. The Systems Development Life Cycle (SDLC) and related methodologies are described with case studies.

CS 6102 Management Information Systems

3(3-0-0) Credits

Management information systems. Relating Systems and information to organization objectives. Information systems and organizational structure ad management. Representation and analysis of system structure. System concepts, information concepts and decision processes. Information system applications. System evaluation and selection.

IC 6301 Internet Marketing

3 (3-0-0) Credits

Introduction to the field of marketing and experience in analyzing situations that marketing managers encounter. The course emphasizes marketing principles, analysis and strategy. Topics include marketing management, buyer behavior, product policy, pricing, distribution, advertising and

promotion and competitive strategy. Marketing in the domain of the Internet, in which the customer base is worldwide but unseen and is reached through a computer screen.

SE 6103 Programming Language

3 (3-0-0) Credits

This course introduces all core features of the modern object-oriented programming language and its application programming interfaces (APIs). Topics include object-oriented programming, abstract data type, encapsulation, inheritance and polymorphism. Generics programming, thread, GUI development, and integrated development environment (IDE). Hand-on exercises in Java illustrate the concepts taught.

3. Concentration Courses

CS 6101 Program and File Structures

3 (3-0-2) Credits

Prerequisite: CE 6404 Systems Analysis and Design

Programming Language. Structured programming concepts. Data structures and indexing. File processing environment. Sequential access. Random access. File I/O. Implementation considerations. Design techniques

CS 6103 Database Systems

3 (3-0-0) Credits

Prerequisite: CE 6404 Systems Analysis and Design

The data environment. Introduction to basic technical concepts and system resources for data, data structures, operating system topics, and file organization. Database Management Systems, logical data models, and internal data models. DBMS facilities, database administration, DBMS evaluation, and distributed databases.

CS 6403 Information Systems Development Methodology

3 (3-0-0) Credits

Prerequisite: CE 6404 Systems Analysis and Design

This course presents various methodologies used in developing an information system. Application development strategies. Application system development management. Individual behavior and group dynamics in the development process. Systems implementation and operation: systems construction and conversion, system testing, systems operations and support.

CS 6602 Data Communication and Networking

3 (3-0-0) Credits

Prerequisite: CE 6404 Systems Analysis and Design

This course presents the fundamental concepts and principles of data communications, networking, distributed applications, network management and security. Coverage includes communications techniques, transmission methods, wide area networks (WANs), local area networks (LANs), high-speed trends in networking, and communications architectures and subsequent internetworking issues. The course also addresses the issues of how to make policy, design, and installation decisions related to planning and implementing data communication and computer network applications.

CE 6514 Customer Relationship Management

3 (3-0-0) Credits

Prerequisite: CS 6102 Management Information Systems

This course will help you focus on providing optimal service to your customers through CRM. Customers want more than just affordable prices; they also want service, support, and recognition. After finishing this course, you'll have a foundation for creating business practices that will create ongoing customer loyalty and value.

CE 6624 Supply Chain Management

3 (3-0-0) Credits

Prerequisite: CS 6102 Management Information Systems

Planning and managing supply and demand; selecting suppliers; acquiring materials; producing and scheduling products and/or services; warehousing; inventory control; distribution management; and customer service.

CE 6705 Quantitative Analysis

3 (3-0-0) Credits

Prerequisite: CS 6102 Management Information Systems

This course provides an understanding of numerical analysis tools which use to analyze quantitative information. Topics include forecasting, simulation, optimization along with their applications.

CE 6710 Enterprise Resource Planning

3 (3-0-0) Credits

Prerequisite: CS 6102 Management Information Systems

This course presents key enterprise systems concepts from functional, technical, and implementation perspectives with emphasis on the process-centered organization and how integrated systems are designed to support cross-functional business.

CE 6505 Financial Management

3 (3-0-0) Credits

Prerequisite: CS 6102 Management Information Systems

Principles of financial organization and management in technological enterprise; demands for funds; internal and external supply of funds; budgetary control; reserve and dividends policy. Emphasize systems approach and problems of engineering design and automation as they influence financial decisions.

CE 6511 Marketing Management

3 (3-0-0) Credits

Prerequisite: CS 6102 Management Information Systems

Study of marketing decision areas in technically based firm, including product selection and development, marketing research, market development, distribution, advertising, and promotion. Pricing policies including legal aspects and problems in selecting training, and controlling field sales force. Examination of interaction within consumer and industrial marketing environments.

CE 6620 Production/ Operations Management

3 (3-0-0) Credits

Prerequisite: CS 6102 Management Information Systems

Examination of responsibilities of production manager in the technological enterprise for providing finished goods to meet the quality, price, quantity and specification needs of the market place. Study of functions of production manager. Quantitative approach to decision making in production management.

CE 6711 Strategic Management

3 (3-0-0) Credits

Prerequisite: CS 6102 Management Information Systems

This course will incorporate strategy with business policy and apply a holistic approach to interactions of the internal and external organization environment. In a global environment, managers and leaders must be able to react to acquisitions, outsourcing, downsizing, and strategic alliances. This course will give you a complete view of the evolving corporate terrain and will show how large and mid-size companies can become more effective and productive in the entire business arena. Additionally, this course will focus on winning strategies and expose the student to various ways to improve corporate strategy and execution of goals and objectives.

