

## 6.1 SYNOPSIS OF UNIVERSITY COURSES

### **ULAM 1112 Malay Language for Communication Purposes**

This course is designed for first year foreign undergraduates from countries of non-Malay origins. It is focused on the communication aspects in order to help students in the teaching and learning process. The oral aspects of the communication will be emphasized to encourage the students to involve in social interaction effectively.

### **ULAB 1112 English for Academic Communication**

This course prepares students for the skills needed to perform academic tasks, such as taking notes from written and oral texts, producing academic assignments and giving oral presentation related to their academic assignments. Through these tasks, students will practice various skills such as looking for information from various sources (print, internet, etc.), extracting information from different text types, making notes of information obtained, expanding notes into coherent extended texts and presenting information as well as giving viewpoints in an oral presentation. The tasks assigned will be in the form of individual and group projects that develop students' skills in time management, project management, team work and group interaction.

### **ULAB 2112 Advanced English for Academic Communication**

Prerequisites: ULAB1112 English for Academic Communication

This course prepares students for advanced academic communication in English with emphasis on oral communication skills. Students will be assigned projects that require them to look for and extract relevant information from various sources. In the process of completing the projects assigned, students will put into practice various skills developed in the earlier as well as skills in collecting data through interviews and questionnaire survey, integrating and presenting information (in oral and written form), time management and group interaction. The various oral activities such as presenting proposal of the project, giving a briefing on the progress of the report and presenting the completed report are designed to build students' oral communication skills and confidence in expressing themselves, i.e. skills that are much needed in their studies and career.

### **ULAB 3012 English for Career Search**

Course Pre-requisites: ULAB2112 Advanced English for Academic Communication

The course prepares students to learn more about their respective field of work. This is done through projects on job hunting and career search which require them to search on information related to their future profession. Through the sharing of information, students will be informed of what their future profession entails. This component is followed by a component on writing effective curriculum vitae and persuasive job application letter using appropriate language and tone. Students will also have the opportunity to practice skills for effective job interviews.

**ULAB 3022 English for Workplace Communication**

Course Pre-requisites: ULAB2112 Advanced English for Academic Communication

The course aims to introduce and expose students to the basic principles of communications at the workplace. This includes appreciating the importance of the four language skills, i.e. listening, reading, speaking and writing in effective workplace communication. In the course students will have the opportunity to practice effective meeting and discussion skills in formal and informal communicative events and read and write appropriate workplace related documents. Students will also be exposed to situations where they learn to function as individuals and team members and interact verbally and non verbally with appropriate language, style and gestures.

**ULAB 3032 Reading for Specific Purposes**

Course Pre-requisites: ULAB2112 Advanced English for Academic Communication

The aim of this course is to introduce students to texts of different genres and rhetorical structures, namely, literature and science-based texts. Students are taught to deal with two main areas of reading: reading for academic purposes and reading to appreciate literary texts. In reading for academic purposes, students are exposed to authentic texts drawn from journals, research articles and magazines. They are taught how to discuss and respond critically to issues related to the texts. They are required to extract holistic ideas of the theme and react to them by stating agreement or disagreement, advantages or disadvantages of the ideas stated and making inferential opinion and justification. In appreciating literary texts, students are taught to analyse some literary texts. They are also required to share their own experience, perceptions, and opinions to issues presented in the literary texts. In both, reading for academic purposes and literary appreciation, the texts serve as stimulus and context for language learning.

**ULAB 3042 Writing For Specific Purposes**

Course Pre-requisites: ULAB2112 Advanced English for Academic Communication

The course focuses on two areas of writing: (1) the writing of technical information that students would be expected to perform in their professional career, and (2) the skills of organizing various types of data towards producing a thesis. For the first part of the course, students will be introduced to the techniques of gathering technical information about product, service or specialized subjects and to present that information to a target audience in the form of instruction manuals, brochures, memorandums and reports. The various forms and functions of these written documents will also be discussed. For the second part of the course, students will have the opportunity to go through the steps in planning a thesis, assembling and presenting data, writing the findings, and drawing conclusions from a study. In addition, students will be exposed to the nature of academic thesis, and analysis and evaluate existing theses. For both parts, the English grammar, proper language usage and acceptable writing standards will be covered.

**ULAB 3052 Effective Oral Communication Skill**

Course Pre-requisites: ULAB2112 Advanced English for Academic Communication.

The course focuses on the techniques of producing good spoken discourse (to include oral presentation, speech and briefing) using the English sound and speech systems. Aspects of sound production and speech production aimed at improving intelligibility and communicability will be covered. It will also incorporate aspects of confidence building, visual aids preparation and audience handling. Participant will have substantial practice in speech delivery.

**UHAS 1172 Malaysia Dynamic**

This course discusses the basic sociological concepts on culture and ethnic relations. It focuses on the development of ethnic relations in Malaysia from the sociology, history and constitution perspectives. It also emphasizes to develop skills in understanding a making sense of Malaysian society thus enabling the students to contribute to the country's development. Among the topics that are covered in the course are issues on globalization, government policies and strategies in the context of national solidarity and development, multi-ethnic relations for the Islamic perspectives and cultures.

**UHAS 1162 Arts, Customs & Beliefs of Malaysians**

This course is designed for first year foreign undergraduates from countries of non-Malay origins. Students will be exposed to various aspects of the Malaysian culture such as the belief system, religious festivals, customs and etiquette of different racial groups in Malaysia. They will also be introduced to Malaysian traditional music, arts and crafts.

**UHAS 2032 Technocrat and Development**

This course focuses on technocrats' roles and responsibilities toward the nation development process. This course includes topics on sociology, economics, politics, technology, professional ethics and globalization issues from various perspectives.

**UHAS 2042 Introduction to Industrial Sociology**

The aim of this course is to discuss industrial aspect according to sociological perspectives. It focuses on the role of industrial sociology, industrial development and implication towards society and family. It also discusses employees' rights under respective laws and the union functions in industrial relation.

**UHAS 2052 Effective Communication**

This course focuses on effective communication techniques. These include verbal and non verbal communication, interpersonal communication effectiveness, public speaking, conflicts management and problem solving.

**UHAS 2062 Introduction to Industrial Psychology**

Industrial Psychology is a part of psychology discipline, which is related to behavioral science at workplace. It also applies psychological principals to understand various behaviors, which involve employees and work. Industrial psychology also considers personnel issue, workplace problems and behavioral management at workplace.

**UHAS 2072 Racial Relation**

The course aims to introduce and expose students to the aspects related to social relation sociology. This includes basic concepts of racial relation such as race, races, racism, ethnic, ethnocentrism, prejudice, stereotype, and form of races/ethnics identity in Malaysia, Balkan, South Africa, United States and South East Asia countries. The focus is more on cause, effects, process and methods of solving racial relation problems.

