Prospectus

Bachelor of Engineering Program in Digital Engineering (International Program)

1. **Degree Title**
   - ✓ Full Name: Bachelor of Engineering (Digital Engineering)
   - ✓ Abbreviated Name: B.A. (Digital Engineering)

2. **Program Director**
   - ✓ Kittasil Silanon

   - ✓ COLLEGE OF COMPUTING, Prince of Songkla University Phuket Campus
     80 M.1 Vichitsongkram Road, Kathu, Phuket 83120
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3. **Duration of Study**
   2 semesters/Year (4 Years)

4. **Program Overview**
   a) Objectives
      Principles of artificial intelligence and software engineering are the fundamental keys of which student's acquisition is assured. Realistic project- and scenario-based learning, alongside a practical company internship are well selected to propel student's abilities in many dimensions and lead our students to be able to develop their own automation systems and Internet of Things (IoTs) in conjunction with cloud computing and cybersecurity.

   b) Learning Outcomes
      - Problem Solving and Critical Thinking
      - Digital Literacy and Software Literacy
      - Communication and Interpersonal Relation
      - Technical and Creative Skills
      - Social Awareness and Responsibility
      - Life Long Learning Skills

   c) Career Opportunities
      - Digital Engineer/Computer Engineer
      - Software Engineer/Developer
      - Embedded System Engineer/IoT Engineer
      - Artificial Intelligence Engineer

- Network and Data Communication Engineer
- Cybersecurity Analyst and Designer

5. **Admission Requirements**
   - A copy of your transcript: Grade 12, M6, Year 13 or the result of an approved equivalency examination (with English translation)
   - Either one of the certified copy of the following certificates:
       ** your high school diploma (with English translation)
       ** one of the following certificates: IGCSE, GED, or IB
   - English proficiency test result (TOEIC, TOEFL or IELTS) with at least 2 years' validity.
   - Additional requirements might be requested by the Admissions Committee.

6. **Tuition + Enrollment Fees**
   48,000 Baht (+ entrance fee 15,000 Baht)

7. **Curriculum Structure and Components**
   The students must complete a minimum requirement of 132 credits to graduate. The curriculum is comprised of General Education Courses (30 credits), Specific Education Courses (96 credits), and Free Elective Courses (6 credits).

Courses	Credits
1. General Education (GE) Courses	**30**
1.1 Compulsory GE Courses	24
1.2 Elective GE Courses	6
2. Specific Education Courses	**96**
2.1 Core Courses	30
2.2 Major Courses	39
- Technology for Application	6
- Technology and Software Methodology	9
- Basic System Infrastructure	12
- Hardware and Computer Architecture	12
2.3 Specialized Courses	21
- Compulsory Specialized Courses	15
**** Network and Security Engineering**	

**** Intelligent Object**	
**** Software Engineering**	
- Elective Specialized Courses	6
2.4 Cooperative Education Courses	6
3. Free Elective Courses	6
TOTAL	132

8. Study Plan

First Year		Semester 1
Course Code	Course Title	Credits
xxx-xxx	General Education	5 ((X)-Y-Z)
977-100	Introduction to Digital Engineering	1(1-0-2)
977-101	Computer Ethics and Laws	1(1-0-2)
977-102	Business Process Design and Innovation	3(2-2-5)
977-103	Physics for Engineers	3(2-2-5)
977-104	Introduction to Computer Programming	3(2-2-5)
977-113	Discrete Mathematics	2(2-0-4)
	TOTAL	18(X-Y-Z)

First Year		Semester 2
Course Code	Course Title	Credits
xxx-xxx	General Education	4 ((X)-Y-Z)
977-105	Linear Algebra	2(2-0-4)
977-110	Web Programming	3(2-2-5)
977-111	Data Structures and Algorithms	3(2-2-5)
977-112	Database System	3(2-2-5)
977-114	Digital Logic and Design	3(2-2-5)
	TOTAL	18(X-Y-Z)

Second Year		Semester 1
Course Code	Course Title	Credits
xxx-xxx	General Education	5((X)-Y-Z)
977-200	Calculus	3(3-0-6)
977-210	Object Oriented Programming	3(2-2-5)
977-212	Data Communications and Networking	3(2-2-5)
977-215	Electric Circuits and Electronics	3(2-2-5)
977-216	Computer Architecture	2(2-0-4)
	TOTAL	19(X-Y-Z)

Second Year		Semester 2
Course Code	Course Title	Credits
xxx-xxx	General Education	5((X)-Y-Z)
977-201	Statistics and Probability	3(2-2-5)
977-211	Software Engineering	3(2-2-5)
977-213	Computer Security	3(2-2-5)
977-214	Internet of Things	3(2-2-5)
977-217	Operating Systems	2(2-0-4)
	TOTAL	19(X-Y-Z)

Third Year		Semester 1
Course Code	Course Title	Credits
xxx-xxx	General Education	3(X-Y-Z)
977-300	Seminar	1(0-2-1)
977-301	Project Management and Quality Assurance	3(3-0-6)
977-310	Intelligent Systems	3(2-2-5)
977-3xx	Compulsory Specialized course 1	3(X-Y-Z)
977-3xx	Compulsory Specialized course 2	3(X-Y-Z)
977-3xx	Compulsory Specialized course 3	3(X-Y-Z)
	TOTAL	19(X-Y-Z)

Third Year		Semester 2
Course Code	Course Title	Credits
xxx-xxx	General Education	3((X)-Y-Z)
977-302	Project in Digital Engineering I	3(0-9-0)
977-3xx	Compulsory Specialized course 4	3(X-Y-Z)
977-3xx	Compulsory Specialized course 5	3(X-Y-Z)
977-xxx	Elective Specialized Course 1	3(X-Y-Z)
xxx-xxx	Free Elective Courses	3(X-Y-Z)
	TOTAL	18(X-Y-Z)

Fourth Year		Semester 1
Course Code	Course Title	Credits
xxx-xxx	General Education	5((X)-Y-Z)
977-400	Pre Cooperative Education	1(0-3-0)
977-402	Project in Digital Engineering II	3(0-9-0)
976-4xx	Elective Specialized Course 2	3(X-Y-Z)
xxx-xxx	Free Elective Courses	3(X-Y-Z)
	TOTAL	15(X-Y-Z)

Fourth Year		Semester 2
Course Code	Course Title	Credits
Plan A. Cooperative Education		
977-490	Cooperative Education	6(0-36-0)
	TOTAL	6(0-36-0)
Plan B. Internship		
977-4xx	Specialized Course (Project)	3(X-Y-Z)
	TOTAL	3(X-Y-Z)