IC 6001 Internet and E-Commerce Technology

3(3-0-0) Credits

Prerequisite: IC 6001 Internet and E-Commerce Technology

History and development of Internet. Features of the Internet. The technology and practices of the Web, with a focus on helping students understand how the Web works, how it relates to other information systems, and what are the principle technical and design issues the Web community is facing. This course also introduces an overview of the principles of electronic commerce from the business perspective. The origin and growth of E-Commerce. Differences and similarities between E-Commerce and traditional commerce. Relationship of E-Commerce to the Internet. Electronic money. Electronic contracts. E-Commerce examples. Electronic stock trading. Electronic catalogs. Accounting, auditing and taxation issues. International aspects. Technologies relevant to electronic commerce. Communications and networking, the internet, programming languages, security, databases and archiving, web authoring tools, multimedia, transaction processing, search engines, data mining.

IC 6021 Database System for Internet Application

3 (3-0-0) Credits

Prerequisite: IC 6001 Internet and E-Commerce Technology

This course provides in-depth study of the concepts involved in the development of internet applications with database interaction. Topics include an overview of database fundamentals, basics of developing database-driven internet applications, a discussion of technologies involved in creating these internet applications. Students will learn to use these technologies to create robust server-side applications. Programming assignments provide hands-on experiences to reinforce the concepts. (Note: current technologies used in this course may include PHP programming language with MySQL database or ASP.NET with SQL database.)

IC 6111 Web Application Development

3 (3-0-2) Credits

Prerequisite: IC 6301 Internet Marketing

An introduction to computer programming using modern programming and mark up language is described in the context of the global Internet and corporate Intranets. Topics include Client Server and open system standards, Web and HTTP services, HTML and XML, proper role of programming

languages such as PERL and JavaScript, developing objects for the web using Corba/java and DCOM/ActiveX, and Interactive and Multimedia content.

IC 6403 Information Security

3 (3-0-0) Credits

Prerequisite: IC 6001 Internet and E-Commerce Technology

An overview of methods of assuring genuine, secure and confidential transmission of information across networks. Principles of digital cryptography, stenography and public-key cryptosystems. Cryptographic standards, e.g. DES. Government security policy. Digital signatures, digital escrow, certification. Secure communications. Secure hardware. Intrusion detection and countermeasures: password attacks, virus detection and removal. Copy and counterfeit detection: digital watermarks, electronic notaries. Privacy and anonymity protocols: third-party order/purchase.

SE 6201 Advanced Programming Language

3 (2-2-0) Credits

Prerequisite: SE 6103 Programming Language

This course provides the knowledge of advanced programming techniques, advanced data structures and algorithms, standard libraries and programming tools. The instructor selects the current programming language and state-of-the-art libraries to demonstrate the programming techniques and their applications. (Note: current programming languages and standard libraries may include C# or VB.NET with .NET framework, C++ with Standard Template Library or Open Source software tools.)

SE 6401 Software Testing and Quality Assurance

3 (3-0-0) Credits

Prerequisite: SE 6103 Programming Language

This course provides concepts and techniques for software testing and quality assurance. Topics cover software testing at the unit, component and system levels; automatic and manual techniques for generating and validating test data; software testing tools; static vs. dynamic analysis; functional testing; the testing process; inspections; and reliability assessment. Study how to implement the quality assurance according to the design review.

SE 6402 Software Project Management

3 (3-0-0) Credits

Prerequisite: SE 6103 Programming Language

Lifecycle and process models; process metrics; planning for a software project; mechanisms for monitoring and controlling schedule, budget, quality, and productivity; and leadership, motivation, and team building.

SE 6403 Enterprise Applications Development

3 (3-0-0) Credits

Prerequisite: SE 6103 Programming Language

This course provides an overview of architecture and design principles employed in building enterprise multi-tier applications, and explores of the specific approach using current technologies. Topics include a component-based approach to the design, development, assembly, and deployment of enterprise applications. Components used for developing the presentation layer, business logic, and processing XML documents.

4. Concentration Elective Courses

CS 6001 Computer Systems Concepts

3 (3-0-0) Credits

This course presents the concepts of computer system including computer structure, computer architecture, machine language, and assembly language, operating systems, and operating environment for application programs.

CS 6210 Introduction to Software Engineering

3 (3-0-0) Credits

Prerequisite: SE 6103 Programming Language

This course presents the importance of Software Engineering to Computer Information Systems. Topics include software project management, software life cycle, software specifications, and software maintenance.

CS 6220 Compiler Writing

3 (2-2-0) Credits

Prerequisite: SE 6103 Programming Language

This course introduces basic concepts in compiler, including translations, symbols, syntax semantics, and pragmatics. Topics also include symbol tables, memory management, subroutines, intermediate forms, code generation, and optimization.