**UHAS 2082 Malaysian Socio-Economics Development**

The course focuses into the meaning and measurement of development, development theories, and development plan in Malaysia before and after Independence Day, poverty eradication, society restructuring and development strategy of various sectors in Malaysia. The development strategy is viewed especially in urbanization, industrial sector, privatization, foreign investment, technology transfer and national industrial policy.

**UHAS 2092 Professional Ethics**

This course consists basic debates on ethics (morale), ethics theories, ethics awareness, ethics principals and functions, ethics relations with professionalism, ethics problem in profession, value and structure of professional ethics, service obligation, obligation towards client, obligation towards profession, ethics current issues in management, medical, engineering and business.

**UHAS 2102 Introduction to Counseling**

The aim of the course is to expose students to the fundamentals of counseling. This includes counseling concept, basic counseling skill, career counseling, workplace counseling, industrial problems, interview and counselor's role in industry.

**UHAS 2112 Introduction to International Relation**

The aim of this course is to explain the development of international relation. This course will also discuss thematic issues such as economics and international trade, laws, military, human rights, Islam and International Relation, globalization and New World Order.

**UHAS 2122 Critical and Creative Thinking**

The aim of the course is to develop students understanding of the concept, theory and practices of critical and creative thinking. Attention is on critical and creative thinking technique as well as obstacles factors of both thinking methods. Both thinking methods help students to make decisions or solve problems whether in-group or individual.

**UKQxxxxx1 Co-Curriculum**

Refer to co-curriculum hand book

**ULAxxxx2 Foreign Language Elective Courses**

A foreign language course is a free elective with 2 credits and open to all Bachelor students.

### **UICI1012 Islamic & Asian Civilization**

The course familiarizes students with the Islamic and Asian Civilization. It discusses on the science of civilization that embrace an introductory to the science of civilization, the interactions of various civilizations (Malay, China and Indian): Islam in Malay Civilization and its role in establishing the Malaysian civilization, contemporary issues on the Islamic and Asian Civilization, Islam Hadhari and nation-building. At the end of the course, student will be extensively exposed to the history, principles, values and fundamental aspects of the civilization studies in a Malaysia as well as able to strengthen the integrity of Malaysian as citizen of a multi-racial country which has a high tolerance towards others. Throughout the learning process, some aspects of generic skills namely team working, communication skills and ethics will be emphasized.

### **UICI 2032 Islam & Current Issues (UICI 2132)**

The course acquaints students with various topics on current issues and the Islamic approaches to overcome the problems and to encounter the challenges. The topics comprise discussions on globalization, clash of Eastern and Western civilizations, moral decadency, ethical issues in science and technology, economic issues, development and environmental issues, post-modernism, governance and administration, issues that challenge the credibility of Islam, as well as fundamentalism and extremism. Issues pertaining to the ethnic relations and ethnic chauvinism and the current challenges of Muslim people will also be discussed. At the end of the course, students will be able to explain the Islamic views pertaining to current issues and able to provide answers and alternatives to the problems by referring to the Islamic principles. They are also able to work in team and equip themselves with communication and problem solving skills.

### **UCSD 2762 Information Technology Entrepreneurship**

This course will provide an overview of the basic concepts of entrepreneurship focusing on the nature, environment, and risks of new venture formation and building of businesses in the Malaysian context. It is designed to explore the personality of the entrepreneur and how innovative business ideas are created. Class members will consider business planning, self-assessment, business idea generation and operating strategies required to start a new small IT based business. Students will also be exposed to current case studies of existing companies involved in the IT business. Active participation by students during class discussions and activities is encouraged and expected.

### **UCSD3761 Technopreneurship Seminar**

This 1-credit course will provide an extension to the existing 2-credit subject (UCD2762) on how to analyze and evaluate the business opportunities using the knowledge and skills acquired from the previous subject. Class members will consider business planning, self-assessment, idea generation, and operating strategies required to start a new small business. Students will also be exposed to Harvard Business School Case Method in order to give them exposure to the real world problems and their solutions. Active participation by students during class discussions and activities is encouraged & expected.

### **USC 2010 ICT Project Development for Community Service**

Service learning combines community service with academic instruction, focusing on critical, reflective thinking and responsibility. Service learning programs involve students in activities that address community needs with their academic skills. This course will enable students to work with government and private agencies, utilities, and local community to design and develop an ICT project in the selected area. Students will work in a group and be able to perform effectively in a wide range of social and professional contexts.

The development of soft skills will be embedded within the contexts of managing small projects, team working and solving community problems. Students are required to make reflections on the learning theories and concepts as well as experiences of community service.

## **6.2 SYNOPSIS OF PROGRAMMES CORE COURSES**

### **SCSD 1513 Technology & Information System**

As a primer subject, this course will introduce students to information systems and technology (IS/IT), as well as its uses in daily life both at home and at work. Various aspects of IS/IT encompassing hardware, software, network, communications, internet, multimedia, graphics and systems applications will be introduced. Students will be equipped with basic skills in handling PC installation and productivity tools via practical work in the labs, which shall comprise a major part of the study. At the end of the course, student should be able to distinguish basic IS/IT component and applications.

### **SCSD 2523 Database**

This course introduces students to the concept of database system and how it can be used in daily human life and profession. The main focus of the course is to equip students with knowledge and skills on important steps and techniques used in developing a database, especially in the conceptual and logical database design phase. Among topics covered are database environment, database design, entity relationship diagram, normalization, and structured query language (SQL). Students will be taught to use a database management system (DBMS). Students are required to design and develop a mini database application system using the learned techniques, DBMS and a development tool. At the end of the course, students should be able to apply the knowledge of designing and developing a good database system.

### **SCSD 2613 System Analysis and Design**

The main focus of this course is to provide a practical approach of systems analysis and designing skills for the students using structured methodology. Hence the course enables students to study information system requirements for any system application within an organizational context. The contents are sequentially organized directly from planning, analysis, designing and implementation phases. The course includes some main topics such as steps in conducting systems feasibility studies, information gathering techniques, analysis and design systems tools and model within an organizational context, process-modeling technique using data flow diagram, designing model using structure chart and prepare the process specification using structured English or pseudo codes. From the resulting output of the planning and analysis phase shall enable students to form input, output and interface design. Hence a basic system prototype can be developed.

### **SCSI 1013 Discrete Structure**

This course introduces students to the principles and applications of discrete structure in the field of computer science. The topics that are covered in this course are set theory, fundamentals of logic, relations, functions, counting methods, discrete probability theory, graph theory, Boolean algebra, finite automata and coding theory. At the end of the course, the students should be able to use set theory, logic, relations, functions, and Boolean algebra to solve computer science problems, analyze and solve problems using counting methods and discrete probability theory, apply graph theory in real world problems, use deterministic finite automata finite state machines to model electronic devices, and apply coding theory to solve computer science problems.