Fourth Year		Summer
Course Code	Course Title	Credits
Plan B. Internship		
977-491	Internship	3(0-18-0)
	TOTAL	3(0-18-0)

9. Course Descriptions

General Education (GE) Courses   30 Credits

Compulsory GE Courses

001-102 The King's Philosophy and Sustainable Development   2((2)-0-4)
Prerequisite Course:
Semester Offered: On demand
Meaning, principles, concept, importance and goal of the philosophy of sufficiency; work principles, understanding and development of the King's philosophy and sustainable development; an analysis of application of the King's philosophy in the area of interest including individual, business or community sectors in local and national level

980-022 Basic Lifesaving (CPR, and AED)   1((1)-0-2)
Prerequisite Course:
Semester Offered: On demand
Intro to first aid, roles and responsibilities, scene assessment, precautions; medical emergencies, breathing problems, choking, heart attack, diabetic emergency, stroke, seizure, bleeding from mouth; injury emergencies, bleeding, controlling bleeding, shock, head, neck, and spinal injuries, fractures and sprains, burn, hypothermia; CPR, scene safety, chest compression, mouth to mouth, equipment, AED

980-023 PSU Volunteer   1((1)-0-2)

Prerequisite Course:

Semester Offered: On demand

Activities integrating body of knowledge, emphasizing on the philosophy of sufficiency economy and apply to its principles of job, principles of understanding, accessibility and development for the benefit of society and the benefit of mankind, cultivating morals, ethics and public mind; team working within and/or across disciplines under the supervision of advisors

950-101 New Consciousness   1((1)-0-2)

Prerequisite Course:

Semester Offered: On demand

Creation of new consciousness or mindfulness, self – awareness in the present moment, peaceful and neutral mind in daily life; application of mindfulness in learning and doing all activities, use of mindfulness to see thoughts and emotions, understanding the changes of emotions; understanding one's self and others with happiness and sharing

950-102 Happy and Peaceful Life   2((2)-0-4)

Prerequisite Course:

Semester Offered: On demand

Various multi cultures; happiness of life; understanding and acceptance of the difference and variousness; team work; live in peace; communication skills and creative solving the problems in multiple pattern society

117-114 Living a Peaceful Life   2((2)-0-4)

Prerequisite Course:

Semester Offered: On demand

Value of life and human being; self-understanding and empathy; positive thinking; understanding of different cultures, opinions, beliefs and values; moral life; communication skills and multicultural competence; principle of conflict management and non-violence, application of these concepts and skills for happy life and peace

988-031 Global Citizenship   2((2)-0-4)

Prerequisite Course:

Semester Offered: On demand

The roles and responsibilities as members of society; respect for rights of others; lawfulness; adaptation to a multicultural society, both locally and internationally

001-103 Idea to Entrepreneurship   1((1)-0-2)

Prerequisite Course:

Semester Offered: On demand

Introduction to new entrepreneur creation; entrepreneurship appraisal; business opportunity analysis; project feasibility study; SWOT analysis; market survey and research; marketing strategy for new business; business marketing; marketing planning; production management; accounting financial analysis; financial planning; business; investment funding sources; business networking; public sectors services and facilities; business ethics

988-041 Earth System and Environment   2((2)-0-4)

Prerequisite Course:

Semester Offered: On demand

Geology of the earth and origin; Geological disaster and human risk; Climate changes and human impacts; Human with natural disasters; Ecosystem and Environment; Environmental cycle with human existence; Environmental pollution and problem from human; Environmental problem in daily and processes solve problem

969-041 Choose Wisely Live Well   2((2)-0-4)

Prerequisite Course:

Semester Offered: On demand

Link and integration of product and service consumption from business providers and daily activities; relevance of business activities and daily life; the exploitation of business services to facilitate daily life; the development of business mindset to help organizing daily activities; the implications of business in daily life

969-042 Digital Economy 2((2)-0-4)
Prerequisite Course:
Semester Offered: On demand
Basic Computer Skills, Speed Reading, Time Management, Effective Study Skills, Financial Management Skills, Negotiation Skills, Stress Management, writing a Resume, Searching the Web

969-051 Change your thoughts, Change your life 2((2)-0-4)
Prerequisite Course:
Semester Offered: On demand
Importance of systematic thinking Systematic thinking framework Thinking process development System thinking techniques Task priority management Task scheduling and management Tools for systematic thinking Application of systematic thinking in real-life

969-052 CrOM Thinking: Creative and Open Minded Thinking 2((2)-0-4)
Prerequisite Course:
Semester Offered: On demand
Thinking under principles of reasons and logic Thinking under multidisciplinary of creativity Inspiration and motivation for creative thinking Mechanics and process for creative thinking in differences and your style Creative adaptation and problem solving in daily life Creative for changing and improvement yourself

969-061 Systematic Solving 2((2)-0-4)
Prerequisite Course:
Semester Offered: On demand
Lifelong Learning Skills, pursuit of knowledge and management, Positive thinking, problem solving and decision making skills in a systematic way, critical thinking, emotional Intelligence

969-062 Growth Mindset 2((2)-0-4)
Prerequisite Course:
Semester Offered: On demand
Exploring logically necessary truth and deductive validity; involving the practical study of logical reasoning; lesson and discussion on making critical arguments based on reasons and evidences; debates and workshops for argumentations; implications of being overcritical

805-061 Logical Thinking   2((2)-0-4)

Prerequisite Course:

Semester Offered: On demand

Exploring logically necessary truth and deductive validity; methods of analyzing and evaluating arguments of all types using both formal and informal techniques; identifying fallacies and introducing elementary symbolic logic; involving the practical study of logical reasoning; assessing the logical coherence of what we read and write using critical thinking, deductive reasoning and decision-making theory

988-061 Thinking in Number   2((2)-0-4)

Prerequisite Course:

Semester Offered: On demand

History of mathematics and mathematicians, relationship between numbers and natural phenomena; the application of mathematicians to other fields such as lottery, stock

805-062 Mathematics in Daily Life   2((2)-0-4)

Prerequisite Course:

Semester Offered: On demand

Percentage, ratio, basic statistics and their applications for everyday life. Financial mathematics such as profit, loss, commission, tax, interest, etc.