- CS 6230 Business Graphics** **3 (2-2-0) Credits**
Prerequisite: SE 6103 Programming Language
 This course introduces basic concepts of graphic, including explicit and implicit lines and properties of graphics on high-resolution graphic screen. Graphic software for three dimensional graphics is used with the case study.
- CS 6235 Remote Sensing** **3 (2-2-0) Credits**
Prerequisite: SE 6103 Programming Language
 This course introduces basic concepts of remote sensing which observe an object from a distance. Topics covered include: origins of data, data compression, data reduction, and image processing and analysis. Remote sensing software is used with case study.
- CS 6240 Thai Utilities** **3 (2-2-0) Credits**
Prerequisite: SE 6103 Programming Language
 This course introduces Basic Input/ Output System (BIOS). Topics covered include: storage of Thai data, Sorting and searching of Thai data, algorithm to break Thai phrases and programs to display Thai. Thai utility software is used with case study.
- CS 6250 Operating Systems** **3 (2-2-0) Credits**
Prerequisite: SE 6103 Programming Language
 This course introduces basic concepts, structure and functionality of a generic operating system. The various components will be considered. The current operating system will be considered as case studies throughout the course. The view in this course is the one of an application program.
- CS 6310 Computer Architecture and Interface** **3 (3-0-0) Credits**
 This course presents the importance of computer architecture and interface to Computer Information Systems. Topics include the architecture and interface of various computer platforms, such as desk calculator, mobile phone, personal digital assistant, desktop computer, and workstation.
- CS 6401 Information Systems Analysis** **3 (3-0-0) Credits**
Prerequisite: CS 6102 Management Information Systems
 Application system development life cycle. Problem needs identification and feasibility assessment. Information requirement determination. Requirement analysis and logical specifications. Structured systems and Object Oriented systems modeling.
- CS 6402 Information Systems Design** **3 (3-0-0) Credits**
Prerequisite: CS 6102 Management Information Systems
 This course presents the design methods for both structured systems and object oriented. Structured systems design methods: application architecture and modeling, database design, input/output and user interface design. Objects oriented design methods: elements design, objects and classes design, human interface design.
- CS 6501 Computerized Decision Support Systems** **3 (3-0-2) Credits**
Prerequisite: CE 6404 Systems Analysis and Design
 This course explores the evolution and principles of Computerized Decision Support Systems. The structure and components are examined. Management issues and case studies are covered. Techniques for system development and practical assignments are included in this course.
- CS 6502 Management Information Systems Policy** **3 (3-0-0) Credits**
Prerequisite: CS 6102 Management Information Systems
 Planning an organizational information system. Organization of information system function. Computer center administration. Management information systems development. Selection and development of information system personnel. Social and legal environment. The information system executive.
- CS 6503 Computer Profession** **3 (3-0-0) Credits**
Prerequisite: CS 6102 Management Information Systems
 This course will begin by discussing the ethical issues that arise when information systems are developed and used. Business globalization will be portrayed as a principal characteristic of today's competition. The major thrusts in using strategic information systems to seek competitive advantage will be discussed. Strategies, forces, and tactics in competitive markets will be related to the deployment of strategic information systems.

- CS 6601 Data Communications and Computer Network** **3 (3-0-0) Credits**
 Principles underlying the interconnection of large numbers of computers. Transmission technologies: Ethernet, optical fiber, gigabit networks, cellular transmission and infrared. Intranets and internets. Reliable message passing, interoperability. Network technologies: servers, clients, access control.
- CS 6701 Artificial Intelligence Concepts** **3 (3-0-0) Credits**
 This course presents the evolution and basic concepts of artificial intelligence. Various AI techniques and their applications are discussed.
- CS 6710 Artificial Intelligence Languages** **3 (3-0-0) Credits**
Prerequisite: SE 6103 Programming Language
 This course presents the evolution of AI languages such as LISP and PROLOG. Students must master one of AI languages in this course.
- CS 6720 Machine Translation** **3 (2-2-0) Credits**
Prerequisite: SE 6103 Programming Language
 Evolution of machine translation of natural languages. Machine translation process. Symbols, Grammar, Semantics, Pragmatics. Computer packages for machine translation. Machine translation between Thai and English.
- CS 6730 Image Processing** **3 (2-2-0) Credits**
Prerequisite: SE 6103 Programming Language
 Digital image. Visual perception. Image model sampling and quantization. Image transformation. Fast transformation in one dimension and two dimensions. Convolution and correlation image enhancement. Histogram equalization. Smoothing. Homomorphic image model. Pseudo-color image processing. Case study.
- CS 6740 Expert Systems** **3 (3-0-2) Credits**
Prerequisite: CE 6404 Systems Analysis and Design
 This course explores the evolution and principles of Expert Systems. The structure and components are examined. Management issues and case studies are covered. Techniques for system development and practical assignments are included in this course.
- CS 6800 Computer-Assisted Education** **3 (3-0-0) Credits**
Prerequisite: CE 6404 Systems Analysis and Design
 This course explores the evolution and principles of Computer Information Systems in Education. The structure and components are examined. Management issues and case studies are covered. Techniques for system development and practical assignments are included in this course.
- CS 6810 Office Automation** **3 (3-0-0) Credits**
Prerequisite: CE 6404 Systems Analysis and Design
 This course explores the evolution and principles of Computer Information Systems in Office Automation. The structure and components are examined. Management issues and case studies are covered. Techniques for system development and practical assignments are included in this course.
- CS 6820 Factory Automation** **3 (3-0-0) Credits**
Prerequisite: CE 6404 Systems Analysis and Design
 This course explores the evolution and principles of Computer Information Systems in Factory Automation. The structure and components are examined. Management issues and case studies are covered. Techniques for system development and practical assignments are included in this course.
- CS 6900 Electronic Banking** **3 (3-0-0) Credits**
Prerequisite: CE 6404 Systems Analysis and Design
 This course explores the evolution and principles of Computer Information Systems in E-Banking. The structure and components are examined. Management issues and case studies are covered. Techniques for system development and practical assignments are included in this course.
- CS 6910 Current Topics in Computer Information Systems** **3 (3-0-0) Credits**
 Topics of current interest for the field of computer applications which changes rapidly.