**SCSI 3143 Probability & Statistical Data Analysis (SCSI 2143 or SCSI 3143)**

This course is designed to introduce some statistical techniques as tools to analysis the data. In the beginning the students will be exposed with various forms of data. The data represented by the different types of variable are derived from different sources; daily and industrial activities. The analysis begins with the data representation visually. The course will also explore some methods of parameter estimation from different distributions. Further data analysis is conducted by introducing the hypothesis testing. Some models are employed to fit groups of data. At the end of course the students should be able to apply some statistical models in analysis data using available software.

**SCSJ 1013 Programming Technique I**

As a fundamental subject, this course equips the students with theory and practice on problem solving techniques by using the structured approach. Students are required to develop programs using C++ programming language, in order to solve simple to moderate problems. The course covers the following: preprocessor directives, constants and variables, data types, input and output statements, text files, control structures: sequential, selection and loop, built-in and user-defined functions, one dimensional and two dimensional arrays.

**SCSJ 1023 Programming Technique II**

Prerequisites: SCSJ1013 Programming Technique 1

This course equips the students with theory and practice on problem solving techniques by using two approaches, namely the structured approach and the object oriented approach. The first part of the course provides students with basic skills to program in Linux platform and advanced concepts in structured programming techniques including advanced files, pointers and structured data. The second part of the course is to provide students with object-oriented techniques such as class, objects, overloading, aggregation and inheritance.

**SCSJ 2203 Software Engineering**

Prerequisites: SCSJ1013 Programming Technique I

This course is designed to give students an introduction to an engineering approach in the development of high quality software systems. It will discuss the important software engineering concepts in the various types of the common software process models. The students will also learn the concepts and techniques used in each software development phase including requirements engineering, software design and software testing. This course will also expose the students to utilizing object-oriented method (e.g. UML) and tools in analyzing and designing the software. At the end of this course, students are expected to be able to appreciate most of the common software engineering concepts and techniques as well as producing various software artifacts, documentations, and deliverables.

**SCSJ 2013 Data Structure &Algorithm**

Pre-requisites: SCSJ1023 Programming Technique II

This course provides an introduction to data structure and algorithms, types of data structures and programming principles. Student will learn abstract data type concepts using class and apply ADT concept in the implementation of data structures. Recursive function, algorithm efficiency, order of magnitude analysis and Big O notation will be discussed. Students will implement operations that can be applied to data structures using various sorting and searching techniques. Further, students will be exposed to linear data

structures such as linked lists, stack and queue. Non-linear data structures such as tree and graphs will also be discussed. At the end of the course, students should be able to implement and apply the theory and concepts of data structure in the mini project which is conducted in group.

### **SCSJ 2154 Object Oriented Programming**

Pre-requisites: SCSJ1023 Programming Technique II

This course presents the concepts of object orientation and object-oriented programming techniques using Java programming language. It provides students with a thorough look at the basic constructs of the Java programming language such as its basic data types and operations. It also emphasizes on the use of standard Java APIs that allow students to develop text-based, GUI, multi-threaded, and network applications. It will also provide the programming techniques on exception handling and input/output files. At the end of this course, students should be able to use the basic constructs in object-oriented programming and utilize the selected Java APIs

### **SCSJ 3253 Computer Science Theory**

This course introduces students to a formal language and automata theory. It will emphasize on grammar, language and abstract machine such as context Free Grammar, Finite Automata, Push down Automata, and Turing Machine. The course will also provide practice on the acceptability of data by these machines. At the end of the course, students should be able to apply the theory in constructing this abstract machine and testing them with the right data.

### **SCSR 1013 Digital Logic**

Digital electronics is the foundation of all microprocessor-based systems found in computers, robots, automobiles, and industrial control systems. This course introduces the students to digital electronics and provides a broad overview of many important concepts, components, and tools. The students will get the up-to-date coverage of digital fundamentals- from basic concepts to programmable logic devices. Laboratory experiments provide hands-on experience with the devices and circuits studied in the classroom.

### **SCSR 1213 Network Communication**

Prerequisites: SCSR1013 Digital Logic

This course will discuss the basic topics of computer network and data communications. Based on OSI seven layers, the course will apply top-down approach. Starts with the important and usage of computer network in commonly applications, the approach will go further detail in the technical aspect in data communication. At the end of this course, students should be able to design the logical and physical of local area network, configure the network devices as well as evaluate the local area network implementation. This course follows the Cisco Networking Academy curriculum. Students will be given a certificate to mark the successful completion of the course.

### **SCSR 2033 Computer Organization and Architecture**

This course was designed to give the understanding of basic concept of computer organization and architecture. Topics covered in this subject will be on computer performance, types of data and the representative, arithmetic manipulation, instruction execution, micro programmable control memory, pipelining, memory, input/output and instruction



format. At the end of this course, the student should be able to understand the concept of overall computer component and realize the current technology in computer hardware.

### **SCSR 2043 Operating System**

Prerequisites: ~~SCR~~SCSR1043 Computer Organization & Architecture (The code of COA is SCSR2033 or SCSR1043?)

The subject will emphasize on the introduction to major operating system components. Students will be exposed to the techniques in designing operating system. Topics covered include process management, concurrency and synchronization, deadlock, memory management, file management, secondary storage management and I/O management.

### **SCSV 1223 Web Programming**

This course gives theoretical and technical insight of Web environment technologies and components for application developments. Current technologies and components available for web consist of standard HTML objects, client-script (JavaScript, VB Script), and application logic - CGI (C, C++, Perl, Python, etc.), Servlet (Java), Server Pages Technologies (ASP, PHP, and JSP), Applet, Active-X, VRML and numbers of Shockwave components from Macromedia Inc. The miscellaneous of web technology make it suitable for both conventional and multimedia application. For conventional web base application, the students will be exposed to the client-script programming (JavaScript) and application logic programming (CGI-Perl and PHP). This part gives details explanations on the functional components functional and how they interact to each other. Students are required to practice using the components by doing quizzes and assignments. MIME() types handling and connection to external resources such as database is also emphasized especially in application logic programming. Support for multimedia application development will involve the technologies and components such as VRML, Applet and Shockwave. Basic knowledge and steps for preparation and deployment of these components in web environment are the main topics that will be addressed. Details explanation on how to control the behavior of these components in browser environment using client script programming (JavaScript) and CGI application logic (Perl) are also given. At the end of this course, students are expected to have solid knowledge in advance WEB programming regardless of the rapid changes in related technology accordingly.

### **SCSV 2113 Human Computer Interaction**

This Course is design to presents fundamentals, technologies and components for web application developments. Standard HTML for content creation, CSS for content presentations, JavaScript for client-side logics, PHP a server-side language for business logics and data processing.