805-071 English for Fundamental Listening and Speaking   2((2)-0-4)

Prerequisite Course:

Semester Offered: On demand

Reinforcement of listening and speaking skills; development of effective communication in both daily life and academic settings; an interdisciplinary approach to (self-)studying and language development; the application of knowledge for enhanced learning in academic contexts

805-072 English for Fundamental Reading and Writing   2((2)-0-4)
Prerequisite Course:
Semester Offered: On demand
Reinforcement of reading and writing skills; development of understanding authentic, and basic academic texts; reading literature; an interdisciplinary approach to (self-)studying and language development; the application of knowledge for enhanced learning in academic contexts; writing skills targeted at sentence level

810-091 Thai Arts   1((1)-0-2)
Prerequisite Course:
Semester Offered: On demand
Meaning, scope and classifications of Thai arts; studies of Thai arts, visual arts, sculptures, architecture, Thai handicrafts, Thai literature, Thai classical music and performing arts

810-092 Thai Culture   1((1)-0-2)
Prerequisite Course:
Semester Offered: On demand
Meaning, scope of Thai culture; studies of Thai culture, Thai festivals and traditional events, Thai cuisine and desserts

969-091 Keyboard for Fun   1((1)-0-2)
Prerequisite Course:
Semester Offered: On demand
Type of keyboards; touch-typing skills; touch-typing techniques; touch-typing practice; speed typing contest

969-092 E-Sport   1((1)-0-2)
Prerequisite Course:
Semester Offered: On demand
Evolution of computer game and the development of e-sport; current situations and trends in game industry; discussion on elements relevant in e-sport; discussion and debate on global e-sport tournaments; organizing e-sport competitions; implications of playing game

805-091 Music Appreciation   **1((1)-0-2)**
Prerequisite Course:
Semester Offered: On demand
Gaining knowledge of Thai, international, and folk music through various perspectives including history, politic, society, language, belief, regions, environment, and culture

988-091 Camping   **1((1)-0-2)**
Prerequisite Course:
Semester Offered: On demand
Organizing components, planning, site survey, equipment and budgeting of camping; recreational activities and camping; types of camping i.e. urban, beach, conservation forest, and special purpose camping; environmental conservation and camping

980-081 Badminton   **1((1)-0-2)**
Prerequisite Course:
Semester Offered: On demand
Historical background, evolution of rules, regulations and safety, practicing badminton to develop personal health

980-082 Brazilian Jujitsu   **1((1)-0-2)**
Prerequisite Course:
Semester Offered: On demand
Basic Brazilian athletics knowledge and skills; learning body control for Strength of mind and body; using martial arts to protect yourself

980-083 Muay Thai Boxing   **1((1)-0-2)**
Prerequisite Course:
Semester Offered: On demand
Basic boxing knowledge and skills; rules, regulations and safety, practicing Thai Chaiya Boxing to develop personal health

980-084 Volleyball   **1((1)-0-2)**
Prerequisite Course:
Semester Offered: On demand
Basic knowledge, rules; volleyball skill practice

980-085 Basketball   **1((1)-0-2)**
      Prerequisite Course:
      Semester Offered: On demand
      Basic knowledge, rules; basketball skill practice

980-086 Tennis   **1((1)-0-2)**
      Prerequisite Course:
      Semester Offered: On demand
      Basic knowledge, rules; tennis skill practice

980-091 Swimming   **1((1)-0-2)**
      Prerequisite Course:
      Semester Offered: On demand
      Basic knowledge, rules, swimming skill practice

980-092 Aerobic   **1((1)-0-2)**
      Prerequisite Course:
      Semester Offered: On demand
      Knowledge about aerobics, movement with music skill, and practice

980-093 Yoga   **1((1)-0-2)**
      Prerequisite Course:
      Semester Offered: On demand
      Basic knowledge, evolution of rules, regulations and safety, practicing yoga to develop personal health

980-094 Mixed Martial Arts   **1((1)-0-2)**
      Prerequisite Course:
      Semester Offered: On demand
      Historical background, evolution of rules, regulations and safety, practicing Mixed Martial Arts to develop personal health

980-095 Tai Chi   **1((1)-0-2)**
      Prerequisite Course:
      Semester Offered: On demand
      Basic knowledge, evolution of rules, regulations and safety, practicing Tai Chi to develop personal health

980-096 Scuba Diving   1((1)-0-2)

Prerequisite Course:
Semester Offered: On demand
Principles, equipment and methods for diving; science for diving; planning, recording and problem solving in diving; sample and data collecting techniques; diving practice in both swimming pool and sea

980-097 Social Dance   1((1)-0-2)

Prerequisite Course:
Semester Offered: On demand
Basic social dance skills and etiquette; social dance music; emphasis on practice

Elective GE Courses

980-001 Disaster Preparedness   2((2)-0-4)

Prerequisite Course:
Semester Offered: On demand
Various types of disasters, causes of disasters, anthropogenic effects on disasters' severity; the importance of disaster risk reduction, disaster risk reduction cycle, community's roles in disaster risk reduction cycle; disaster prevention and mitigation, disaster response, disaster recovery; preparedness, different levels of preparedness, individual level, family level, community level, national level, international level

810-001 Guiding Statistics   2((2)-0-4)

Prerequisite Course:
Semester Offered: On demand
Fundamental statistical methodologies for problem solving and decision making in real-life application; data gathering, graphically organized data; probability and estimation methods for decision making

810-002 Social Psychology   2((2)-0-4)

Prerequisite Course:
Semester Offered: On demand
The examination of human social systems and behavior with an emphasis on cultures, societies, social orders, basic human needs, human behavior regarding reinforcement, learning, perception, motivation, intelligence and ability to adapt to changing circumstances

810-003   Thai History and Society   2((2)-0-4)

Prerequisite Course:
Semester Offered: On demand
Classifications of Thai era; evolution in terms of politics, government; foreign affairs, economy and society; characteristic and structure of Thai society, social, economic and political foundations of Thai society; important religions in Thailand; current situations in Thai society; factors affecting changes in Thai society

810-004 Young Investor   2((2)-0-4)

Prerequisite Course:
Semester Offered: On demand
Money and happiness; income and saving planning; impacts on financial planning to desired lifestyle; personal wealth planning; types of financial investment and potential risks; expense management for family and social responsibilities

988-001 Wisdom of Living   2((2)-0-4)

Prerequisite Course:
Semester Offered: On demand
Thinking, life administration and management in accordance with changes in Thai and global society; mingling the Thai ways of life with multi-cultural ways of living, public mind and environmental conservation, living happily based on morality, ethics and sufficiency economy

988-002 Contemporary Scientific Innovation   2((2)-0-4)

Prerequisite Course:
Semester Offered: On demand
Scientific basis of discovery, invention and innovation, emphasizing on knowledge integration, case study analysis, creative thinking, problem solving and intellectual property awareness

988-003 Science and the Sea   2((2)-0-4)

Prerequisite Course:
Semester Offered: On demand
Oceanography; Marine Science; Marine and Coastal Resources; Wave of the Ocean; Sea Surface Temperature; Climate Change; Sea level Rising; Ocean Circulation; Ocean Acidification