- CS 6912 Information Systems Audit** **3 (3-0-0) Credits**
Prerequisite: CS 6102 Management Information Systems
 Most organizations today depend heavily upon the proper operation and security of their information systems. To ensure the viability of organizational functioning, it has become critical to pay significant attention to a variety of measures, called collectively, information system controls. For this reason, these controls and the audits that, in turn, ensure that the controls remain effective will be described.
- CS 6913 Client/Server Information Systems** **3 (3-0-2) Credits**
Prerequisite: CE 6404 Systems Analysis and Design
 This course aims to present fundamentals of client/server computing and a survey of latest technologies in this field. The structured techniques for client/server application development as well as the techniques for managing client/server systems will also be covered. The course will include practical assignments of developing client/server applications using latest and powerful development tool of MS-Visual Basic.Net.
- CS 6916 Telecommunication System & Internet Technology** **3 (3-0-0) Credits**
 This course aims to increase an understanding of the network aspects of the telecommunication environment. Study of the basic principles of radio and cable transmission systems, satellite communication and cellular mobile radio communication. To provide an understanding of broadband telecommunication technology and wired & wireless Internet technology: Digital Subscriber Line (DSL) and Mobile Internet.
- CS 6917 Information Systems Management** **3 (3-0-0) Credits**
Prerequisite: CS 6102 Management Information Systems
 This course will discuss the important of IS management. Topics covered include managing distribution systems, managing the IS operation, managing the application development, managing the decision support systems, and managing the people.
- CS 6920 Advanced Topics in Computer Information Systems** **3 (3-0-0) Credits**
 Advanced topics, which may be continuation to topic, offered in other lower-level courses.
- CS 6921 Database Management System and Structured Query Language** **3 (3-0-0) Credits**
 Topics covered include the details of relational database management system and structured query language (SQL).
- CS 6922 Advanced Database** **3 (3-0-0) Credits**
 This course will discuss advanced topics in database.
- CS 6930 Selected Topics in Computer Information Systems** **3 (3-0-0) Credits**
 Topics selected by the instructor to prepare students to continue their research.
- CS 6933 Hypermedia and Internet Computing** **3 (2-2-0) Credits**
Prerequisite: SE 6103 Programming Language
 This course introduces internet and computer programming. Topics covered include HTML, Dynamic HTML, Java Script, CSS and Style Sheet, XML, ASP, and Flash and Action Script.
- CS 6935 Local Area Network** **3 (3-0-0) Credits**
 This course will introduce the Local Area Network (LAN). Topics covered include architecture, systems, design and future trend.
- CS 6940 Seminar in Computer Information Systems** **3 (3-0-0) Credits**
 A Seminar in which each participant must study some specific topics, make a presentation and entertain questions from other participants.
- CS 6942 Business Data Communications** **3 (3-0-0) Credits**
 Importance and Necessity of Data Communication in Today's Business; Data Communications Protocol, Transmission Media, Residential Connection to Internet; LAN's and WANs Technology: Wired Ethernet LANs, Wireless and Virtual LANs, Wide Area Networks; Internetworking and Internet: Connecting LANs and WANs, the Internet; Network Security and Management: Firewall and VPNs, Network Analysis and Design, Network Management.

- CS 6945 Computer Applications in Agriculture** **3 (3-0-0) Credits**
Prerequisite: CE 6404 Systems Analysis and Design
 This course explores the evolution and principles of Computer Information Systems in Agriculture. The structure and components are examined. Management issues and case studies are covered. Techniques for system development and practical assignments are included in this course.
- CS 6950 Computer Applications in Medical Sciences** **3 (3-0-0) Credits**
Prerequisite: CE 6404 Systems Analysis and Design
 This course explores the evolution and principles of Computer Information Systems in Medical Sciences. The structure and components are examined. Management issues and case studies are covered. Techniques for system development and practical assignments are included in this course.
- CS 6951 Wireless Data Network** **3 (3-0-0) Credits**
 The objective of the course is first to provide an understanding of wireless data network and real-world knowledge through numerous detailed wireless implementation. Second is to preview emerging technologies including wireless phone systems, mobile Internet system, satellite system, wireless local loop (WILL), wireless LAN, Bluetooth, and etc. Last is to provide the basic principles of 3G/4G Mobile Wireless Technology.
- CS 6955 Computer Applications in Airlines** **3 (3-0-0) Credits**
Prerequisite: CE 6404 Systems Analysis and Design
 This course explores the evolution and principles of Computer Information Systems in Airlines. The structure and components are examined. Management issues and case studies are covered. Techniques for system development and practical assignments are included in this course.
- CS 6960 Computer Applications in Insurance** **3 (3-0-0) Credits**
Prerequisite: CE 6404 Systems Analysis and Design
 This course explores the evolution and principles of Computer Information Systems in Insurance. The structure and components are examined. Management issues and case studies are covered. Techniques for system development and practical assignments are included in this course.
- CS 6965 Computer Applications in Public Utilities** **3 (3-0-0) Credits**
Prerequisite: CE 6404 Systems Analysis and Design
 This course explores the evolution and principles of Computer Information Systems in Public Utilities. The structure and components are examined. Management issues and case studies are covered. Techniques for system development and practical assignments are included in this course.
- CS 6970 Computer Applications in Law Enforcement** **3 (3-0-0) Credits**
Prerequisite: CE 6404 Systems Analysis and Design
 This course explores the evolution and principles of Computer Information Systems in Law Enforcement. The structure and components are examined. Management issues and case studies are covered. Techniques for system development and practical assignments are included in this course.
- CS 6975 Computer Applications in Hotel** **3 (3-0-0) Credits**
Prerequisite: CE 6404 Systems Analysis and Design
 This course explores the evolution and principles of Computer Information Systems in Hotel. The structure and components are examined. Management issues and case studies are covered. Techniques for system development and practical assignments are included in this course.
- CE 6401 Management of Information Services** **3 (2-2-0) Credits**
 This course studies Administration and functions of computer center, including Planning and organizing computer operations, Staffing and personnel management, Computer selection and performance evaluation, Software evaluation and management, and Microcomputer and office automation management. Students taking this course are expected to serve in the computer center.
- CE 6402 Management and Information Services** **3 (3-0-0) Credits**
 The information service concept. Information service requirement. Information service staff selection and development. Daily operation of information services. Tools and techniques in information services. Technological changes in information services. Users of information services. Marketing of information services. Evaluation of information services.