### **SCSx 3032 Project I**

This is the initial part of a 2-part Final Year Project that every student must fulfill successfully. Students are introduced to the methodologies of research and application development through a series of lectures

### **SCSx 4134 Project II**

This is the second part of a 2-part Final Year Project that every student must fulfill successfully. In this installation, students are required to execute the next phases of their development plan from Part I. Students are now required to code and integrate the different modules that make up the proposed project. Students will test the developed

modules and the final fully-integrated project following software development and research testing practices. Students must meet regularly with supervisor(s) who will monitor their continuous progress. Students are required to prepare a report and present their final work.

#### **SCSx 4118 Industrial Training (HW)**

Industrial training is a practical session that will be undertaken by students at an organization or industry within 20 weeks to acquire the real job's experiences. The objective is for the students to apply the knowledge learned in the university and boost their skills which needed by a profession. The students will involve in developing a system either in group or individual task in order to analyze, design, documentation and maintenance the system. At the end of the industrial training period the students should acquire as much as the basis skills and experiences in professional manner to achieve the desire of producing a technologist with high responsibility.

#### **SCSx4114 Industrial Training Report**

Industrial training is a practical session that will be undertaken by students at an organization or industry within a minimum of TWENTY (20) weeks. The students are required to present their practical training results, as well as produce a technical report.

## **6.3 SYNOPSIS OF PROGRAMMES ELECTIVE COURSES**

### **6.3.1 From Bioinformatics Discipline**

#### **SCSB 2103 Bioinformatics I**

This course guides students from the elucidation and analysis of a genomic sequence to the prediction of a protein structure and the identification of the molecular function. Introduction to Bioinformatics describes the rationale and limitations of the bioinformatics methods and tools that can help solve biological problems. It also shows how to efficiently apply bioinformatics applications to bioinformatics data and evaluate the resulting information. This course, first addresses the ways of storing and retrieving the enormous amount of bioinformatics data produced every day and the methods of decrypting the information encoded by a genome. It then covers the tools that can detect and exploit the evolutionary and functional relationships among biological elements. Subsequent chapters illustrate how to predict the three-dimensional structure of a protein. The book concludes with a discussion of the future of bioinformatics.

#### **SCSB 3103 Bioinformatics II**

This subject familiarizes students with resources essential in examining how raw sequence data from genome sequencing projects can be used to generate information about gene sequence, protein structures, molecular evolution, biochemical, and genomics. It introduces existing DNA sequence and protein structure concepts and theories. Students will be exposed to bioinformatics methods and practices using appropriate bioinformatics tools. The focus will be on preparing the students with sufficient information, understanding and interpretation of biological data that may help them to learn of bioinformatics methodologies.

### **SCSB 3203 Programming for Bioinformatics**

R programming language is becoming the most widely used language in the development of bioinformatics applications. This course builds the programming skills needed to use R for solving bioinformatics and computational biology problems. It begins with coverage on the general properties of the R language, several unique programming aspects of R, and object-oriented programming in R. It also presents methods for data input and output. Generally, the course will provide students with conceptual and practical understanding of R programming language.

### **SCSB 3213 Bioinformatics Database**

This subject allows students to learn the major bioinformatics databases for data ranking, indexing, searching, visualizing and searching. It also covers information retrieval techniques (e.g. classic, networks, extended Boolean, generalized vector, latent semantic indexing, fuzzy), query operations, text operations searching, the main interface paradigms for query formation and visualization of results, models, indexing (R-trees, Gemini) and searching.

### **SCSB 4213 Bioinformatics Visualization**

This course presents the theoretical and technical aspects of data visualization in various bioinformatics applications. It emphasizes on the process of visualization, which includes various data sources, reconstruction of data, data models and data model representation techniques. Real visualization of applications of bioinformatics data such as used in life sciences agriculture, and biotechnology are also discussed.

### **SCSB 4313 Bioinformatics Modeling & Simulation**

This course is designed to introduce simulation as a tool to aid in decision making. Precisely, the students will be exposed to discrete-event simulation. Students will learn on how to represent operations of real-world process or system using conceptual and statistical models. These models will then be translated into computer simulation. The course begins with an overview of simulation followed by selected topics which are the steps in simulation study. Statistical techniques that are widely used in discrete event simulation are introduced in this course. The course also provides a hands-on exercise on developing discrete event simulation model using simulation package. At the end of the course, student should be able to develop a discrete event, statistical computer simulation which imitates real problems to assist in decision making.

### **SCSB 4243 Special Topic in Bioinformatics**

The course begins with an overview of the software development applications with emphasize to the latest tools used to develop the computer systems. Topics such as Microsoft .Net, Python, and other web based tools to support web development environments such as eclipse will be introduced in this subject. Students will be exposed with the technologies available in the market with the knowledge required to support the demand from the software industries in building software related applications.

### **SQBS 11443 Molecular and Cellular Biology**

This course will give the students a basic understanding of concepts and principles in molecular cell biology. Areas covered would be the differences between prokaryotes and eukaryotes, the basic cellular components such as cell structure, plasma membrane, nucleus, cytoplasm, intra-cellular systems and cellular functions. The concept of translation, transcription, gene expression, specialized cellular components will also be covered. Students will also be taught the basics of genetic manipulation in genetic engineering.

### **SQBS 4713 Genomics and Proteomics**

Bioinformatics involves the application of computational methods in order to address problems in molecular biology. This course will provide a graduate introduction to algorithms and their applications in bioinformatics. Topics in molecular biology that will motivate the algorithmic content of the course include: sequence analysis, structure analysis, expression analysis, phylogenetic analysis, and pathway analysis.

### **SCSB 4133 Computational Biology I**

Prerequisites: SCSB2203 Introduction to Bioinformatics, SSCE 2193 Engineering Statistics

This course discusses statistical methods as a basis for machine learning or algorithm used in computational biology. It prepares students for underlying concepts of each statistical method and the applications in biological data processing. This subject covers probabilistic framework, probabilistic modeling, probabilistic graphical model, decision theory and loss function, stochastic processes, cluster analysis, and partial differential equation. These core modules aim to provide students with sufficient knowledge of computational biology to handle biological data processing. Through this subject, students will be given computer-based assignments and a project that required them to look for and apply statistical method for processing of biological data. At the end of this course students should be able to apply the statistical methods for processing of biological data.

### **SCSB 4223 Computational Biology II**

Prerequisites: SCSB4133 Computational Biology, SCSJ1013 Programming Techniques I, SCSK2263 Artificial Intelligence

This course presents an overview of bioinformatics from a computer science perspective to solve problems in biology. The aim of the subject is to introduce concepts and applications of data visualization, data mining, and pattern matching in biology field. Major topics covered are data visualization: sequence, structure, animation and simulation; biological databases: object-oriented database methods, data mining, knowledge management; visualization: exploring the inner workings of complex biological structures; pattern matching techniques, including microarray research and gene prediction; modeling and simulation: event-driven, time-driven, and hybrid simulation techniques. Course work consists of homework assignments making use of software packages for these applications. At the end of this course students should be able to understand the importance of data mining in the models and also algorithm for biological data processing.

