

## COLLEGE OF INFORMATION TECHNOLOGY

### COLLEGE OVERVIEW

The College of Information Technology provides the structure and organization for male and female students to successfully pursue degree programs in Information Technology, Computer Science, and Computer Engineering at the undergraduate level.

#### **Vision and Mission**

##### Vision

The College of Information Technology will provide a unique and distinguished academic unit that participates in:

- Preparing future Information Technology and Computer Science and Engineering professionals and leaders who can support the emergence of Saudi Arabia as a global IT resource.
- Enriching and developing Information Technology intellectual resources.
- Exploring innovative instructional methodologies and technologies to provide the highest quality effective preparation of information technology professionals.
- Establishing communication and the exchange of ideas between the academic and business communities

##### Mission

The College of Information Technology will achieve the following objectives:

- Contribute to advancement of human intelligence and to the promulgation and development of knowledge and understanding in the Information Technology domain.
- Prepare professionals in Information Technology and Computer Science and Engineering, through the utilization of innovative educational processes, in a modern technological environment.
- Transform the graduate to play a pioneering and leading role in the community, enabling him or her to take responsibilities and contribute to solving problems through innovative thinking, collective work, reflection, and self-development.
- Link academic programs and specializations with actual requirements of the surrounding work environment. This will be achieved by maintaining effective partnerships between the university and local business and industry.

- Guide research activities to create solutions for persistent problems in surrounding communities through applied research and technical consultation. The importance of performing basic scientific research for enriching human intelligence should not be neglected.
- Provide community service through continuous training and education.

### **Degrees Offered**

The College of Information Technology offers the following degree programs:

Bachelor of Science in Information Technology  
 Bachelor of Science in Computer Science  
 Bachelor of Science in Computer Engineering.

### **ADMISSIONS PROCESS AND REQUIREMENTS**

Admission to the College of Information Technology is open to students who have successfully completed the PMU Preparation Year Program or who have met the university criteria for bypassing the program.

The degree programs in the College of Information Technology are designed to accept both male and female students.

#### **Required Courses in the Preparation Year Program**

PMU's Preparation year Program concentrates on English language, mathematics, and study skills. Within this program, the first semester math course, PRPM 0011: Introductory Algebra, is required of all students. However, during the second semester of mathematics, students have a choice of two tracks, depending on their desired major at the university.

Students seeking entrance to the College of Information Technology are required to take PRPM 0022: Pre-Calculus, during the second semester of the Preparation Year Program.

### **PERFORMANCE EXPECTATIONS**

#### **Required Grade Average**

The College of Information Technology provides for minimum standards of academic performance from its students. Using a 4.0 scale for course grades, the College of Information Technology requires that students maintain minimum grades of:

- 2.0 in courses from the PMU Core Curriculum
- 2.0 in all degree-specific courses (courses from the Core Curriculum that IT students must complete beyond the minimum requirement)
- 2.25 in all courses required by the college (courses with the GEIT prefix)

- 2.5 in all courses within the academic discipline

A student who receives a D or F in any course is required to repeat the course (in the case of an elective, another elective may be selected) and to achieve the required grade point.

These students will be required to participate in tutoring and remediation programs offered by the college faculty and Learning Resources Center.

### **Student Computing Requirements**

Students within the College of Information Technology are required to have personal laptop computers. They will have access to the university-wide technology-infused environment including wireless Internet access.

Students in the college will have additional specific computing requirements that extend beyond the standard Microsoft Office applications of a typical laptop. They will require access to compilers, design tools, and specialized computing environments.

## **COMPONENTS OF DEGREE PROGRAMS**

The degree programs in the College of Information Technology consist of 128-133 semester credit hours.

### **Majors in IT, Computer Science, Computer Engineering**

Each of the degree programs offered within the College of Information Technology consists of five components.

General Education Requirements: These requirements for the University Core Curriculum and College Core Curriculum include 60 credit hours of courses in PMU core competencies, communication, Arabic Language and Islamic Studies, physical education, mathematics, laboratory science, and social and behavioral sciences.

Degree-Specific Requirements: Each degree program has its own requirements for additional courses from PMU's Core Curriculum in support of the degree program. Those courses will primarily be drawn from mathematics and laboratory science courses. The degree-specific requirements are unique to each degree program.

College of Information Technology Requirements: These requirements will consist of seven courses totaling 22 credit hours that are common to all degree programs within the College of Information Technology. They represent a base of knowledge that is presumed for all IT and computing professionals. The courses within the College of Information Technology that meet these requirements are designated with the prefix GEIT. The courses include the following:

- GEIT 1411: Computer Science I
- GEIT 1412: Computer Science II
- GEIT 1311: Computer Organization
- GEIT 2291: Professional Ethics

GEIT 3341: Database Design  
GEIT 3351: Software Engineering I  
GEIT 4351: Software Engineering II

Degree Program Requirements: Each degree program has unique requirements that differ from others within the college.

Electives. Each degree program identifies the available electives and any constraints that apply to the elective selection.