CE 6403 Management of Computer Security	3 (3-0-0) Credits
Principles of computer security. Privacy and its technical implications on security. Operational security. Physical security. Hardware security. Data security and cryptography. Operating system security. Database security. Personnel and computer security.	
CE 6500 Principles of Engineering Management	3 (3-0-0) Credits
Overview of management topics, including marketing, finance, production/ operations, and human resource. Management of technology for transition of engineers to managers; technology forecasting; planning, organizing, staffing, controlling, and leading of technical activities. Systems engineering approach.	
CE 6503 Accounting for Engineering Management	3 (3-0-0) Credits
Study of accounting principles, procedures, and the application of accounting principles to management planning, control, and decision making. Includes financial statement analysis and cost and budgetary procedures.	
CE 6504 Cost Accounting	3 (3-0-0) Credits
Analysis of job, process, and standard cost accounting methods.	
CE 6506 Investment Analysis	3 (3-0-0) Credits
Comprehensive treatment of investment analysis including effects of taxation and inflation; sensitivity analysis; decisions with risks and uncertainty; decision trees and expected value, normally includes solutions on personal computer and student problem report.	
CE 6507 Engineering Economy	3 (3-0-0) Credits
The analysis of capital expenditures, multi-outcome considerations; risk and uncertainty, and cost of risk. The study of utility theory, dispersed service lives, expansion and economic package concepts, implementation, control and follow up of capital expenditures, mathematical programming, uncertainty, game theory, model building, and simulation, queuing evaluations of capital planning.	
CE 6508 Human Relations In Technical Management	3 (3-0-0) Credits
Human behavior in technical managerial situations, influencing and motivation performance, improving morale and discipline, and self-appraisal and analysis.	
CE 6509 Human Resource Management	3 (3-0-0) Credits
Current practices of procurement and maintenance of technical personnel in research, development, and design organizations. Adaptation of such personnel to the technological enterprise, current practices in personnel administration, labor-management relation-ships.	
CE 6510 Industrial Marketing Systems Analysis	3 (3-0-0) Credits
An analysis of the factors of engineered products, customers, communication; promotion, personal selling, persuasion, and management within a dynamic industrial sales environment.	
CE 6512 Case Studies In General Management	3 (3-0-0) Credits
A quantitative study of engineering management problems related to the functioning of industrial enterprise through case studies.	
CE 6513 Operations in Service Industries	3 (3-0-0) Credits
Study of the design and control of the service operations in industries including all aspects of management, such as, capacity planning, quality, queuing, material, site location, and related strategies.	
CE 6611 Computer Integrated Manufacturing Systems Management	3 (3-0-0) Credits
Study of the design and use of computer-based integrated manufacturing management systems in the allocation and control of plant, equipment, manpower, and materials.	
CE 6613 Industrial Automation	3 (3-0-0) Credits
Traditional (automobile) and modern (computer based) concepts in Industrial Automation. Computer control concepts (sensors, actuators), robotics, flexible manufacturing systems.	