988-004   Nutritional and Toxicology   2((2)-0-4)

Prerequisite Course:
Semester Offered: On demand
A foundation of nutritional knowledge to develop a sustainable pattern of healthy eating; overview of digestion, function, and metabolism pathways of nutrients; the principles of toxicology and their applications in evaluating the safety of foods; evaluation of human exposure to chemicals, and qualitative and quantitative health risk assessment

805-073 English for Intermediate Listening and Speaking   2((2)-0-4)

Prerequisite Course:
Semester Offered: On demand
Reinforcement of intermediate listening and speaking skills; intermediate-level development of effective communication in both daily life and academic settings; an interdisciplinary approach to (self-) studying and language development; the application of knowledge for enhanced learning in academic contexts

805-074 English for Intermediate Reading and Writing   2((2)-0-4)

Prerequisite Course:
Semester Offered: On demand
Consolidation of exchanging ideas and expressing oneself with regards to academic issues; further development of understanding

authentic, and academic texts; reading literature; an interdisciplinary approach to (self-)studying and language development; the application of knowledge for enhanced learning in academic contexts; writing skills targeted at paragraph level; development of an autonomous process approach to writing

805-075 English for Advanced Listening and Speaking 2((2)-0-4)
Prerequisite Course:
Semester Offered: On demand
Reinforcement of advanced listening and speaking skills; academic-level development of effective communication in both daily life and advanced settings; an interdisciplinary approach to (self-)studying and language development; the application of knowledge for enhanced learning in academic contexts

805-076 English for Advanced Reading and Writing 2((2)-0-4)
Prerequisite Course:
Semester Offered: On demand
Consolidation of exchanging ideas and expressing oneself related to scholarly concepts; increased development of understanding authentic, and academic texts; reading literature; an interdisciplinary approach to (self-)studying and language development; the application of knowledge for enhanced learning in academic contexts; writing skills targeted at essay level; introduction to reading and writing research; further development of an autonomous process approach to writing

805-001 English for Pronunciation 2((2)-0-4)
Prerequisite Course:
Semester Offered: On demand
Enhancing speech with correct pronunciation; reading aloud and memorizing written speeches; emphasizing English vowels, intonation, stress, and consonant clusters

805-002 English for Creative Writing 2((2)-0-4)
Prerequisite Course:
Semester Offered: On demand
Evaluate the processes and techniques of creative writing, critique various writing styles and discuss how they are used in literature plus the development of written English and creative thinking through critical reading

805-003 English for International Studies 2((2)-0-4)
Prerequisite Course:
Semester Offered: On demand
Exploring the history of international relations with focus on the language and disciplines of international diplomacy, dialogue, and cooperation related to a world of increasing globalization and complexity

805-004 English for International Business 2((2)-0-4)
Prerequisite Course:
Semester Offered: On demand
Developing the foundation in business English; enhancing a variety of skills that can be applied in multiple scenarios through listening, reading, speaking, and writing on all aspects of conducting business in English

805-005 English for Presentation 1((1)-0-2)
Prerequisite Course:
Semester Offered: On demand
Theories and general characteristics of English for presentation; practice in academic and general presentations; learning how to make points and answer questions in presentations

805-006 English for Job Application 2((2)-0-4)

Prerequisite Course:
Semester Offered: On demand
Practicing English communicative skills relating to job applications, reading job openings from various sources, writing application letters and résumés, practicing job interviews, enlarging vocabulary, and expressions used in job application

805-007 English for Presentation and Discussion 2((2)-0-4)
Prerequisite Course:
Semester Offered: On demand
Theories and general characteristics of English for discussion and presentation; practice in academic and general discussion; learning how to make points and answer questions in discussions and presentations

805-008 Searching and Referencing   2((2)-0-4)

Prerequisite Course:
Semester Offered: On demand
Discovering and reading literature reviews, opinion papers, and research articles; composing a literature review to support a position; using scholarly writing techniques and citations following APA formatting and referencing

969-001 Lifelong Learning   2((2)-0-4)

Prerequisite Course:
Semester Offered: On demand
Basic theory in digital economy, Value creation model, Digital Business model, Market regulation, Digital economics in context, How digital economy influences societies and environment, City Development

988-005 Peaceful Life   2((2)-0-4)

Prerequisite Course:
Semester Offered: On demand
Principle and procedures of community participation in conflict problems; analysis of social, political, cultural and environmental factors in the communities that affect levels of community participation; appropriate technologies; good governances and environmental management; case studies

988-006 Sufficient Communities   2((2)-0-4)

Prerequisite Course:
Semester Offered: On demand
Concept and theory of sustainable development; case study of Royal Initiative Project; deployment in various areas

Specific Education Courses   **96 Credits**

Core Courses

977-100   Introduction to Digital Engineering   1(1-0-2)
Prerequisite Course:
Semester Offered: Semester 1 (1st Year)
Introduction to various fields of engineering; some related engineering professional organizations; engineering ethics; evolution of computer engineering; introduction to digital engineering; introduction to network and security engineering; introduction to intelligent objects; introduction to software engineering; systematic problem analysis and solving techniques; presentation techniques

977-101   Computer Ethics and Laws   1(1-0-2)
Prerequisite Course:
Semester Offered: Semester 1 (1st Year)
Important of ethical, legal and social issues on computer; public policy; impact of computers towards works and societies; methods and tools of analysis; professional and ethical responsibilities; intellectual property; privacy and civil; computer crime; case studies; problem analysis and solutions

977-102   Business Process Design and Innovation   3(2-2-5)
Prerequisite Course:
Semester Offered: Semester 1 (1st Year)
Business development processes such as production processes, logistics, sales, accounting and finance; concepts and principles of process innovation, vision on process, process design, process integration, application of information system and communication in organization workflow and information management, measurement of process efficiency; organization process innovation and redesign; development of new business models, organization change management; case studies from government organizations and business units

977-103   Physics for Engineers   **3(2-2-5)**
Prerequisite Course:
Semester Offered: Semester 1 (1st Year)
Unit; physical quantities and vectors; forces and motions; work; energy and momentum; gravitational interaction; fluid mechanics; introduction to quantum mechanics; mechanical waves; sound waves; temperature and heat; optics; lights; magnetic fields and induction;

977-104   Introduction to Computer Programming   **3(2-2-5)**
Prerequisite Course:
Semester Offered: Semester 1 (1st Year)
Computer components; program analysis and design; data types; operators; condition; repetition; arrays; function and parameter passing process; structuring data; programming practice