### **Capstone Series**

Building on the sophomore and junior level Capstone Series courses required by the PMU Core Curriculum, the college's series is comprised of three courses, GEIT 3351: Software Engineering I, GEIT 4351: Software Engineering II and ASSE 4311: Learning Outcome Assessment III. Each course in the series centers on a different facet of software engineering.

**GEIT 3351: Software Engineering I** examines the theory and practice of software development and maintenance with the focus being on the full software development life cycle, including coverage of tools, techniques, principles, and guidelines for software requirements, specification, design and implementation.

**GEIT 4351: Software Engineering II** focuses on the application of that theory and practice in the design of a solution to a significant software engineering problem. This course will culminate in the development of full design documentation for such a solution.

**ASSE 4311: Learning Outcome Assessment III** concentrates on the implementation, testing, debugging and maintenance of a designed software engineering solution.

## **COURSES REQUIRED FOR MAJORS**

### **Information Technology**

The Bachelor of Science in Information Technology is comprised of five components:

PMU's Core Curriculum: This core curriculum consists of 60 hours of coursework as described on page 87.

The College of Information Technology Requirements: These requirements consist of 22 hours of coursework contained in the seven college courses designated with the GEIT prefix as described on page 88.

Degree-Specific Requirements: These requirements represent support courses in mathematics, laboratory science and business. These requirements both specify and extend Core Curriculum requirements. The degree-specific requirements add 7 credit hours to the degree

program.

The Information Technology degree program extends PMU's Core Curriculum mathematics requirement from six to nine semester credit hours of mathematics and specifies that the courses will be:

MATH 1311 Finite Mathematics for Business  
MATH 1331 Pre-Calculus Mathematics  
MATH 1321 Statistical Methods

The Information Technology degree program extends PMU's Core Curriculum requirement in Natural and Physical Sciences from eight to 12 semester credit hours and specifies that the courses will be:

PHYS 1412 Physics for Engineers I  
PHYS 1413 Physics for Engineers II  
Natural Science elective

The Degree Program Requirements: These requirements consist of 27 hours of coursework as follows:

ITAP 2381: Operations Research  
ITAP 2431: Network Management  
ITAP 3471: Web Server Management  
ITAP 3381: Business Process Redesign  
ITAP 3382: Business Intelligence  
ITAP 3383: Enterprise Resource Planning Systems  
ITAP 3431: Network Security  
ITAP 4371: e-Commerce

Electives: The Information Technology degree program requires six semester credit hours from the College of Business Administration including:

A three-hour Management Information Science elective  
Any other three-hour course from the College of Business Administration

The Information Technology Degree Program requires three semester credit hours of electives to be taken from an approved list of 3000 level and 4000 level courses within the College of Information Technology. The course GEIT 4361: Practical Training also may be taken as an elective.

## **Computer Science**

The Bachelor of Science in Computer Science is comprised of four components:

PMU's Core Curriculum: This core curriculum consists of 60 hours of coursework as described on page 87.

The College of Information Technology Requirements: These requirements consist of 22 hours of coursework contained in the seven college courses designated with the GEIT prefix as described on page 88.

Degree-Specific Requirements: These requirements represent support courses in mathematics, laboratory science and business. These requirements both specify and extend Core Curriculum requirements. The degree-specific requirements add 12 credit hours to the degree program.

The Computer Science degree program extends the PMU's Core Curriculum mathematics requirement from six to 14 semester credit hours and specifies that the courses will be:

MATH 1432: Calculus I  
MATH 1433: Calculus II  
MATH 1321: Statistical Methods  
MATH 2332: Linear Algebra

The Computer Science degree program extends PMU's Core Curriculum requirement in Natural and Physical Sciences from eight to 12 semester credit hours and specifies that the courses will be:

PHYS 1412: Physics for Engineers I  
PHYS 1413: Physics for Engineers II  
Natural Science elective

The Degree Program Requirements: These requirements consist of 27 hours of coursework as follows.

COSC 2332: Discrete Structures  
COSC 3343: Database Theory  
COSC 3351: Algorithms  
COSC 3411: System Programming  
COSC 3421: Data Structures  
COSC 4361: Operating Systems  
COSC 4362: Artificial Intelligence  
COSC 4363: Automata Theory  
COSC 4461: Programming Languages

Electives: The Computer Science Degree Program requires six to eight semester credit hours of elective to be taken from an approved list of 4000 level courses within the College of Information Technology. The course GEIT 4361: Practical Training also may be taken as an elective.

## **Computer Engineering**

The Bachelor of Science in Computer Engineering is comprised of five components:

PMU's Core Curriculum: This core curriculum consists of 60 hours of

coursework as described on page 87.

Degree Specific Requirements: These requirements represent support courses in mathematics, laboratory science and business. These requirements both specify and extend Core Curriculum requirements. The degree-specific requirements add 15 credit hours to the degree program.