- CE 6614 Packaging Management** **3 (3-0-0) Credits**
 Provides a comprehensive background in the field of packaging and its place in productive systems. Emphasizes the design or economics of the system. Analyzes the management of the packaging function and interrelationship with other functions of an enterprise.
- CE 6615 Packaging Materials** **3 (3-0-0) Credits**
 The objective is to explore in depth the major packaging materials used by industry and to give the student an understanding of material characteristics, applications, economics design consideration and their relationship in the total productive system.
- CE 6616 Project Management** **3 (3-0-0) Credits**
 Organization structure and staffing; motivation, authority, and influence; conflict management; project planning; network systems; pricing estimating, and cost control; proposal preparation; project information systems, international project management
- CE 6617 Business Logistics System Analysis** **3 (3-0-0) Credits**
 An analysis of logistics function as a total system including inventory, transportation, order processing, warehousing, material handling, location of facilities, customer service, and packaging with trade-off and interaction.
- CE 6618 Work Analysis And Design** **3 (3-0-0) Credits**
 The design process, work measurement, methods study, and methods design.
- CE 6619 Methods of Industrial Engineering** **3 (3-0-0) Credits**
 Topics to be covered will include the types of problems frequently encountered by industrial engineers, their impact on the management of an industrial concern, and an exposure to the industrial engineering techniques available to solve the problems.
- CE 6621 Inventories Strategies** **3 (3-0-0) Credits**
 Topics to be covered will include the nature of inventory systems and the types of management problems encountered in the operation of such systems. Deterministic models with (and without) typical industrial constraints will be examined along with periodic review models with stochastic models. Topics like MRP, JIT, and OPT will be also included.
- CE 6622 Facilities Layout Planning and Material Flows Systems** **3 (3-0-0) Credits**
 Plant design, layout techniques, materials handling analysis and equipment, line balancing. Computerized plant layout is also included.
- CE 6623 Productivity Engineering and Management** **3 (3-0-0) Credits**
 Study of various models, methods to improve the productivity of manufacturing and service organizations.
- CE 6701 Statistical Process Control** **3 (3-0-0) Credits**
 An integrated analysis of the quality assurance function. Quality engineering, sampling, inspection, and design review are discussed and related. Quantitative aspects of statistical quality control are introduced in context along with a review of Deming's principles of productivity improvement.
- CE 6702 Management of Quality Assurance** **3 (3-0-0) Credits**
 Management of quality including quality control, quality assurance, and the quality management system. Study of the international quality system standard – ISO 9000 and the principle of Total Quality Management (TQM).
- CE 6703 Experimental Design** **3 (3-0-0) Credits**
 Analysis of variance, completely randomized designs, randomized complete block designs other blocking configurations, rested designs, fixed, random and mixed models. Factorial experiments with qualitative and quantitative factors in various design. Single degree of freedom contrasts. Confounding in factorial experiments.
- CE 6704 Maintenance Management** **3 (3-0-0) Credits**
 Maintenance functions and the role of the technical manager in designing, supervising, and implementing maintenance program. Topic includes human aspects of maintenance, preventive maintenance, and computers in maintenance.

- CE 6707 System Simulation** **3 (3-0-0) Credits**
 Model design to simulate discrete event systems with elementary input and output analysis through the use of high order languages applied to industrial engineering problems, introduction to special purpose simulation of languages.
- CE 6708 Sociotechnical Systems** **3 (3-0-0) Credits**
 A through examination of the sociotechnical approach to design and management. Systems of production; principle of design; participative decision making, semi-autonomous work groups.
- CE 6709 Systems Theory ad Cybernetics** **3 (3-0-0) Credits**
 A rigorous introduction to the foundations of systems science and cybernetics. Transformations; information theory, control theory, self-regulation, autopoiesis, organizational closure, self-reference. Application of systems analysis, human communication, and decision making.
- CE 6803 Technology, Policy, ad Society** **3 (3-0-0) Credits**
 The role and implications of technology and technological thinking on society. The nature of public policy with respect to science and technology. The international technology transfer. World modeling and simulation, with special emphasis on third world issues.
- CE 6804 Energy Management** **3 (3-0-0) Credits**
 Appraisal of energy conservation management, economic efficiency of energy sources and energy productivity analysis. Principles of energy efficiencies and energy balance analysis interfaced with engineering management theory.
- CE 6805 Environmental Management** **3 (3-0-0) Credits**
 Technical, economic, political, administrative, and social forces influencing the quality of the environment and the use of resources. Review of government and industrial programs to combat pollution of the air, land and water. Review of existing and pouncing legislation involving environmental and related energy matters, theoretical aspects of specific management problems, procedures for promoting public participation.
- CE 6950 Current Topics in CEM** **3 (3-0-0) Credits**
Prerequisite: CE 6500 Principles of Engineering Management
 Topics of current interest in the field of computer and engineering management.
- CE 6955 Advanced Topics in CEM** **3 (3-0-0) Credits**
Prerequisite: CE 6500 Principles of Engineering Management
 Advanced topics, which may be continuation of a topic, offered in other lower-level courses.
- CE 6960 Selected Topics in CEM** **3 (3-0-0) Credits**
Prerequisite: CE 6500 Principles of Engineering Management
 Topics selected by the instructor to prepare students to continue their research.
- CE 6965 Seminar in CEM** **3 (3-0-0) Credits**
Prerequisite: CE 6500 Principles of Engineering Management
 A seminar in which each participant must study some specific topics, make a presentation and entertain questions from other participants.
- CE 6970 Directed Study in CEM** **3 (3-0-0) Credits**
Prerequisite: CE 6500 Principles of Engineering Management
 Study of topics in CEM directed by the instructor. Each student is expected to present the result of his study to his instructor for comments and evaluation.
- IC 6012 Web Publishing and Design** **3 (3-0-0) Credits**
 This course brings the novice up to speed on current developments on the World Wide Web. Topics include an introduction to the global Internet, the World Wide Web, current web browsers and installing browser-related software, HTML fundamental, Images and multimedia, Page and site design issues, Tables, style sheets, and frames.
- IC 6016 Programming and Designing with Java Script** **3 (2-2-0) Credits**
 This course teaches client-side scripting with the JavaScript programming language. It focuses on using JavaScript to enhance the user interface of web-based presentations. Topics include language

elements, objects and events, related HTML, strings, conditionals, loop, forms validation, cookies, windows, frames, security, and development environments.

IC 6017 Learning Java on the Web

3 (2-2-0) Credits

This course introduces the Java language as a way to enhance web-based presentations. Topics include object-oriented design, Java virtual machine, Java language, client-side applications (applets) for graphics, animation, user interface (AWT), Java security, development environments, and Beans.

