

CURRICULUM / COURSE SYNOPSIS FOR PHD / M.PHIL COMPUTER SCIENCE PROGRAMME

The Department of Computer and Information Technology promotes research and development in areas that are relevant to the needs of the society and that can be sustained by talents from the local community aimed at global competition. These areas are:

Artificial intelligence: Artificial intelligence research studies how computers can be made to exhibit intelligent behaviour in performing certain tasks, which at the moment, are often done better by human beings. These tasks include speech and language processing, vision, motion control, reasoning, planning, decision making, and learning, etc.

Data, Knowledge and Information Management: Research in Data, Knowledge and Information Management draws upon techniques from the database, knowledge base, information retrieval, software engineering and networking areas and focuses primarily on the effective integration and application of technologies from these areas. It is driven by the need of existing and emerging data-, knowledge- and information-intensive applications in both centralized and distributed environments.

Networking and Computer Systems: Research group in networking and computer systems is concerned with conducting cutting edge research that is at the heart of the Information Technology revolution. Their research covers wide and well integrated topics that can be classified as follows: networking equipment, networking applications, networking protocols and networking security.

Software Technologies: Software Technologies are pervasive in that virtually all applications involving the digital computer require software to make the hardware components function properly. They can be modified more easily than hardware to adapt to changes in applications or to support additional features. Research in this area includes computer music, cryptography and security, internet computing and software engineering.

Theoretical Computer and Information Technology: Work in theoretical computer science tries to model central problems from computing applications, find efficient approaches to solving them, and identify structures that underlie computational processes. Solutions are typically, but not always, independent of specific hardware and software architectures. Solutions may involve more modeling than algorithms, more algorithms than performance analysis, or more data structure issues than algorithmic ones.

The **Vision and Graphics** group leads research in image analysis, computer vision and computer graphics. Computer Vision and Image Analysis focuses on the challenge of making computers see and understand images while Computer Graphics focuses on the challenge of making computers create pictures. The major research areas under investigation include computer vision, computer graphics, medical image, biometric systems and video processing.

1. ADMISSION REQUIREMENTS

- (i) Candidates must have five (5) credit passes including English, Mathematics and any other three qualifying subjects for undergraduate admission in the candidates Department.

- (ii) Candidates with Bachelors degree from an approved University must obtain a minimum of second class lower division with a CGPA of 3.0 on a 5-point scale.
- (iii) Candidates must have Academic Master's degree in Computer and Information Technology with a CGPA of 3.50 on a 5-point scale.
- (iv) Candidates must demonstrate adequate intellectual capacity, maturity and effective decision making and problem solving potentials

2. DURATION OF THE PHD PROGRAMME (AFTER MASTER'S DEGREE)

The duration for a PhD programme shall be:

FULL-TIME: A minimum of 6 Semesters A
maximum of 10 Semesters

PART-TIME: A minimum of 8 Semesters A
maximum of 12 Semesters

The student's registration for PhD programme shall lapse if after the maximum duration of the programme the candidate has not presented himself for final examination.

3. REQUIRED CREDIT UNITS FOR GRADUATION

A student will be required to register for a minimum of 30 credit units of which 12 Units are for thesis, 12 for course work and 6 for seminars.

4. PHD PROGRAMME COURSE STRUCTURE

COURSEWORK REQUIREMENTS

YEAR ONE: FIRST SEMESTER

Course Code	Course Title	Credit Units
	General Course	
PGC 901	Synopsis and Grant Writing	3
	Core Courses	
CSC 901	Advanced Data Structures	3
CSC 903	Advanced Computer Architecture	3
	Electives (Choose any One)	
CSC 907	Data Communication and Networking	3
CSC 915	Artificial Intelligence	3
CSC 913	Interactive Computer Graphic	3
	SubTotal	12

YEAR ONE: SECOND SEMESTER

Course Code	Course Title	Credit Units
	Core Courses	
CSC 902	Advance System Analysis and Design	3
CSC 906	Database Design and Implementation	3
	Electives (Choose any One)	
CSC 908	Computer Applications to Industry	3
CSC 916	System software Development	3
CSC 912	Network Programming & Security	3
	SubTotal	9