The Computer Science degree program extends PMU's Core Curriculum mathematics requirement from six semester credit hours to 17 hours and specifies that the courses be:

MATH 1422: Calculus I  
MATH 1423: Calculus II  
MATH 1324: Calculus III  
MATH 2332: Differential Equations  
MATH 2331: Linear Algebra

The Computer Science degree program extends PMU's Core Curriculum Natural and Physical Sciences requirement from eight to 12 hours and specifies that the courses be:

PHYS 1421: Physics for Engineers I  
PHYS 1422: Physics for Engineers II  
Natural Science elective

The College of Information Technology Requirements: These requirements consist of 22 hours of coursework contained in the seven college courses designated with the GEIT prefix as described on page 88.

The Degree Program Requirements: These requirements consist of 24 hours of coursework as identified below.

COEN 2311: Circuits I\*  
COEN 2111: Circuits I Lab  
COEN 3421: Electronics I\*  
COEN 3323: Digital Systems\*  
COEN 3312 : Circuits II\*  
COEN 3322: Signals and Systems\*  
ITAP 3431: Network Security

*\*Courses cross-listed with the General Engineering and Electrical Engineering curriculum*

Electives: The Computer Science Degree Program requires six to eight semester credit hours of electives to be taken from an approved list of 4000 level courses within the College of Information Technology. The course GEIT 4361: Practical Training also may be taken as an elective.

## **COURSE SEQUENCE FOR MAJORS**

## Information Technology

Total Semester Credit Hours: 128

### Freshman Program

<i>First Semester</i>	<i>Hours</i>
ALIS 1211: Arabic Language / Islamic Studies .....	2
PHED 1111: Physical Education .....	1
COMM 1311: Written Communication.....	3
UNIV 1211: Professional Development and Competencies.....	2
MATH 1311: Finite Mathematics for Students of Business.....	3
PHYS 1421: Physics for Engineers I.....	4
GEIT 1411: Computer Science I.....	4
<b>Total Hours: .....</b>	<b>19</b>

<i>Second Semester</i>	<i>Hours</i>
ALIS 1212: Arabic Language / Islamic Studies .....	2
PHED 1112: Physical Education .....	1
COMM 1312: Writing and Research.....	3
UNIV 1212: Critical Thinking and Problem Solving.....	2
MATH 1331: Pre-Calculus Mathematics .....	3
PHYS 1422: Physics for Engineers II.....	4
GEIT 1412: Computer Science II.....	4
<b>Total Hours: .....</b>	<b>19</b>

### Sophomore Program

<i>First Semester</i>	<i>Hours</i>
ALIS 2211: Arabic Language / Islamic Studies .....	2
ASSE 2111: Learning Outcome Assessment I .....	1
COMM 2311: Oral Communications .....	3
UNIV 1213: Leadership and Teamwork.....	2
MATH 1312: Calculus for Students of Business.....	3
MATH 1321: Statistical Methods.....	3
GEIT 2291: Professional Ethics in IT.....	2
<b>Total Hours: .....</b>	<b>16</b>

<i>Second Semester</i>	<i>Hours</i>
ALIS 2211: Arabic Language / Islamic Studies .....	2

COMM 2312: Technical and Professional Communications .....	3
GEIT 1311: Computer Organization I .....	3
ITAP 2431: Network Management.....	4
ITAP 2381: Operations Research .....	3
Social Science Elective* .....	3
<b>Total Hours: .....</b>	<b>18</b>

*\*Select any Social Science course from the College Core Curriculum.*

### Junior Program

<i>First Semester</i>	<i>Hours</i>
ALIS 3211: Arabic Language / Islamic Studies .....	2
ASSE 3211: Learning Outcome Assessment II .....	2
GEIT 3341: Database Design .....	3
ITAP 3471: Web Server Management.....	4
ITAP 3383: Enterprise Resource Planning Systems.....	3
<b>Total Hours: .....</b>	<b>14</b>

<i>Second Semester</i>	<i>Hours</i>
ALIS 3212: Arabic Language / Islamic Studies .....	2
GEIT 3351: Software Engineering I.....	3
ITAP 3382: Business Intelligence .....	3
ITAP 3431: Network Security .....	4
ITAP 3381: Business Process Redesign .....	3
<b>Total Hours: .....</b>	<b>15</b>

### Senior Program

<i>First Semester</i>	<i>Hours</i>
ALIS 4211: Arabic Language / Islamic Studies .....	2
GEIT 4351: Software Engineering II.....	3
ITAP 4371: e-Commerce .....	3
IT Elective*.....	3
Natural Science Elective** .....	4
<b>Total Hours: .....</b>	<b>15</b>

*\*Elective should be selected from COEN 4331: Network Theory, COSC 3343: Database Theory, GEIT 4361: Practical Training, ITAP 4341: Database Management, or ITAP 4372: e-Collaboration*

*\*\*Select any Natural Science course from the College Core Curriculum except Introductory Physics*

<i>Second Semester</i>	<i>Hours</i>
ASSE 4311: Learning Outcome Assessment III (Capstone) .....	3
MIS Elective* .....	3
Business Elective* .....	3
Social Science Elective** .....	3