IC 6018 Developing Secure Commerce Applications

3 (3-0-2) Credits

This course focuses on developing secure commerce applications for the Internet. It introduces security attacks and threats along with standard defenses such as firewalls. Additional topics include secure protocols such as SSL and S-MIME, Cryptographic applications such as privacy, authentication, and message integrity, advanced crypto applications such as digital signatures and certificates, payment protocols such as SET, JEPI, and digital forms of cash.

IC 6019 Learning VBScript and ActiveX

3 (2-2-0) Credits

This course introduces Microsoft's strategy for web application development. It covers Microsoft's "active platform" including ActiveX controls, ActiveX documents, VB script, and Active Server Pages. Topics include Internet Explorer, control development with Control Pad and Visual Basic, DCOM, security, code signing, and development environments.

IC 6022 TCP/IP Network Administration

3 (3-0-0) Credits

This course introduces the environment in which TCP/IP networking is generally used and describes the overall architecture of the TCP/IP protocol suite. Topics include internetworking concept, the functional layers of TCP/IP architecture, the addressing mechanism used to identify computing systems in a TCP/IP internet. Network management, administration, and troubleshooting procedures that system and network administrators employ in keeping a TCP/IP internet running.

IC 6201 Computer Networking

3 (3-0-0) Credits

Principles underlying the interconnection of large numbers of computers. Transmission technologies: Ethernet, optical fiber, gigabit networks, cellular transmission and infrared. Intranets and internets. Reliable message passing interoperability. Network technologies: serves, client, access control.

IC 6401 Banking and Electronic Payment Systems

3 (3-0-0) Credits

Technology for managing payments across electronic networks, including the banking and electronic funds transfer network. Payment gateways, electronic presentment, clearance, dishonor. Credit card transactions, electronic bill payments. Properties and examples of digital cash: cash, cyber cash. Electronic banking, SET, electronic purses, negotiable electronic instruments, secure checks, billing servers, CAF?, SEMPER, Minipay, micro payments. Authenticity, integrity, provability of transactions. Methods for assuring delivery before payment: electronic bills of lading, letters of credit. Point-of-sale transactions, mail order/telephone order (MOTO) systems. Risks: money laundering, kiting, offshore issues. Allocation of risk among buyer, selling, bank and intermediaries.

IC 6501 Managerial Economics

3 (3-0-0) Credits

Basic concepts of microeconomics theory with an emphasis on business applications. The approach of microeconomics is to solve an economic problem by modeling it as an optimization problem; the solution to the optimization problems then interpreted in terms of the original economic problem. This approach will be used to answer such problems as input selection, pricing and project selection. The format of the class is to present theory common to a general class of applied problems and then to apply the theory by solving actual problems. The goal of the class is for the students to be capable of applying the basic concepts to problems faced both future classes (e.g. finance, macroeconomics) and future careers.

IC 6510 Finance and Financial Accounting

3 (3-0-0) Credits

An introduction to the fundamentals of accounting and financial problems faced by firms and the models used to address them. Topics include time value of money and compounding, capital budgeting, portfolio theory and diversification, risk and return, capital structure and dividend policy, and the term structure of interest rates. Financial statements, the balance sheet, the income statement, the statement of cash flows, and the statement of retained earnings, Specific income statement and balance sheet items such as: revenue recognition, current assets (including accounts receivable and inventories, non-current assets, current liabilities, non-current liabilities (including bonds and leases), inter-corporate investment and business combinations, and income taxes.

IC 6444 System Reliability**3 (3-0-0) Credits**

Complex software systems must satisfy not only requirements about functionality but also requirements about other critical properties such as reliability, security, safety, and survivability. This course addresses the related questions of what constitutes "good enough" with respect to critical properties, how we design software systems that satisfy these criteria, and how we gather evidence to decide whether a given software system is good enough to use in a particular setting. We will examine properties of systems such as reliability, security, safety, and survivability and design/analysis techniques such as risk analysis, hazard analysis, error recovery, and associated design processes.

IC 6601 Applied Data Analysis**3 (3-0-0) Credits**

This course develops methods for analyzing statistical relationships involving several variables. Techniques studied in the course are useful for a variety of business applications in accounting, finance, marketing, production and other areas. The course emphasizes formulating models and using them for decision making prediction. Topics include assessing the accuracy of coefficient estimates and predictions (interval estimation and hypothesis testing), and the more general problem of assessing the suitability of a model (specification analysis). The course involves extensive hands-on work with state-of-the-art software and data from a variety of real-world applications.

IC 6612 Information Retrieval**3 (3-0-0) Credits**

This course develops methods for analyzing statistical relationships involving several variables. Techniques studied in the course are useful for a variety of business applications in accounting, finance, marketing, production and other areas. The course emphasizes formulating models and using them for decision making prediction. Topics include assessing the accuracy of coefficient estimates and predictions (interval estimation and hypothesis testing), and the more general problem of assessing the suitability of a model (specification analysis). The course involves extensive hands-on work with state-of-the-art software and data from a variety of real-world applications.

IC 6666 Human-Computer Interaction**3 (3-0-0) Credits**

This course provides an overview and introduction to the field of human-computer interaction. It introduces students to tools, techniques, and sources of information about HCI and provides a systematic approach to design. The course increases awareness of good and bad design through observation of existing technology, and teaches the basic skills of task analysis, and analytic and empirical evaluation methods. Cognitive issues, "friendly" systems and cultural differences in system usage are also discussed.