977-105   Linear Algebra   **2(2-0-4)**
Prerequisite Course:
Semester Offered: Semester 2 (1st Year)
Matrices and linear systems; determinants; solution to system of linear equations; vector spaces; vector subspaces; rank; dimension; basis; orthogonality; projection; eigenvalues and eigenvectors

977-200   Calculus   **3(3-0-6)**
Prerequisite Course:
Semester Offered: Semester 1 (2nd Year)
Relations; functions and graphs of relations; limits and continuity; derivatives and applications; integrals and application

977-201   Statistics and Probability   **3(2-2-5)**
Prerequisite Course:
Semester Offered: Semester 2 (2nd Year)
Set and probability theories; random variables; discrete probability distributions; continuous probability distribution; sampling distribution; estimation; hypothesis testing; linear regression and correlation

977-300 **Seminar** 1(0-2-1)

Prerequisite Course: 977-102 Introduction to Digital
Engineering
Semester Offered: Semester 1 (3rd Year)
Seminar in current issues, case studies in information and
communication technology; specific content of the seminar
changes each time it is offered

977-301 **Project Management and Quality Assurance** 3(3-0-6)

Prerequisite Course: 977-102 Introduction to Digital
Engineering
Semester Offered: Semester 1 (3rd Year)
Principles of project management and risks; various types of
project and their management, project management limitation,
planning and project development techniques; selection of
project leaders and management, their responsibilities,
functions, monitoring, reporting and communications; basic
requirement and principles of quality management (QM) ;
planning and controlling/ monitoring for quality, in- house
participative QM

977-302 **Digital Engineering Project I** 3(0-9-0)

Prerequisite Course: 977-111 Data Structure and Algorithm
　　　　　　　-977113 Digital Logic and Design
Semester Offered: Semester 2 (3rd Year)
Digital engineering project development under the adviser
supervision

977-400 **Pre-cooperative Education** 1(0-3-0)

Prerequisite Course:
Semester Offered: Semester 1 (4th Year)
Concepts of cooperative education; process of cooperative
education and; regulations and permissions related to
cooperative education; basic knowledge and techniques in job
application e.g., company selection, writing the job application,
interviewing; basic knowledge and techniques for apprentice
e.g., presentation and report writing techniques, personality in
working place, social psychology

977-401 Digital Engineering Project II   **3(0-9-0)**
Prerequisite Course: 977-302 **Digital Engineering Project I**
Semester Offered: Semester 1 (4th Year)
Continuing of 977-302 for developing the project until finish; an oral presentation and demonstration of the project must be given; a final written report must be submitted

Major Courses

977-110 Web Programming   **3(2-2-5)**
Prerequisite Course:
Semester Offered: Semester 2 (1st Year)
The internet architecture and web technology; principles of web processing; web programming languages and tools; scripting language; database management system (DBMS) ; database connection; database query; web application design and implementation; introduction to framework; micro- service architecture

977-111 Data Structures and Algorithms   **3(2-2-5)**
Prerequisite Course: 977-104 Introduction to Computer Programming
Semester Offered: Semester 2 (1st Year)
Programming paradigms; programming constructs; fundamental concepts of data structures; array; linked lists; stack; queue; trees, binary tree, traversal, B- tree, AVL- tree; complexity analysis; searching and sorting; binary search tree; concepts of recursion; algorithmic strategies; greedy algorithms; divide- and- conquer techniques; dynamic programming graph problems; shortest path; distributed algorithms; NP-complete problems

977-112 Database Systems   **3(2-2-5)**
Prerequisite Course:
Semester Offered: Semester 2 (1st Year)
Database concepts; data independence; entities and relationships; data models; relational database design; normalizations; database query language; development and database life cycle; physical database design; transaction processing; distributed database systems

977-113   Discrete Mathematics   **2(2-0-4)**
Prerequisite Course:
Semester Offered: Semester 1 (1st Year)
Logic; sets; relations; functions, basic proof theory; counting; graph theory; tree theory; recursion relations; theory of computation; finite automata

977-114   Digital Logic and Design   **3(2-2-5)**
Prerequisite Course:
Semester Offered: Semester 2 (1st Year)
Introduction to digital systems; Boolean and digital number systems; digital systems design; logic gates; switching theory; combinational logic circuits; modular design of combinational circuits; data conversion; sequential logic circuits; register and storage elements; introduction to HDL; modeling and simulation; verification process; fault models and testing; design for testability

977-210   Object Oriented Programming   **3(2-2-5)**
Prerequisite Course: 977-104 Introduction to Computer Programming
Semester Offered: Semester 1 (2nd Year)
Object oriented programming concept; basic components and characteristics of object; abstract data type; information hiding; class and class hierarchies; inheritance; polymorphism; event- driven programming; concurrency; fundamental design pattern; using application programming interface (API)

977-211   Software Engineering   **3(2-2-5)**
Prerequisite Course: 977-104 Introduction to Computer Programming
Semester Offered: Semester 1 (2nd Year)
Introduction to software development process; software life cycle; software requirement and specifications; software requirement engineering; software design; software testing and validation; concept of language translation; the concept of project management; software quality assurance; fault tolerance; software evolution; software support and maintenance; introduction to software tools and environments

977-212 Data Communications and Networking   **3(2-2-5)**

Prerequisite Course:

Semester Offered: Semester 2 (1st Year)

Overview of protocols and architecture of OSI model and TCP/IP; data transmissions and communications; encoding and decoding; analog and digital signal; signal modulations; packet switching; LAN and WAN technologies; wireless networks; mobile ad hoc networks; mobile networking; virtual network and overlay network; network cabling; IP addressing and sub-netting; basic network security; basic network troubleshooting; case studies

977-213 Computer Security   **3(2-2-5)**

Prerequisite Course:

Semester Offered: Semester 2 (2nd Year)

Principle of computer security; cryptography, public key, symmetric key; integrity, hash function; steganography; authentication, password, biometric; authorization, access control mechanisms; network security; malware, virus, worm; wireless security

977-214 Internet of Things   **3(2-2-5)**

Prerequisite Course:

Semester Offered: Semester 2 (2nd Year)

Internet of things concepts; architecture of the Internet and web technologies; IoT components; networking; hardware and software; IoT design; connecting an IoT device to internet;gathering data from IoT devices; introduction to IoT data analytics;management and troubleshooting, case studies and prototype; trends

977-215 Electric Circuits and Electronics   **3(2-2-5)**

Prerequisite Course:

Semester Offered: Semester 2 (2nd Year)