### **SQBS 4683 Structure and Function of Protein**

This course will give the students the basic knowledge and principles behind protein architecture and its function. Areas will include the use of computational and experimental methods to determine protein structure and function from the first and second principle of protein folding, the experimental determination of structure determination, protein structure prediction and the protein interactome.

## 6.3.2 From Database Discipline

### **SCSD 2623 Database Programming**

This course is designed to teach students how to create programmed solutions using the SQL and SQL\*Plus script as well as PUSQL procedural language. As each student is required to have a working knowledge of the programming process and understanding of the functional constructs in programming, the focus of this course is on database problems and potential solutions. Topics that will be covered include storing, retrieving, updating and displaying data using Structured Query Language (SQL) integrated into Stored Procedures, Functions, Packages and Triggers (PUSQL Programming). This course counts towards the requirement for Oracle9i Database Administrator Certificate and PUSQL Developer OCA Certificate examinations.

### **SCSD 3104 Applications Development**

Prerequisites: SCSD2613 System Analysis & Design / SCSJ2213 Software Engineering / SCSJ2154 Object Oriented Programming ([SCSJ2213](#) or [SCSJ2203 for Software Engineering](#))

This course is a comprehensive look at the state of the art in developing software application from the perspective of unified modeling view. Students learn various levels of application development models including use case, design, component and deployment models. Students also learn extensively to design software using design pattern to solve recurring problem. Other topics such as database, advanced application, testing and maintenance are included to complete a full cycle of software development.

### **SCSD 3633 Information Retrieval**

Course Pre-requisite: SCSD2523 Database

This subject allows students to learn the major information retrieval techniques for document ranking, indexing, searching, visualizing multimedia objects, and searching the Web. It covers main IR models (classic, networks, extended Boolean, generalized vector, latent semantic indexing, fuzzy), query operations, text operations searching, the main interface paradigms for query formation and visualization of results, models, indexing (R-trees, Gemini) and searching.

### **SCSD 3713 Database Administration**

Prerequisites: SCSD2523 Database

This subject addresses how to manage a database server in a client-server environment. It focuses on database administration (DBA) skills in general and specific skills needed to manage an enterprise level, large scale, relational database system such as Oracle and Microsoft SQL Server. The first part of the course takes a look at concepts underlying a database administration such as enterprise database planning, database architecture, installation, configuration and operation. Students will also learn how to create an operational database and properly manage the various structures in an effective and efficient manner including performance monitoring, database security, user management, DBMS tuning and backup/recovery techniques. The lesson topics are reinforced with structured hands-on practices.

### **SCSD 3723 System Development Technology**

This course provides fundamental theories and practices of using tools and technologies for developing a basic web- based business application. In general, students will learn basic ASP.NET programming language for developing application programs based on the .NET technology framework. Furthermore, students will also be taught on the overview of data access using ASP.NET with SQL Server database technology. These tools and technologies are used in the development and implementation of a fully functional database-driven web application. At the end of the semester, students should have the skill to apply the taught technologies. This is evident through the preparation and documentation of database systems development and the ability to develop a prototype of an information system using programming languages such as ASP.NET and database management systems such as SQL Server.

### **SCSD 3733 Multimedia Data Modeling**

This subject presents a comprehensive introduction to multimedia databases. It provides a solid understanding of level of data modeling: conceptual, logical and physical. Multimedia data structures, multimedia database modeling and multimedia database indexing techniques will be examined in this course.

### **SCSD 3753 Data Mining**

Prerequisite: SCD2523 Database

This subject presents a comprehensive introduction to knowledge discovery in databases (KDD). It provides a solid understanding of the entire discovery processes and the needs for it. Data mining as steps taken within KDD are explained. Students apply the knowledge learnt to solve some real world problems.

### **SCSD 4743 Enterprise Systems Design & Modeling**

This subject presents a data management perspective to the Enterprise Information Systems in a contemporary organization. The course will introduce the importance of enterprise information system management, strategic role of information systems in an organization, enterprise system integration, representation and patterns, enterprise value system and value chain modeling, enterprise information retrieval, view integration and implementation compromises, and inter versus intra enterprise systems. At the end of the semester, student should be able to plan and manage the development and maintenance of enterprise data and information systems.

### **SCSD 4813 Intelligent Decision Support System**

Intelligent Decision Support System will be study theoretical and implementation for artificial intelligence and multi- criteria techniques that can be applied in a decision support system. It focuses in development, operation and evaluation of an intelligent decision support system on supporting the performance of multi-user engaging on a common task or work. The subject covers the introduction to information systems, data analysis, multi criteria decision-making process, linear programming, inference engine, knowledge representative, genetic algorithm and neural net.

**SCSD4823 Knowledge Management System**

Pre-requisite: Application Development (SCSJ2104)

This subject covers the basic concept of Knowledge Management including the definition and the importance of Knowledge Management, types of knowledge management systems such as document management systems, decision support systems and group support systems. It focuses on the development and deployment of knowledge management systems. Several Knowledge Management tools and technology are introduced and real case studies are discussed. At the end of the course, students should be able to develop basic Knowledge Management Systems.

**SCSD4833 Information Security & Data Recovery**

This course is concerned with fundamental principles and practices of information security and data recovery. Topics include are concept of data security and data recovery, data loss and data organization, business continuity and disaster recovery planning, legal and ethics issues in information security, information security technology, computer operations security, physical security and security architecture and models using current standards and models.

**SCSD4843 Special Topic for Database Systems**

This course is meant to expose students to the current industrial issues pertaining to database systems and technologies. Various topics of interests that are directly or indirectly affecting or are being influenced by databases systems and technologies are explored and discussed. Participation in web forums as well as physical interaction, with practitioners on case studies is encouraged. Students should be able to conduct their own investigation and deductions of selected topics. Among the various areas of interests that shall be explored will include standards, tests & bench markings, architecture, business intelligence, best practices, data storage, predictive analytics and integration issues.

### 6.3.3 From Software Engineering Discipline

**SCSJ 2253 Requirements Engineering and Software Modeling**

Prerequisites: SCSJ2203 Software Engineering

This course provides an introduction to software modeling and a thorough look at the requirements engineering. It will discuss the introduction to software modeling such as overview of modeling and Meta modeling, mathematical models, specification languages, properties of modeling languages, syntax versus semantics, and different types of models including domain model. Requirements engineering topics include requirements engineering process, types of requirements, requirements elicitation techniques, requirements specification: textual and graphical, documentation standards, requirements analysis, requirements for typical systems, and requirements management. At the end of this course, the students should be able to describe the fundamentals of software modeling and use the common requirements engineering technique.