**Total Hours: ..... 12**

*\*Elective should be 4000-level course.*

*\*\*Select any Social Science course from the College Core Curriculum.*

## **Computer Science**

Total Semester Credit Hours: 130-132

### Freshman Program

<i>First Semester</i>	<i>Hours</i>
ALIS 1211: Arabic Language / Islamic Studies .....	2
PHED 1111: Physical Education .....	1
COMM 1311: Written Communication.....	3
UNIV 1211: Professional Development and Competencies.....	2
MATH 1422: Calculus I .....	4
GEIT 1411: Computer Science I.....	4
<b>Total Hours: .....</b>	<b>16</b>

<i>Second Semester</i>	<i>Hours</i>
ALIS 1212: Arabic Language / Islamic Studies .....	2
PHED 1111: Physical Education .....	1
COMM 1312: Writing and Research.....	3
UNIV 1212: Critical Thinking and Problem Solving.....	2
MATH 1423: Calculus II.....	4
GEIT 1412: Computer Science II.....	4
GEIT 1311: Computer Organization .....	3
<b>Total Hours: .....</b>	<b>19</b>

### Sophomore Program

<i>First Semester</i>	<i>Hours</i>
ALIS 2211: Arabic Language / Islamic Studies .....	2
ASSE 2111: Learning Outcome Assessment I .....	1
COMM 2311: Oral Communication.....	3
UNIV 1213: Leadership and Teamwork.....	2
PHYS 1421: Physics for Engineers I.....	4
MATH 1321: Statistical Methods.....	3
<b>Total Hours: .....</b>	<b>15</b>

<i>Second Semester</i>	<i>Hours</i>
ALIS 2212: Arabic Language / Islamic Studies .....	2
COMM 2312: Technical and Professional Communications .....	3
COSC 2332: Discrete Structures .....	3
PHYS 1422: Physics for Engineers II.....	4
GEIT 3341: Database Design .....	3
Social Science Elective* .....	3
<b>Total Hours: .....</b>	<b>18</b>

*\*Select any Social Science course from the College Core Curriculum.*

Junior Program

<i>First Semester</i>	<i>Hours</i>
ALIS 3211: Arabic Language / Islamic Studies .....	2
ASSE 3211: Learning Outcome Assessment II .....	2
MATH 2332: Linear Algebra .....	3
COSC 3411: System Programming .....	4
COSC 3421: Data Structures .....	4
GEIT 2291: Professional Ethics.....	2
<b>Total Hours: .....</b>	<b>17</b>

<i>Second Semester</i>	<i>Hours</i>
ALIS 3212: Arabic Language / Islamic Studies .....	2
GEIT 3351: Software Engineering I.....	3
COSC 3343: Database Theory.....	3
COSC 3351: Algorithms.....	3
Natural Science Elective* .....	4
<b>Total Hours: .....</b>	<b>15</b>

*\*Select any Natural Science course from the College Core Curriculum.*

Senior Program

<i>First Semester</i>	<i>Hours</i>
ALIS 4211: Arabic Language / Islamic Studies .....	2
GEIT 4351: Software Engineering II.....	3
COSC 4361: Operating Systems.....	3
COSC 4461: Programming Languages.....	4
IT Elective* .....	3-4
<b>Total Hours: .....</b>	<b>15-16</b>

*\*Select any course from COEN 4331: Network Theory, COSC 4311: Parallel Computing, COCS 4364: Compilers, ITAP 4341: Database Management, ITAP 4372: e-Collaboration, or GEIT 4361: Practical Training.*

<i>Second Semester</i>	<i>Hours</i>
ASSE 4311: Learning Outcome Assessment III (Capstone) .....	3
COSC 4362: Artificial Intelligence .....	3
COSC 4363: Automata Theory.....	3
Social Science Elective** .....	3
IT Elective* .....	3-4
<b>Total Hours: .....</b>	<b>15-16</b>

*\*Select any course from COEN 4331: Network Theory, COSC 4311: Parallel Computing, COCS 4364: Compilers, ITAP 4341: Database Management, ITAP 4372: e-Collaboration, or GEIT 4361: Practical Training.*

*\*\*Select any Social Science course from the College Core Curriculum.*

## **Computer Engineering**

Total Hours: 130-133

### Freshman Program

<i>First Semester</i>	<i>Hours</i>
ALIS 1211: Arabic Language / Islamic Studies .....	2
PHED 1111: Physical Education .....	1
COMM 1311: Written Communication.....	3
UNIV 1211: Professional Development and Competencies.....	2
MATH 1422: Calculus I.....	4
GEIT 1411: Computer Science I.....	4
<b>Total Hours: .....</b>	<b>16</b>

<i>Second Semester</i>	<i>Hours</i>
ALIS 1212: Arabic Language / Islamic Studies .....	2
PHED 1112: Physical Education .....	1
COMM 1312: Writing and Research.....	3
UNIV 1212: Critical Thinking and Problem Solving.....	2
PHYS 1421: Physics for Engineers I.....	4
MATH 1423: Calculus II.....	4
GEIT 1412: Computer Science II.....	4
<b>Total Hours: .....</b>	<b>20</b>