Quantities and units; definition and meaning of voltage, current, and resistance; current source; voltage source; Ohm's law; energy and power; Kirchhoff's laws; series circuit; parallel circuits; superposition theorem; Thevenin's theorem; Norton's theorem; circuit analysis using loop and node methods; introduction to alternating current circuits; characteristics of resistor, capacitor, and inductor; circuit impedance; analysis of RLC circuits; electronic properties of materials; diodes and diode circuits; MOS transistors and biasing; MOS logic families; bipolar transistors and logic families;

operational amplifiers circuit; electronic voltage and current sources; data conversion circuits; integrated circuit building blocks

977-216   Computer Architecture   **2(2-0-4)**

Prerequisite Course:

Semester Offered: Semester 1 (2nd Year)

Fundamental of computer architecture; instruction set architecture; processor organization; memory system and cache; input/output; RISC; VLIW; operating system support; computer arithmetic; memory system organization and architecture; distributed system models, pipeline and superscalar techniques; interfacing and communication; device subsystems; organization of the CPU; multi-core processor; introduction to parallel processing

977-217   Operating Systems   **2(2-0-4)**

Prerequisite Course: 977-104 Introduction to Computer Programming

Semester Offered: Semester 2 (2nd Year)

Basic concepts of operating systems; processes and concurrency; process management and scheduling; input/output management; memory management; file systems; device management; system performance evaluation

977-310   Intelligent Systems   **3(2-2-5)**

Prerequisite Course: 977-113 Discrete Mathematic

Semester Offered: Semester 1 (3rd Year)

Introduction to intelligent systems; problem solving by searching; uninformed and informed search; local search; machine learning concepts; data preparation; data quality; classification techniques; decision tree learning, artificial neural networks; Bayes' theorem; model evaluation; problem analysis; feature selection; clustering; reinforcement learning ; deep learning; application of machine learning

Specialized Courses

Network and Security Engineering

977-320   Mathematics for Network and Security Engineering   3(3-0-6)
Prerequisite Course: 977-113 Discrete Mathematic
Semester Offered: On demand
Optimization; linear programming; unconstrained optimization; graphs and digraphs; Bellman's principle; Dijkstra's algorithm; shortest spanning trees; greedy algorithm; Prim's algorithm; flow in networks; maximum flow; Ford-Fulkerson algorithm; bipartite graphs; cryptography; combinatorics

977-321   Computer Networks and Management   3(2-2-5)
Prerequisite Course: 977-212 Data Communications and Networking
Semester Offered: On demand
Principles of technologies and modern computer networking; communication protocol; peer- to- peer, client- server, and cloud computing networks; advanced network design and management; IP addressing and sub- netting in organization; network configuration and implementation; network protection and detection; basic network resource management; fault management; network security management; access level control and network security policy; user account management; networking ethics

977-322   Cloud Computing and Implementation   3(2-2-5)
Prerequisite Course: 977-212 Data Communications and Networking
Semester Offered: On demand
Cloud computing architecture; cloud computing services: SaaS, PaaS, IaaS; technologies for cloud computing; terms and conditions; security standards; data protection; abnormal incident response process; cloud computing implementation; data transition; cloud computing application in IT industries; case studies

977-323   Network Security and Management   3(2-2-5)
Prerequisite Course:
Semester Offered: On demand
Introduction to network security; cybersecurity; threats; denial of service; computer crime; vulnerability, protection and awareness; security management and monitoring; analyze risks; security policy; defenses; access control systems; application security; authentication

and authorization; intrusion detection and prevention system; case studies

977-324 Cybersecurity 3(2-2-5)
Prerequisite Course: 977-213 Computer Security
Semester Offered: On demand
Concept of cybersecurity; data gathering; hacking; virus; malware; protection; cryptography; backup; physical protection; computer-related crime; computing laws; computing ethics.

977-331 Mobile and Wireless Networks 3(2-2-5)
Prerequisite Course: 977-212 Data Communications and Networking
Semester Offered: On demand
Design and implementation of protocols; applications for wireless and mobile networking; techniques for using signal channels; transport layers of wireless network; wireless network problems; device constraints; node mobility

977-332 Internet Protocols and Implementation 3(2-2-5)
Prerequisite Course: 977-212 Data Communication and Networking
Semester Offered: On demand
Network architecture and protocols; network layers; domain system; transport layer; TCP and UDP protocol; error control of ICMP protocol; fragment and defragment; security in IP networks; DHCP; network management of SNMP; real-time networking and quality of service (QoS); functions of internet protocol

977-333 Hacking and Penetration Security Testing 3(2-2-5)
Prerequisite Course: 977-213 Computer Security
Semester Offered: On demand
Analysis and risk assessment of information technology system; vulnerability check; white-box and black-box penetration testing; problem process and report; web security; kinds of attacking; system hardening; network infrastructure; case studies

977-334 Advanced Network Security 3(2-2-5)
Prerequisite Course: 977-213 Computer Security
Semester Offered: On demand
Advanced concepts in applied systems and networking security; security policies; access controls; IP security; authentication mechanisms; intrusion detection and protection

977-335 Advanced Network Technology   3(2-2-5)
Prerequisite Course: 977-212 Data Communication and Networking
Semester Offered: On demand
advanced network design and development; enterprise topologies; service integration in TCP/ IP networks; protocol design; implementation and performance; network security and forensics; cloud computing; internet of things and server infrastructures; case studies in advanced network technology

977-336 Cyber Crime and Digital Forensics   3(2-2-5)
Prerequisite Course:
Semester Offered: On demand
Cyber- crimes; digital forensics procedures; memory forensics; data layers; related laws; case studies in digital forensics

977-337 Network Programming and Simulation   3(2-2-5)
Prerequisite Course: 977-212 Data Communications and Networking
Semester Offered: On demand
Principles of TCP/IP socket programming; introduction of computer simulation technologies; computer network simulation, design and data analysis; network simulation tools; case studies in network programming and simulation

977-330 Special Topic in Network and Security Engineering I   3(X-Y-Z)
Prerequisite Course:
Semester Offered: On demand
Special topics; novel theories or technologies related to network and security engineering

977-430 Special Topic in Network and Security Engineering II   3(X-Y-Z)
Prerequisite Course:
Semester Offered: On demand
Special topics; novel theories or technologies in networking and security engineering

977-431 Project in Network and Security Engineering   3(0-9-0)
Prerequisite Course: 977-401 Project in Digital Engineering 2
Semester Offered: On demand
Project development in the field of network and security engineering under the adviser supervision that illustrate the integration of network and security engineering knowledge that have been learning

Intelligent Objects

977-340 **Mathematics for Intelligent Objects**   **3(3-0-6)**
Prerequisite Course:
Semester Offered: On demand
Differential equation; Fourier series; Fourier transformation; lapace transformation; complex number; polar form of complex numbers; introduction to information theory; entropy