**SCSJ 2363 Software Project Management**

Prerequisites: SCSJ2203 Software Engineering

Students will study the software project planning, cost estimation and scheduling, project management tools, factors influencing productivity and success. Students will also learn productivity metrics, analysis of options and risks, software process standards and process implementation, software contracts and intellectual property and approaches to maintenance and long term software development.

**SCSJ 3104 Applications Development**

Prerequisites: SCSJ2203 Software Engineering & SCSJ2154 Object Oriented Programming

This course is a comprehensive look at the state of the art in developing software application from the perspective of unified modelling view. Students learn various levels of application development models including use case, design, component and deployment models. Students also learn extensively to design software using design pattern to solve recurring problem. Other topics such as database, advanced application, testing and maintenance are included to complete a full cycle of software development.

**SCSJ 3253 Programming Technique III**

Prerequisites: SCSJ3303 Internet Programming

This course provides students with the knowledge on how to develop robust back-end functionality using Enterprise JavaBeans (EJB) technology. This course uses an online auction scenario to demonstrate how to leverage container- managed services with entity, session, and message beans to resolve the real-world problems presented by an electronic commerce application. The emphasis of this course is on providing practical EJB technology coding experience, while also covering the designs and best practices used to solve transaction, messaging, security, and legacy integration issues. In addition, this course looks at how EJB technology components can be integrated with web • service technologies. The hands-on lab environment uses the Java 2 Platform, Enterprise Edition (J2EE) reference implementation server to provide students with a nonvendor-specific experience.

**SCSJ 3303 Internet Programming**

Prerequisites: SCSJ2154 Object Oriented Programming & SCSV1223 Web Programming

This course covers the development of web component with Servlet and JSP Technologies. This course will enable students to obtain the knowledge and skills necessary to quickly build web applications based on JSP and servlet technologies using the Tomcat web container and the Struts framework. Students are exposed to the current methods for analyzing, designing, developing, and deploying web applications with Java technologies. At the end of this course, student should be able to develop a web-based application using JSP and servlet technologies.

**SCSJ 3323 Software Design and Architecture**

Prerequisites: SCSJ2203 Software Engineering

This course provides the students with an in-depth look at the theory and practice of software design. It will emphasize the design and example applications of design patterns, architectures, and frameworks: including the current middleware technologies. It will also provide the techniques for analysis and evaluation of design and architectures,



overview of modern design methods, basics of software evolution, reengineering and reverse engineering. At the end of this course, the students should be able to use the techniques, architectural styles, and design patterns in software

### **SCSJ 3343 Software Quality Assurance**

Prerequisites: SCSJ2203 Software Engineering

The content of the course include the extends discussion of Software Quality Assurance issues much beyond the classic boundaries of custom-made software development by large established software houses. It dedicates significant attention to the other software development and maintenance environment that reflect the current state of industry. It also stress the comprehensive discussion of SQA implementation issues especially in dealing with implementation process that refer to real-life situation, such topic include Procedure and work instruction, Supporting Quality Device, Cost of Software Quality, The SQA unit and other actors in the SQA framework. The courses also emphasize up-to-date SQA topics such as Automated Testing, Computerized SQA tools and International SQA Standard.

### **SCSJ 3403 Special Topic in Software Engineering**

Prerequisites: SCSJ2203 Software Engineering

This course equips students with the theory and practice in methodology, technology, approach and tools of the state-of-the-art in the engineering and development of a software system. Students are also exposed to technology and knowledge required by industry.

### **SCSJ 3553 Artificial Intelligence**

This course will provide the students with the fundamental theories and techniques in artificial intelligence (AI). It will discuss the introduction to AI, History, Philosophy, Definition and Applications, Fundamental Issues in Intelligent Systems, Knowledge Representation and Search, Search and Constraint Satisfaction, Reasoning, Logic, Graph Theory, Problem Solving Techniques — Strong Method and Reasoning in Uncertain Situations, Inference, Searching involving Brute Force and Heuristic Search, Soft Computing and Agent Technology, and Machine Learning. At the end of this course, the students should be able to solve the given problem using the AI concept, theory, and technique.

### **SCSJ 3563 Computational Intelligence**

Prerequisites: SCSJ3553 Artificial Intelligence

The aim of this course is to give a state-of-the-art presentation of methods used in artificial intelligence in certain areas such as Data Mining, Machine Learning and Fuzzy Logic. The teaching will be done by hands-on. Students will be equipped to understand and apply fundamental areas of computational intelligence techniques and use them in the important areas of artificial intelligence domain. This course will cover the topics on neural network, genetic algorithm, fuzzy logic and rough set.

### **SCSJ 3603 Knowledge- Based & Expert Systems**

Prerequisites: SCSJ3553 Artificial Intelligence

This course is designed to expose the students to knowledge-based system that requires expert knowledge in the system development. It emphasizes the theory, concepts and important components in expert system. The students will be introduced the difference between expert and conventional systems. Students will experience developing an

application using any expert system tools with appropriate methodologies. Having some skills in AI programming, but not essential, is an advantage in the development of the system prototype. The students are expected to be able to work in a team and adhere to professional ethics.

#### **SCSJ 4383 Software Construction**

Prerequisites: SCSJ3203 Computer Science Theory

This course provides the students a general principles and techniques for disciplined low level software design. Students will study the use of parser generators, basics of language and protocol design, formal languages, state transition and table-based software design. Students will also learn formal methods for software construction, techniques for handling concurrency and inter-process communication, tools for model-driven construction, an introduction to Middleware and hot-spot analysis and performance tuning.

#### **SCSJ 4423 Real Time Software Engineering**

Prerequisites: SCSJ2203 Software Engineering

This course equips the students with knowledge in embedded real-time systems and real-time software development particularly on how software engineering approaches assist real-time software development. The knowledge unit for this course area emphasize the following topics; real-time concepts, embedded real-time development methodologies, real-time operating systems, embedded real-time hardware fundamental and real-time analysis. The objective of this course is to introduce students with key software engineering practices in real-time software development and give practical experience to the students in developing embedded real-time software using appropriate software methods and tools.

#### **SCSJ 4463 Agent Oriented Software Engineering**

Prerequisites: SCSJ2203 Software Engineering

The course begins with an overview of the agent systems and software agents. Then we focus on agent system architecture and infrastructure from a software engineering viewpoint, including requirements for agent-based systems, modeling and design of agent based systems, development process for agent-based systems. Topics such as agent architecture, communication, and knowledge sharing, computing and uncertainty management are discussed. Studying society of agents and models of agency follows. Finally, a perspective on a methodology for agent-oriented software engineering and standards are presented.