IC 6766 Supply Chain Management**3 (3-0-0) Credits****Prerequisite: IC 6001 Internet and E-Commerce Technology**

A survey of basic manufacturing management. Management of raw materials and finished inventory to maximize return on investment. The interrelationship of obtaining materials, working on and storing them internally, and delivering them to their final destination in the face of uncertainty, changing prices and varying demands. Inventory and reorder policies. Order fulfillment. Dealing with peak and slack demands.

IC 6777 Competitive Strategy**3 (3-0-0) Credits**

This course will survey the basic management principles and current thinking in corporate strategy with a focus on the organization. The course meets once a week in an executive program format and employs the Socratic method, encouraging in-class discussion between students and instructor. The course focuses on economic and technological change: strategic management of operations, fast-cycle management, strategic capital budgeting, corporate restructuring, and global business strategy. The methodology for the course is Sustainability Analysis, winner of the 1992 Pacific Telesis Award.

IC 6910 – 6919 Current Topics in Internet and E-Commerce**3 (3-0-0) Credits**

Topics of current interest for the field of internet and E-Commerce which changes rapidly.

IC 6920 – 6929 Advanced Topics in Internet and E-Commerce**3 (3-0-0) Credits**

Advanced topics which may be continuation to topic offered in other lower-level courses.

IC 6930 – 6939 Selected Topics in Internet and E-Commerce**3 (3-0-0) Credits**

Topic selected by the instructor to prepare students to continue their research.

- IC 6940 Seminar in Internet and E-Commerce** **3 (3-0-0) Credits**
 A seminar in which each participant must study some specific topics, make a presentation and entertain questions from other participants.
- IC 6960 C. T. in IEC (Technical Communication)** **3 (3-0-0) Credits**
 Topics selected by the instructor to prepare students to continue their research
- SE 6101 Principles of Programming Languages** **3 (3-0-0) Credits**
Prerequisite: SE 6103 Programming Language
 This course is for students interested in high-level programming languages and their formal semantics. Such study enables precise reasoning about programs, their efficient implementation and easy reuse, as will be discussed in the course. The materials to be covered include operational semantics, denotation semantics, and axiomatic semantics. We will consider imperative programming languages, functional programming languages, object-oriented programming languages, logic programming languages, and programming languages with sets and maps. We will look at topics including type systems, abstraction mechanisms, efficient implementation, and declarative ness. We will also study concurrency and parallelism.
- SE 6102 Software Engineering** **3 (3-0-0) Credits**
Prerequisite: SE 6103 Programming Language
 This course explores the principles and practices of software engineering. Topics include software development processes, system requirements analysis, modern software design and implementation, software testing, and software maintenance. Unified modeling language (UML) will be covered to model static and dynamic behaviors of software systems. Students will participate in a group project on software development.
- SE 6202 Database System and Design** **3 (3-0-0) Credits**
Prerequisite: SE 6103 Programming Language
 Database concepts, introduction to database management. Relational database, object and object relational database. Database design using normalization technique. The entity-relationship models and the transformation to logical databases. The object role model and case studies.
- SE 6203 Software Systems Architectures** **3 (3-0-0) Credits**
Prerequisite: SE 6103 Programming Language
 This course provides in-depth explanations of architectural design for large and complex software systems. Topics include commonly-used models and notations for expressing and reasoning about software system architectures, design patterns, techniques for designing and implementing the architectures, and refactoring.
- SE 6301 Database Engineering** **3 (3-0-0) Credits**
Prerequisite: SE 6103 Programming Language
 Database management system concept. Transaction processing, concurrency control, recovery control, backup and recovery. Physical database and access mechanisms. Query processing and optimization. Distributed databases, advanced research topic in databases.
- SE 6302 Internet Applications Programming** **3 (2-2-0) Credits**
Prerequisite: SE 6103 Programming Language
 This course develops advanced skills using the Perl programming language. The special focus is in using Perl to develop robust Internet and intranet applications. Topics of study include advanced parsing techniques, directory and file manipulation, advanced process management, Perl functions and libraries, Perl debugging, modules, object-oriented usage, databases and structured query language (SQL), CGI access to databases, Perl DBM databases, advanced windows issues, security for Perl CGI, and performance issues.
- SE 6303 Mobile Programming** **3 (2-2-0) Credits**
Prerequisite: SE 6103 Programming Language
 This course will teach students how to program mobile phones and other hand-held devices using current technologies. Topics cover fundamentals of mobile programming, user interface, data access and storage, and performance issues for hand-held devices. Mobile games programming. Wireless programming for Smartphone, PocketPC. Students will participate in a group project to design and develop the mobile applications.

SE 6910 – 6919 Current Topics in Software Engineering 3 (3-0-0) Credits

Topics of current interest for the field of software engineering which changes rapidly.

SE 6920 – 6929 Advanced Topics in Software Engineering 3 (3-0-0) Credits

Advanced topics which may be continuation to topic offered in other lower-level courses.

SE 6930 – 6939 Selected Topics in Software Engineering 3 (3-0-0) Credits

Topic selected by the instructor to prepare students to continue their research.

SE 6940 Seminar in Software Engineering 3 (3-0-0) Credits

A seminar in which each participant must study some specific topics, make a presentation and discussion.

5. Master's Project

IS 6998 Master's Project 3 (0-0-3) Credits

6. Master's Thesis

IS 7000 Master's Thesis 3 (0-0-3) Credits

IS 7001 Master's Thesis 9 (0-0-9) Credits