### Sophomore Program

<i>First Semester</i>	<i>Hours</i>
ALIS 2211: Arabic Language / Islamic Studies .....	2
ASSE 2111: Learning Outcome Assessment.....	1
COMM 2311: Oral Communication.....	3
UNIV 1213: Leadership and Teamwork.....	2
MATH 1324: Calculus III.....	3
GEIT 2291: Professional Ethics.....	2
PHYS 1422: Physics for Engineers II.....	4
<b>Total Hours: .....</b>	<b>17</b>

<i>Second Semester</i>	<i>Hours</i>
ALIS 2212: Arabic Language / Islamic Studies .....	2
COMM 2312: Technical and Professional Communications .....	3
COEN 2311: Circuits I.....	3
COEN 2111: Circuits Lab.....	1
GEIT 1311: Computer Organization .....	3
MATH 2332: Differential Equations .....	3
Social Science Elective* .....	3
<b>Total Hours: .....</b>	<b>18</b>

*\*Select any Social Science course from the College Core Curriculum.*

Junior Program

<i>First Semester</i>	<i>Hours</i>
ALIS 3211: Arabic Language / Islamic Studies .....	2
ASSE 3211: Learning Outcome Assessment II .....	2
COEN 3323: Digital Systems .....	3
GEIT 3341: Database Design .....	3
COEN 3312: Circuits II .....	3
COEN 3421: Electronics I .....	4
<b>Total Hours: .....</b>	<b>17</b>

<i>Second Semester</i>	<i>Hours</i>
ALIS 3212: Arabic Language / Islamic Studies .....	2
GEIT 3351: Software Engineering I .....	3
COEN 3322: Signals and Systems.....	3
MATH 2331: Linear Algebra .....	3
Lab Science Elective* .....	4
<b>Total Hours: .....</b>	<b>15</b>

*\*Select any Chemistry or Biology course from the College Core Curriculum.*

Senior Program

<i>First Semester</i>	<i>Hours</i>
ALIS 4211: Arabic Language / Islamic Studies .....	2
GEIT 4351: Software Engineering II.....	3
ITAP 3431: Network Security .....	4
COEN 4322: Digital Signal Processing.....	3
EE or IT Elective* .....	3-4
<b>Total Hours: .....</b>	<b>15-16</b>

*\*Select any 4000-level course from Electrical Engineering or Information Technology*

<i>Second Semester</i>	<i>Hours</i>
ASSE 4311: Learning Outcome Assessment III (Capstone) .....	3
EE or IT Elective* .....	3-4
EE or IT Elective* .....	3-4
Social Science Elective** .....	3
<b>Total Hours: .....</b>	<b>12-14</b>

*\*Select any 4000-level course from Electrical Engineering or Information Technology*

*\*\*Select any Social Science course from the College Core Curriculum.*

## **UNDERGRADUATE COURSES OFFERED BY THE COLLEGE OF INFORMATION TECHNOLOGY**

### **Assessment – ASSE**

**ASSE 4311: Learning Outcome Assessment III (3,0)** This is the capstone course required of all students pursuing an undergraduate degree program within the College of Information Technology. The objective of this course is to bring together in an applied manner the knowledge and skills obtained by the students throughout their undergraduate program. The course is designed so as to cover topics that are relevant from an integrated IT systems design and implementation perspective. The term “integrated IT systems design and implementation” refers to complex collaborative efforts that bring together knowledge skills in the related areas of computer science, computer engineering, and information technology (as covered by the three undergraduate programs offered by the College of Information Technology). The course is very applied. One of its main components is a team project focusing on integrated IT systems design and implementation. The course also includes a mix of speakers’ presentations, project work, and discussions on contemporary articles from industry publications. **Prerequisites:** GEIT 1411: Computer Science I, GEIT 1412: Computer Science II, GEIT 1311: Computer Organization I, GEIT2291: Professional Ethics, GEIT 3341: Database Design, GEIT 3351: Software Engineering I, GEIT 4351: Software Engineering II.

### **Computer Engineering – COEN**

**COEN 2111: Circuits I Lab (0,3) - Also listed as EEEN 2111: Circuits I (0,3)** This course covers experimental aspects of the topics covered in COEN 2311: Circuits I. Topics include basic breadboarding techniques and circuit construction; use of multimeters, oscilloscopes, power supplies, and function generators; DC and AC voltage and current measurement techniques; troubleshooting

techniques; and comparison of experimental and simulated circuits.

**Prerequisites:** MATH 1324: Calculus III, PHYS 1422: Physics for Engineers II. Completion of or concurrent registration for: MATH 2332: Differential Equations, COEN 2331: Circuits I

**COEN 2311: Circuits I - Also listed as GEEN 2314: Circuits I (3,1)**

This course covers important theory in DC and AC circuits analysis.

Topics include a review of the solution of simultaneous equations; Kirchoff's Current and Voltage Laws; nodal and mesh circuit analysis; superposition; source transformations; Thevenin and Norton Equivalent circuits; ideal op-amps; and RC, RL, and RLC circuits.