#### **SCSJ 4483 Web Technology**

Prerequisites: SCSJ3303 Internet Programming, SCSJ3253 Programming Technique III

This course provides students with the information needed to design, implement, deploy, and maintain web services and web service clients using Java technology components and the Java 2 Platform, Enterprise Edition (J2EE platform) platform.

## **6.3.4 From Computer Network & Security Discipline**

### **SCSR 2242 Computer Networks**

Prerequisites: SCSR1213 Network Communication

This course is design to discuss on network layer and data link layer of OSI Model. It will emphasize on concept and function of routers, routing protocol, IOS management application and Access Control List (ACLs). Data link layer will discuss on flow control, error control and other protocol related to data link layer. At the end of the course, the student should be able to design network for local and wide area network, set the access security and apply in some case study.

### **SCSR 2941 Computer Networks Lab**

Prerequisites: SCSR1213 Network Communication

This course is actually the series of laboratory session to give the student hand-on experience on configuration of routers, IOS management application, configuration of routing protocol, TCP/IP and Access Control List (ACLs). At the end of this laboratory session, the student should be able to working in wide area network devices such as routers and switches.

### **SCSR 3104 Application Development**

This course is a comprehensive look at the state of the art in developing software application from the perspective of unified modeling view. Students learn various levels of application development models including use case, design, component and deployment models. Students also learn extensively to design software using design pattern to solve recurring problem. Other topics such as database, advanced application, testing and maintenance are included to complete a full cycle of software development.

### **SCSR 3242 Inter Networking Technology**

Prerequisites: SCSR2242 Computer Networks

This course will be emphasized on addressing technique of computer network using Variable Length Subnet Masking (VLSM). Additionally the focus will be given to routing protocol such as RIP, OSPF, and EIGRP, introduction to the concept of VLAN (Virtual LANs), STP (Spanning Tree Protocol) and VTP (VLAN Trunking Protocol). The subject also provides an extensive study in wide area network technology including WAN standard, encapsulation and design. At the end of this course, student should be able to configuring network devices, design wide area network and apply knowledge in some case study.

### **SCSR 3243 Netcentric Programming**

Prerequisites: SCSR1213 Network Communication, SCSJ1023 Programming Technique

This course is design to provide the student the skill and understanding of HTTP and web-based application development. Emphasis of the course is hands-on training on top of recent software development environment. A project based system development work will be an essential component of the course. Topics include HTTP client/server

communication and application design, servlet and Java Server Page (JSP) containers session management, database connectivity, etc. at the end of this course, they should be able to design and develop the web- based application

#### **SCSR 3253 Network Programming**

Prerequisites: SCSR1213 Network Communication, SCSJ1023 Programming Technique

This course covers various techniques and technologies to develop network applications using Java Programming Language. Topics cover from networking fundamentals to Remote Method Invocation (RMI), including TCP and UDP sockets, multicasting, multimedia network application and peer-to-peer computing. At the end of this course student should be able to design and develop some application based on client server approaches.

#### **SCSR 3413 Computer Security**

This course is designed to expose the student issues pertaining to computer system security. Topics covered include access control, basic cryptography, program/software security, operating system security, network security, database security, security policy and administration. At the end of this course student should be able to implement some basic security approach in specific case study.

#### **SCSR 3443 Cryptography**

Prerequisites: SCSR2413 Computer Security (SCSR2413 change to SCSR3413)

This course is aimed to introduce the student the concepts of fundamental cryptography and its applications. The topics that will be covered are evolution of cryptography, number theory, information theory, symmetric and asymmetric cryptography and message authentication. Several cryptographic structures and the characteristics of the algorithms that provide the strength to the algorithms will also be discussed. At the end of this course, the student should be able to apply the knowledge in developing application with security features.

#### **SCSR3941 Inter Networking Technology Lab**

Prerequisites: SCSR2941 Computer Networks Lab

This course is actually the series of laboratory session to give the student the skill on practically handling inter networking devices to clearly understand the concept of existing inter networking technology. And the end of the laboratory session should be experience in testing and configuring wide area network devices and implementing it in some case study.

#### **SCSR 4273 Network Administration & Management**

Prerequisites: SCSR2242 Computer Networks, SCSR2941 Computer Networks Lab

This subject helps to equip students with skills and knowledge of state-of-the-art technologies application and software application for upgrading the level of manageability for certain computer network. It covers the knowledge of network management and administration architecture, management protocols, web based management and network management and administration planning. At the end of this course, the student should gain some skills in providing well manage network environment by using network management and administration software to manage, administer and troubleshoot the networks.

**SCSR 4283 Network Performance Analysis, Design and Simulation**

Prerequisites: SCSR2242 Computer Networks

This course presents main ideas on how to design a new computer network (LAN, WAN) using latest technologies with basic security features, how to manage and monitor network performances (LAN) and how to forecast the performance of computer network using simulation and queue analysis techniques.

**SCSR 4453 Network Security**

Prerequisites: SCSR2213 Network Communication, SCSR2413 Computer Security

This subject educates students about the overall security process based on a security policy design, implementation and management. Emphasis is placed on security technologies, products and solutions; and on firewall and secure router design, installation, configuration, and maintenance. The subject covers authentication, authorization, and accounting (AAA) implementation using routers and firewalls and security the network at both Layer 2 and 3 of the OSI model, intrusion prevention system (IPS) and virtual private network (VPN) implementations using routers and firewalls.

**SCSR 4473 Security Management**

Prerequisites: SCSR2413 Computer Security

The subject is aimed to impart knowledge and skill sets required to assume the overall responsibilities of administration and management of security of a computer system. This subject covers issues related to administration and management of security of organization assets. Topics include security management concept, risk management, contingency planning, incident responses and handling. The subject will also cover security standards, security planning, ethical and legal issues in information. At the end of this course, student should be able to propose a simple security plans for an organization.

**SCSR 4483 Security Programming**

Prerequisites: SCSR2413 Computer Security, SCSJ1023 Programming Technique II

This subject covers various techniques and technologies to develop secure applications using Java Programming Language. Topics cover from Basic Security Concepts to Authentication and Authorization, including Cryptography Fundamental, Keys & Certificates, Key Management, Message Digests, Digital Signatures, Cipher-based Encryption and SSL & HTTPS. At the end of this course student should be able to design and develop secure application based on current security technologies.

**SCSR 4973 Special Topics on Network & Security**

Prerequisites: SCSR2242 Computer Networks, SCSR 2413 Computer Security

This Course will cover some special topic in computer systems and/or computer networks. This will include the new technology and product related to the field. At the end of this course, student should be able to apply the theory into practical.