977-341 **Sensors and Microcontroller Interface**   **3(2-2-5)**
Prerequisite Course:
Semester Offered: On demand
Sensors and signals; types of analogue and digital sensors; analog-to-digital and digital-to-analog conversion; op-amp amplification; typical op- amp filters; microcontroller architecture; peripheral interfacing; serial communication; programming technique; memory mapped input/output; microcontroller applications with sensor interfaces

977-342 **Intelligent Connected Objects**   **3(2-2-5)**
Prerequisite Course: 977-104 Introduction to Computer Programming
Semester Offered: On demand
Use of microcontroller unit (MCU) and field-programmable gate array (FPGA) ; embedded programming; interrupts; scheduler; physical interface; IoT architecture; IoT networking; cloud computing; data visualization and analytics; real applications

977-343 **Image Processing and Computer Vision**   **3(2-2-5)**
Prerequisite Course: 977-105 Linear Algebra
Semester Offered: On demand
Signal and image acquisition; sampling and quantization; image enhancement; image transformations; image segmentation; image morphology; object representation; introduction to pattern recognition

977-344 **Robotics and Automation Systems**   **3(2-2-5)**
Prerequisite Course: 977-104 Introduction to Computer Programming
Semester Offered: On demand
The basics of industrial automation systems and flexible manufacturing; industrial robotics technology; basics of industrial robot, sensors and sensor systems, mechanical structure, drives, precision, repeatability; the use of industrial robots; programming of industrial robots; simulation tools for offline programming of

industrial robots; integration in production systems; production within industrial networks

977-351 High Performance Computing   **3(2-2-5)**
Prerequisite Course: 977-216 Computer Architecture
Semester Offered: On demand
Parallel patterns; master- worker and message- Passing; parallel algorithm design; collective communication patterns; complexity; benchmarks and formal models; MPI process groups; parallel matrix multiplication; advanced MPI topics; patterns in Pthreads; mutual exclusion in Pthreads; basic patterns in OpenMP; mutual exclusion in OpenMP; hybrid architectures; MPI+ OpenMP; GPU computing; OpenCL; OpenACC

977-352 Cyber-physical Systems   **3(2-2-5)**
Prerequisite Course: 977-341 Sensors and Microcontroller Interface
Semester Offered: On demand
Introduction to Cyber- physical systems (CPSs); combination of cyber capabilities with physical capabilities; discrete computerized control algorithms; sensing and control systems design; prototyping systems; software and hardware implementation; designing project incorporating infrastructure systems

977-353 Embedded Computing and Real time Operating Systems   **3(2-2-5)**
Prerequisite Course: 977-217 Operation System
Semester Offered: On demand
Introduces the issues challenges and methods for designing embedded computing systems; examples of embedded systems include mobile phones, game consoles, home appliances, and automobiles; design aspects of embedded systems; software and system-level design; power management; program analysis; real-time operating systems; task scheduling; wireless sensors; project on real embedded computing systems

977-354 Control of Mobile Robots   **3(2-2-5)**
Prerequisite Course: 977-105 Linear Algebra
Semester Offered: On demand
Introduction to mobile robotics; kinematics of mobile robot; dynamics and control of mobile robot; sensors for localization; sensors for navigation; localization in mobile robotics; reactive navigation; global navigation; kinematic structures

977-355 Pattern Recognition for Machine Vision   **3(2-2-5)**
Prerequisite Course: 977-105 Linear Algebra
Semester Offered: On demand
Overview of problems of machine vision and pattern classification; image formation and processing; feature extraction from images; biological object recognition; Bayesian decision theory; clustering; classification

977-356 Connected Devices Programming   **3(2-2-5)**
Prerequisite Course: 977-210 Object Oriented Programming
Semester Offered: On demand
Introduction to programming for the mobile devices; using software development kits (SDKs); mobile application development; anatomy of a mobile; the characteristics of a mobile; model-view-controller (MVC); android OS; android software; user interface (UI) and intents; user interface (UI) design patterns; building a dashboard; the basis services of mobile data; content providers; touch-based Interaction

977-357 Advanced Computer Architecture   **3(2-2-5)**
Prerequisite Course: 977-216 Computer Architecture
Semester Offered: On demand
Introduction to multi- core architecture; concept of parallel programming; thread- level parallelism; design patterns for parallel programming; debugging parallel programs; performance analysis and optimization; development tool for parallel programming

977-350 Special Topic in Intelligent Objects I   **3(X-Y-Z)**
Prerequisite Course:
Semester Offered: On demand
Special topics; novel theories or technologies related to intelligent objects

977-450 Special Topic in Intelligent Objects II   **3(X-Y-Z)**
Prerequisite Course:
Semester Offered: On demand
Special topics; novel theories or technologies related to intelligent objects

977-451   **Project in Intelligent Objects**   **3(0-9-0)**

Prerequisite Course: 977-401 Project in Digital Engineering 2
Semester Offered: On demand
Project development in the field of intelligent objects under the adviser supervision that illustrate the integration of intelligent object knowledge that have been learning

Software Engineering

977-360   **Requirement Engineering and Software Modeling**   **3(2-2-5)**

Prerequisite Course: 977-211 Software Engineering
Semester Offered: On demand
Software requirements management and process; requirement eliciting; requirement analyzing; requirement negotiating; requirement detail specifying; requirement testing; requirement traceability; managing requirements and changing requirements; techniques and tools used to define and verify requirements ensuring user's needs

977-361   **Software Architecture and Design**   **3(2-2-5)**

Prerequisite Course: 977-210 Object Oriented Programming
                        977-211 Software Engineering
Semester Offered: On demand
Software architectural styles, structural and behavioral viewpoints, strengths and weaknesses; software architecture document (SAD); application of architecture styles and design pattern in software detailed design; software framework; basic design patterns for software design; unified modeling language (UML); object-oriented analysis and design; case studies in software architecture and design

977-362   **Software Verification and Validation**   **3(2-2-5)**

Prerequisite Course: 977-211 Software Engineering
Semester Offered: On demand
Fundamental concepts and methods for verification and validation of software work products; software reviews; software inspection, software testing; software problem analysis and reporting

977-363 Software Process Improvement and Quality Assurance   **3(2-2-5)**

Prerequisite Course: 977-211 Software Engineering

977-301 Project Management and Quality Assurance

Semester Offered: On demand

Quality and quality factors; quality measurement; quality assurance; software life cycle model and standards; quality and process improvement; model based process improvement; quality tools; verification and validation; causal analysis and defect prevention; configuration management; software quality measurement model; software process improvement standards