**Prerequisites:** MATH 1324: Calculus III, PHYS 1422: Physics for Engineers II. Concurrent registration for: COEN 2111: Circuits Lab. Completion of or concurrent registration for: MATH 2332: Differential Equations

**COEN 3312: Circuits II - Also listed as EEEN 3312: Circuits II**

**(2,2)** This course is a continuation of COEN 2311: Circuits I. Topics include a review of DC and AC circuit analysis techniques; complex numbers and phasors; use of phasors in the analysis of AC circuits; AC power concepts; polyphase circuits; magnetically coupled circuits; applications of Laplace and Fourier transforms in circuit analysis; s-domain circuit analysis; Bode plots; and filters. **Prerequisites:** MATH 2332: Differential Equations, COEN 2311: Circuits I, COEN 2111: Circuits I Lab

**COEN 3322: Signals and Systems - Also listed as EEEN 3341:**

**Signals and Systems (3,0)** This course presents instruction in electrical signals and systems. Subject matter includes types of signals and systems, signal and system modeling, Fourier Series, Fourier Transform and applications, Laplace Transform and applications, state variable techniques, discrete time signals and systems. **Prerequisite:** COEN 3312: Circuits II

**COEN 3323: Digital Systems - Also listed as EEEN 3331: Digital**

**Systems (2,3)** This course addresses the understanding and design of digital systems. Topics progress through Boolean algebra and logic gates; combinational logic; sequential logic and synchronous sequential logic systems; and design of logic circuits. **Prerequisites:** COEN 2311: Circuits I, COEN 2111: Circuits I Lab

**COEN 3421: Electronics I - Also listed as EEEN 3421: Electronics**

**I (3,3)** This course is the first of two courses in the use of electronic devices in analog and digital circuits. The lecture component covers device physics and modeling of op-amps, diodes, FETs, and BJTs; single and multi-stage amplifiers; differential amplifiers; feedback; frequency response; Bode plots. Laboratory component covers generation and acquisition of signals; current, voltage, and impedance measurements; transfer function measurement; and spectrum measurements and analysis. **Prerequisites:** COEN 2311: Circuits I,

COEN 2111: Circuits I Lab. Completion of concurrent registration for:  
COEN 3312: Circuits II

**COEN 4322: Digital Signal Processing (2,3)** The course presents an overview of the nature of signals, the algorithms and techniques used to process those signals and the applications to which digital signal processing can be usefully put. **Prerequisite:** COEN 3322: Signals and Systems

**COEN 4331: Network Theory (3,0)** This course examines the structural and theoretical issues underlying networks. Data communication principles and protocols, network structures and open systems are discussed. **Prerequisite:** ITAP 2431: Network Management

### Computer Science – COSC

**COSC 2331: Discrete Structures (3,0)** Discrete Structures is the study of objects that have discrete as opposed to continuous values including the foundations of logic, algorithms and their complexity, mathematical reasoning, relations, graphs, trees and combinatorics. **Prerequisite:** MATH 1423: Calculus II

**COSC 3343: Database Theory (3,0)** This course is the study of the principles of database systems. The goal is to prepare students an understanding of the theory as well as practices of database management systems. **Prerequisites:** GEIT 1412: Computer Science II, MATH 1313: Statistical Methods

**COSC 3351: Algorithms (3,0)** This course is the study of the design and performance analysis of algorithms. Time and space complexity analysis of algorithms, design paradigms, and graph algorithms are discussed. **Prerequisites:** COSC 3421: Data Structures, MATH 1313: Statistical Methods

**COSC 3411: Systems Programming (3,1)** Systems programming is the study of the basic programming principles and skills for building systems software, including the introduction to UNIX, shell programming, and Perl programming. **Prerequisites:** GEIT 1412: Computer Science II, GEIT 1311: Computer Organization

**COSC 3421: Data Structures (3,1)** Data structures is the systematic study of some advanced data structures, including list, stack, queue, dictionary, and graph. Sorting and hashing algorithms and their associated computational costs are discussed. Algorithm analysis techniques are also investigated to provide a metric to measure the performance of an algorithm in question. **Prerequisites:** GEIT 1412: Computer Science II, MATH 1313: Statistical Methods, MATH 2332: Differential Equations

**COSC 4311: Parallel Computing (3,0)** This course provides a basic,

in-depth look at techniques for the design and analysis of parallel algorithms and for programming them on commercially available parallel platforms. Principles of parallel algorithms design and different parallel programming models are both discussed. MPI, POSIX threads, and Open MP all are discussed. This course is for anyone wanting to gain proficiency in all aspects of parallel and distributed programming. **Prerequisite:** COSC 3351: Algorithms

**COSC 4361: Operating Systems (3,0)** This course is the study of the principles, purposes, and organization of operating systems. The goal is to prepare students an understanding of the theory as well as practices of the design and implementation of operating systems software. **Prerequisites:** GEIT 1311: Computer Organization, COSC 3411: System Programming, COSC 3421: Data Structures

**COSC 4362: Artificial Intelligence (3,0)** The course presents an overview of artificial intelligence and its methods for solving problems. Basic algorithms for finding solutions to problems or adaptively improving responses to situations are discussed. Expert systems, genetic algorithms, and intelligent agents are among the areas that are explored. **Prerequisites:** COSC 3421: Data Structures, COSC 3351: Algorithms.