## **6.3.5 From Computer Graphics & Multimedia Software**

### **SCSV 2213 Fundamental of Computer Graphics**

Prerequisite: Mathematics for Computer Graphics (SCSV1113) Programming Technique II (SCSJ1023)

The course introduces students to the fundamental of computer graphics applications. It will emphasize on raster graphics hardware, generation of 2D primitives, 2D and 3D transformations, specification of windows and viewports. Students are required to write 2D/3D application in order to reinforce their understanding. At the end of the course, the student should be able to understand how a computer graphics system works and develop simple graphics application using standard graphics libraries.

### **SCSV 2523 Multimedia Web Programming**

Prerequisite: Web Programming (SCSV1223)

The course is designed to expose fundamentals, technologies and components for Web 2.0 and multimedia web application developments. Various web technologies for Web 2.0 and web multimedia will be teach such as VRML, web graphics, AJAX, Web component programming and Dynamic Flash.

### **SCSV 3104 Applications Development**

This course is a comprehensive look at the state of the art in developing software application from the perspective of unified modelling view. Students learn various levels of application development models including use case, design, component and deployment models. Students also learn extensively to design software using design pattern to solve recurring problem. Other topics such as database, advanced application, testing and maintenance are included to complete a full cycle of software development.

### **SCSV 3113 Geometric Modeling**

This course is designed for students to understand how 3D geometric objects are being modeled. This subject emphasizes on the theory of representations, algorithms, and the underlying theoretical framework, essential to solving geometric problems encountered in modeling a 3D object. Selected advanced research issues, such as mesh generation, shape reconstruction; feature based modeling, non-manifold geometry, and variation surface modeling is also covered. At the end of the course, the student should be able to apply the knowledge of 3D geometric modeling and write program to produce simple 3D models using standard 3D graphics libraries.

### **SCSV 3123 Real-time Computer Graphics**

This course is designed to expose students in developing real-time and interactive computer graphics applications. This is an intensive programming subject and students are expected to equip themselves with adequate programming skills. Interactive development such as fast polygon rendering algorithm with level-of detail, scene management, dynamic camera manipulation, real-time shading and rendering and physical simulation will be covered and integrated in the application. Throughout the course, students will design and develop a real-time computer graphics application. At the end of this course, student should be able to acquire the theory and practice of real-time computer graphics.

### **SCSV 3213 Fundamental of Image Processing**

The course introduces students to the fundamental of computer graphics applications. It will emphasize on raster graphics hardware, generation of 2D primitives, 2D and 3D transformations, specification of windows and viewports. Students are required to write 2D/3D application in order to reinforce their understanding. At the end of the course, the student should be able to understand how a computer graphics system works and develop simple graphics application using standard graphics libraries.

### **SCSV 3223 Multimedia Data Processing**

This course will concentrate on using existing frameworks (Java Media Framework, DirectX or Mat Lab) for processing multimedia data with the main purpose to train the students to produce multimedia data related software & tools. As multimedia comes with many types of data (text, audio, video, and animation) and varieties of formats for presentation and storage, students will be first exposed with the basic ideas and concept behind multimedia data technology. Students are required to understand the theory and techniques for data acquisition, sampling, storage, and presentation. Next, students are exposed with more advance task which involving multimedia data manipulation. At the end of the course students are required to produce their own software/application for multimedia data presentation & manipulation.

### **SCSV 3233 Multimedia Networking**

This course will introduce the fundamental theory of multimedia networking. It will emphasize on information representation, data transmission and networking protocol. Streaming media, synchronized multimedia integration language, media data compression and programming framework for distributed multimedia application are also covered. At later part of the course, the students will be taught on distributed multimedia networking, standards for multimedia networking, networking requirement for distributed multimedia applications, multimedia server-based application. At the end of the course, students should be able to implement concepts and media programming techniques in developing distributed multimedia applications.

### **SCSV 3553 Artificial Intelligence (SCSJ3553 or SCSV3553)**

This course will provide the students with the fundamental theories and techniques in artificial intelligence (AI). It will discuss the introduction to AI, History, Philosophy, Definition and Applications, Fundamental Issues in Intelligent Systems, Knowledge Representation and Search, Search and Constraint Satisfaction, Reasoning, Logic, Graph Theory, Problem Solving Techniques — Strong Method and Reasoning in Uncertain Situations, Inference, Searching involving Brute Force and Heuristic Search, Soft Computing and Agent Technology, and Machine Learning. At the end of this course, the students should be able to solve the given problem using the AI concept, theory, and technique.

### **SCSV 4213 Computer Games Development**

Prerequisite: SCSV3123 Real Time Computer Graphics

This course introduces and equips student to the process of developing Computer Games including fundamental theory such as Game Design and Game Programming. The game design provides students with basic skills to design games such as genre-specific, storytelling, level design and project lifecycle and documents. The game programming emphasizes on the development of games using XNAGraphics Library, DirectX and OpenGL, or any latest game engine technology employed in developing games.

**SCSV 4233 Data Visualization**

Prerequisite: SCSV2213 Fundamental of Computer Graphics

This course presents the theoretical and technical aspects of data visualization in various applications. It emphasis on the process of visualization, which include various data sources, reconstruction of data, data models and data model representation techniques. Real applications of data visualization such as used in medical, scientific, engineering, biotechnology and environment applications are also discussed.

**SCSV 4243 Advanced Computer Graphics**

Prerequisite: SCSV2213 Fundamental of Computer Graphics

Student is expected to have basic knowledge about 3D modelling and rendering techniques. Topics covered include 3D transformation, viewing, projection, 3D Clipping, viewport transformation. Lighting, shading, visible surface detection, adding realism through textures, ray casting, ray tracing and grandiosity are also covered. At the end of the course, the students should be able to apply the rendering and lighting algorithms and then implement the algorithms in the creation of a 3D graphics project.

**SCSV 4273 Introduction to Speech Recognition**

Prerequisite: SCSJ1023 Programming Technique II

This course aims to provide theoretical foundations and practical experience in computer speech processing and recognition. Many of the techniques and algorithms covered under the course are applicable to a variety of areas concerned with recognizing sequences. On completion of the course, students should be able to understand the basic principles of pattern recognition, gain knowledge of automatic speech recognition (ASR) system design, and the various trades-offs involved. It should also enable students to read and discuss technical papers in ASR, speech processing and pattern recognition.

**SCSV 4283 Windows Programming**

This course is an attempt to be a comprehensive source in programming for the Windows platform. The lecture will start its discussion windows programming concepts and rules that must be followed by every windows application, and how a program must interact with the Windows OS. Beyond these concepts and their terminology, we will create a windows application skeleton using an event-driven approach. Next, we will develop windows applications using GUI features such as menus, message boxes, dialog boxes, scroll bars, radio button, check boxes, list boxes, icons, cursors, and bitmap. This subject emphasizes students to develop windows applications using advanced features such as text and graphics. The understanding Mapping Modes and Viewports will be discussed.