977-364 Software Deployment and Maintenance   **3(2-2-5)**

Prerequisite Course: 977-211 Software Engineering

Semester Offered: On demand

Techniques for software changeability; forward engineering and backward engineering version management; challenges in software development and software improvement; impact analysis; software migration; software refactoring; reverse engineering; software work product integrity control; using CASE tools for software work product audits and traces

977-371 Software Project Management and Estimation   **3(2-2-5)**

Prerequisite Course: 977-211 Software Engineering

977-301 Project Management and Quality Assurance

Semester Offered: On demand

Software project planning; software cost estimation; software price estimation; software development scheduling; risk management; software risk identification; risk analysis; risk prioritization; risk management planning; risk resolution; risk monitoring; software project monitoring and control; software metrics; methods for data collection; data interpretation and evaluation

977-372 Advanced Database Systems   **3(2-2-5)**

Prerequisite Course: 977-112 Database System

Semester Offered: On demand

Relational database management system components; installation and configuration of database management system; database system management for multi-user; database integrity and security; database recovery; applying relational database via web; modern database system technologies

977-373   Component-based Software Development   **3(2-2-5)**
Prerequisite Course: 977-210 Object Oriented Programming
Semester Offered: On demand
Concepts and techniques of component-based software development; component-oriented tools and languages; component-based software development approaches; system designing and building; reusing components, including component-of-the-shelf and in-house software components

977-374   Advanced Object Oriented Programming   **3(2-2-5)**
Prerequisite Course: 977-210 Object Oriented Programming
Semester Offered: On demand
Advanced object oriented programming techniques; GUI programming; 2D and 3D visualization programming; database connection; transaction management; form and report; network connection with various protocols; socket and remote method invocation

977-375   Advanced Software Modeling and Development   **3(2-2-5)**
Prerequisite Course: 977-361 Software Architecture and Design
Semester Offered: On demand
Reflection programming technique; aspect- oriented software development; model- driven software development; modelling languages; techniques for meta- modelling; model transformation approaches; analysis techniques on models

977-376   Alternative Software Development   **3(2-2-5)**
Prerequisite Course: 977-211 Software Engineering
                                         977-210 Object Oriented Programming
Semester Offered: On demand
Principle of adaptive software development; basic characteristics of an adaptive software development life cycle; collaborative approach; agile methodologies; engineering practice in agile software development such as scrum, Kanban, lean, test driven development (TDD), feature driven development (FDD), automated acceptance testing, extreme programming (XP); software specification by example; continuous integration

977-377   Best Practice in Software Engineering   3(2-2-5)
Prerequisite Course: 977-211 Software Engineering
                                       977-210 Object Oriented Programming
Semester Offered: On demand
Introduction and definitions of software engineering best practices; best practices for software architecture and design; best practices for project planning; best practices for programming and coding; best practices for software changes and control; best practices for software quality assurance; best practices for security; best practices for international software standards; best practices for legacy applications; best practices for software metrics

977-378   Formal Methods in Software Engineering   3(2-2-5)
Prerequisite Course: 977-360 Requirement Engineering and Software
                                       Modeling
Semester Offered: On demand
Formal methods; formal specification; mathematical notation; schema calculus generic constructions; rigorous software development; semi-formal specification; cleanroom software engineering; test generation from specification; formal method tools; case studies

977-370   Special Topic in Software Engineering I   3(X-Y-Z)
Prerequisite Course:
Semester Offered: On demand
Special topics; novel theories or technologies related to software engineering

977-470   Special Topic in Software Engineering II   3(X-Y-Z)
Prerequisite Course:
Semester Offered: On demand
Special topics; novel theories or technologies related to software engineering

977-471   Project in Software Engineering   3(0-9-0)
Prerequisite Course: 977-401 Project in Digital Engineering 2
Semester Offered: On demand
Project development in software engineering under the adviser supervision that illustrate the integration of software engineering knowledge that have been learning

Artificial Intelligence and Data Science

968-251 Introduction to Artificial Intelligence   3(2-2-5)
Prerequisite Course:
Semester Offered: On demand
Definitions and objectives of artificial intelligence (AI); problems and
state spaces; heuristic search; natural language processing; knowledge
representation; machine learning; expert systems; decision support
systems; computer vision and image processing; AI applications

968-252 Data Science   3(2-2-5)
Prerequisite Course:
Semester Offered: On demand
Data science; statistical inference; data science life cycles; exploratory
data analysis; data science methods; data science process; machine
learning algorithms

968-352 Introduction to Machine Learning   3(2-2-5)
Prerequisite Course:
Semester Offered: On demand
Learning and the general-to-specific ordering; decision tree learning;
artificial neural networks; hypotheses evaluation; Bayesian learning;
computational learning theory; instance-based learning; genetic
algorithms; sets of rules learning; analytical learning

968-356 Introduction to Natural Language Processing   3(3-0-6)
Prerequisite Course:
Semester Offered: On demand
Principles of natural language processing; lexical analysis; syntactic
analysis; semantic analysis; problems and ambiguities in natural
language; relation between sentences

Animation and Digital Media Technology

968-263 Computer Graphics and Design 1 (2D)   3(2-2-5)
Prerequisite Course:
Semester Offered: On demand
Principal of computer graphic design; design process; tools for
graphic design; workshops for computer graphic design (e.g. printing
design, character design, packaging design)

968-264 Game Design and Development   **3(2-2-5)**
Prerequisite Course:
Semester Offered: On demand
Design for basic game elements; rules; paper game prototyping; level
design; game testing; game revising; utilizing software applications
for game design

968-366 Basic Animation and Motion Graphics   **3(2-2-5)**
Prerequisite Course:
Semester Offered: On demand
Processes in animation making; character preparation; the use of
appropriate animation processes and techniques; basic object
human and animal rigging

968-367 Game Programming   **3(2-2-5)**
Prerequisite Course: 977-104 Introduction to Computer
Programming
Semester Offered: On demand
Game architecture; game logic; game views; game event
management; AI game; workshop for basic game programming
project

Cooperative Education/Internship   6 credits

977-490 Cooperative Education   **6(0-36-0)**
Prerequisite Course: 977-400 Pre Cooperative Education
Semester Offered: Semester 2 (4th Year)
On the job training as a full-time staff of an approved workplace for
a period not less than 16 weeks or 640 hours including oral
presentation and final report submission to the entrepreneur

977-491 Internship   **3(0-18-0)**
Prerequisite Course: 80% of curriculum
Semester Offered: On demand
Internship in the field of digital and software engineering in industrial
enterprises, companies or academic institutes an ICT professional
office not less than 320 hours