**COSC 4363: Automata Theory (3,0)** This course is to give an introductory study of automata, formal languages, and computability, including set theory and countability, finite automata and regular languages, push-down automata and context-free languages, Turing machines, Church's thesis, halting problem, and uncomputability. **Prerequisites:** COSC 3351: Algorithms, MATH 2331: Linear Algebra, MATH 2332: Differential Equations

**COSC 4364: Compilers (3,0)** This course is the study of the theory and practice of constructing a compiler, including lexical analysis, parsing, semantic analysis, run-time organization, code generation, and optimization. During the course of the semester, the students complete a significant compiler project. **Prerequisites:** COSC 3351: Algorithms, COSC 4461: Programming Languages

**COSC 4461: Programming Languages (3,1)** Programming languages is the study of basic concepts and constructs underlying the design of the modern programming languages. Various programming paradigms, including object-oriented, functional, logic, and concurrent programming, are discussed. **Prerequisites:** GEIT 1412: Computer Science II, COSC 3411: System Programming

### **General Information Technology – GEIT**

**GEIT 1311: Computer Organization (3,0)** This course examines the functional components of computer systems. Topics discussed include processors, memory types and hierarchies, buses, I/O, interrupts, etc. with emphasis on how they affect program execution, parameter

passing and inter-program communications between programs written in diverse languages. **Prerequisite:** GEIT 1411 - Computer Science I

**GEIT 1411: Computer Science I (3,1)** The course is an introduction to programming and to the use of algorithms in designing programs. A software engineering approach to developing computer programs is stressed and object-oriented concepts are introduced. The course examines standard control structures, approaches to modularization, and the use of primitive and structured data types. **Prerequisite:** None.

**GEIT 1412: Computer Science II (3,1)** This course is a continuation and extension to GEIT 1411 Computer Science I. It introduces the student to a systematic study of basic data structures such as queues, stacks and binary trees including searching and sorting algorithms and their associated computational costs. A software engineering approach to developing computer programs is stressed and object-oriented concepts are emphasized. Reusability of code, effective software development methodologies and good programming practices are significant components of the course. **Prerequisites:** GEIT 1411: Computer Science I. Students also are expected to have successfully completed the first mathematics course in their degree program.

**GEIT 2291: Professional Ethics (2,0)** This course is designed to educate students on the impact ethical issues have on the use of information technology in the modern business world. It examines the ethical codes of the professional societies and the philosophical bases of ethical decision-making. Students acquire the foundation that helps them make appropriate decisions when faced with ethical dilemmas ethics and professional conduct in the workplace. **Prerequisite:** None.

**GEIT 3351: Software Engineering I (3,0)** The course is designed to provide an introduction to the theory and practice of software development and maintenance. The focus is on the full software development life cycle, including coverage of tools, techniques, principles, and guidelines for software requirements, specification, design and implementation. Particular emphasis is placed on the principles and methods used to develop and validate software requirements. Students are guided toward a better understanding of the various tasks and specialties that contribute to the development of a software product. **Prerequisites:** GEIT 1411: Computer Science I, GEIT 1412: Computer Science II.

**GEIT 4351: Software Engineering II (3,0)** This course is a continuation and extension of GEIT 3351: Software Engineering I. The objective of this course is to give students an understanding of key issues involved in the design and implementation of computer software to automate business processes in organizations. The course is designed so as to cover topics that are relevant from a software engineering perspective, with a focus on software design and implementation, and software development project management. It is

very applied, and one of its main components is a team project focusing on software design and implementation. **Prerequisites:** GEIT 1411: Computer Science I, GEIT 1412: Computer Science II, GEIT 3351: Software Engineering I.

**GEIT 4361: Practical Training (3,0)** This course provides opportunities for students to apply the academic concepts, skills and techniques learned in their coursework to a professional work-oriented setting. The course offers the potential for a one-semester internship with a regional employer or a directed study course providing practical learning experiences that benefit the community. **Prerequisites:** Senior year standing and the consent of the instructor.

### **Information Technology – ITAP**

**ITAP 2381: Operations Research (3,0)** This course introduces some of the basic concepts in operations research and quantitative analysis. Students gain a working knowledge of operations research techniques that are used extensively in organizations to solve large, structured problems. Coverage includes the use of optimization (linear, integer, and non-linear programming) models, network models, simulation and risk analysis in developing optimal solutions to operational and strategic problems in modern organizations. **Prerequisites:** GEIT 1412: Computer Science II, MATH 1312: Calculus for Students of Business, MATH 1321: Statistical Methods

**ITAP 2431: Network Management (3,1)** This course introduces students to business data communications and networking concepts, tools and methods. The goal is to prepare students to apply networking tools and methods to the solution of business problems. The course covers the use of basic data communications and networking hardware such as hubs and routers, and of simple programming tools to customize and integrate existing software. It introduces networking, distributed transaction processing, and Web-related concepts. The course also covers concepts for managing distributed storage and connectivity related to data, voice, image, and video. Its specific focus is on Web-based systems. The course includes a mix of lectures, laboratory demonstrations and assignments, and discussions on contemporary articles from industry publications. **Prerequisites:** GEIT 1411: Computer Science I, GEIT 1412: Computer Science II, GEIT 1311: Computer Organization I.

**ITAP 3341: Database Design (3,0)** The objective of this course is to give students an understanding of key issues related to database design and implementation to support the automation of key business processes in organizations. The course is designed so as to cover topics that are relevant from a database design and implementation perspective; particularly one that involves the provision of online

access to data resources to a variety of physically distributed organizational users. It includes a mix of lectures (some of which are conducted in the laboratory) and discussions on contemporary articles from industry publications. **Prerequisites:** GEIT 1411: Computer Science I, GEIT 1412: Computer Science II.

**ITAP 3381: Business Process Redesign (3,0)** The objective of this course is to give students an understanding of key issues involved in business process redesign in organizations. The course is designed so as to cover topics that are relevant from a business process redesign perspective. Some of those topics are more conceptual, such as business process modeling methods, while others are more applied, such as IT-based business process change implementation approaches. The course includes a mix of lectures and discussions on contemporary articles from industry publications. **Prerequisites:** GEIT 1411: Computer Science I, GEIT 1412: Computer Science II, GEIT 1311: Computer Organization I, GEIT 3341: Database Design.

**ITAP 3382: Business Intelligence (3,0)** The objective of this course is to give students an understanding of key issues involved in business intelligence applications in organizations. The course is designed so as to cover topics that are relevant from a business intelligence perspective. It is oriented toward the provision of online access to aggregate data analysis results to a variety of physically distributed organizational users. It includes a mix of lectures (some of which are conducted in the laboratory) and discussions on contemporary articles from industry publications. **Prerequisites:** GEIT 1411: Computer Science I, GEIT 1412: Computer Science II, GEIT 1311: Computer Organization I, GEIT 3341: Database Design.

**ITAP 3383: Enterprise Resource Planning Systems (3,0)** The course is intended to introduce students to the underlying need for information and business process integration in large organizations. It takes an overview look at the functional areas of a business and the business processes that support the functional areas. The emphasis is on the use of advanced information technology for integrating business functions through distributed databases for support of internal business functions. It includes a discussion of the idea behind selection and implementation of enterprise resource planning (ERP) systems. A part of the course is set aside for demonstrations and "hands on" exercises with one of the available ERP software packages. Students use this software to perform some of the processes and tasks to create, track, and communicate enterprise information. **Prerequisites:** GEIT 1411: Computer Science I, GEIT 1412: Computer Science II, GEIT 2341: Database Design.

**ITAP 3431: Network Security (3,1)** This course examines the basic principles, techniques and technologies associated with securing local area networks. Topics covered include security threats, data protection including cryptography and authentication, a review of network

security applications and techniques for the management of intruders, malicious software and other internal and external threats to the network. **Prerequisite:** ITAP 2431 Network Management

**ITAP 3471: Web Server Management (3,1)** The primary objective of this course is to give students a comprehensive overview of the tools and techniques needed to successfully administer Web servers. The course is designed so as to cover topics that are relevant to the role of a Web server administrator. Topics include installation, configuration, and administration of Web servers on common hardware/software platforms. **Prerequisites:** GEIT 1411: Computer Science I, GEIT 1412: Computer Science II, ITAP 2431: Network Management.

**ITAP 4311: Database Management (3,0)** The objective of this course is to give students an understanding of key issues involved in the management of data resources in organizations. The course is designed so as to cover topics that are relevant from a data center management perspective; particularly one that involves the provision of online access to data resources to a variety of physically distributed organizational users. It includes a mix of lectures (some of which are conducted in the laboratory) and discussions on contemporary articles from industry publications. **Prerequisites:** GEIT 1411: Computer Science I, GEIT 1412: Computer Science II, GEIT 1311: Computer Organization I, GEIT 3341: Database Design

**ITAP 4371: E-Commerce (3,0)** The primary objective of this course is to expose students to the advanced use of information technology in the design and implementation of Web-based business applications to support e-commerce. The course presents concepts, methodology, and tools for designing, implementing, and management of e-commerce applications in a business-to-business paradigm. **Prerequisites:** GEIT 1411: Computer Science I, GEIT 1412: Computer Science II, GEIT 2341: Database Design, ITAP 3471: Web Server Administration.

**ITAP 4372: E-Collaboration (3,0)** The objective of this course is to give students an understanding of key issues involved in using e-collaboration technologies to support teams conducting collaborative tasks in organizations. The course is designed so as to cover topics that are relevant from an e-collaboration technology implementation and use perspective; particularly one that addresses collaborative tasks conducted by physically distributed organizational users. It includes a mix of lectures (some of which are conducted in the laboratory) and discussions on contemporary articles from industry publications. **Prerequisites:** GEIT 1411: Computer Science I, GEIT 1412: Computer Science II, GEIT 1311: Computer Organization I, GEIT 3341: Database Design