YEAR TWO: FIRST SEMESTER

Course Code	Course Title	Credit Units
	Core Course	
CSC 919	Seminar I	2

YEAR TWO: SECOND SEMESTER

Course code	Course Title	Credit Units
	Core Course	
CSC 929	Seminar II	2

YEAR THREE: FIRST SEMESTER

Course Code	Course Title	Credit Units
	Core Course	
CSC 939	Seminar III	2

SECOND SEMESTER

Course code	Course Title	Credit Units
	Core Course	
CSC 949	Thesis	12

COURSE CONTENTS

PGC 901: Synopsis and Grant Writing 3 Units

Identification of types and nature of grant and grant writing; mining of grants application calls on the internet. Determining appropriate strategy for each grant application. Study of various grant application structures and contents and writing of concept notes, detailed project description, budgeting and budget defence. Study of sample grant writings in various forms and writing of mock research and other grants. Identification of Veritas University synopsis structure and requirements, (Introduction, methodology and Results). Determining the content of each sub-unit of the synopsis. Steps in writing of synopsis from the Dissertation/Thesis document. Structural and language issues. Common errors in synopsis writing and strategies for avoiding them. The roles of the student and supervisor in the production of a synopsis. Writing of mock synopsis. All registered PhD students must attend a solution based interactive workshop to be organized by the school of Postgraduate Studies for a practical demonstration and application of the knowledge acquired from the course, conducted by selected experts.

CSC 901 Advanced Data Structures (3 Credit Units)

Fundamental data structure, Arrays, stacks, queues, tree, graph. Operations on data structure, sorting searching accessing etc, abstract data types, storage techniques for different data structures. Structured and unstructured data **Or** Seminar presentation in the research area

CSC 903 Advanced Computer Architecture (3 Credit Units)

Computer architecture and design principles; computer structures, arithmetic logic units, input/output organization, partitioning, parallel processing, multiprocessor and thread-level parallelism; interconnection networks and clusters, vector processing, multiprocessing, Fault tolerance computing, fault and error modelling **Or** Seminar presentation on current trends in the research area

CSC 908 Computer Applications to Industry (3 Credit Units)

Application of the computer to numerical calculation. Data deduction and modelling in the industry, storage will be laid on the future of the application which have specialization techniques **Or** Seminar presentation on current trends in the research area.

CSC 916 System Software Development (3 Credit Units)

State of the art techniques in software design and development, laboratories in applying the techniques covered, structure design, structure programming, top-down design and development, segmentation and modularization techniques. **Or** Seminar presentation on current trends in the research area

CSC 913 Interactive Computer Graphics (3 Credit Units)

Design of interactive computer graphics system, including display devices, files and image generation, interactive devices and techniques, three dimensional concept and techniques, digital photography, video editing, virtual environment technology, computer animation, **Or** Seminar presentation on current trends in the research area.

CSC 902 Advance System Analysis and Design (3 Credit Units)

The Systems Development Life Cycle, Planning, Analysis, Design, Implementation, Systems Development Methodologies, Structured Design, Rapid Application Development, Agile Development, Selecting the Appropriate Development Methodology, Project Team Skills and Roles, Business Analyst, Systems Analyst, Infrastructure Analyst, Change Management Analyst. **Or Seminar presentation on current trends in the research area.**

CSC 906 Database Design and Implementation (3 Credit Units)

Review of the three popular data model relation, network and hierarchical, comparison and implementation of various data models, object oriented databases; client/server systems; web database development, Fuzzy database approaches, state of the art in fuzzy database modeling, FuzzyERR, **Or Seminar presentation on current trends in the research area.**

CSC 907 Data Communication and Networking (3 Credit Units)

The basic element of data communication system, communication protocol and data transmission modes, the use of computer network, different component of computer network, different type of network. Data. **Or Seminar presentation on current trends in the research area.**

CSC 912 Network Programming and Security (3 Credit Units)

Programming: Sockets and Socket Address structures, Concept of Zombies, Daemon Processes, Super servers, Concurrent versus Iterative servers, Protocol Independence, Error Handling: Wrapper functions, OSI Model, Unix standards. TCP Connection establishment and Termination, Protocol Usage by Common Internet Applications. Sockets Address Structures, Byte ordering and Manipulation Functions, TCP Socket System Calls, TCP Client-Server E.g., I/O Multiplexing, Signal Handling in Concurrent Servers. Socket Options, IP Address and Conversions, Ipv4 and Ipv6 Interoperability. Security: Classical Encryption Techniques, Symmetric and asymmetric Ciphers: Block ciphers and the Data Encryption Standards, Public key Encryption and Hash Functions: Public-Key Cryptography and RSA Network Security Practices: Authentication applications-Electronic Mail Security, Network Security Practices: IP Security-Web Security System Security: Intruders-Malicious Software-Firewalls, forensic study. **Or Seminar presentation on current trends in the research area.**

CSC 919 Seminar I (2 Credit Units)

The first seminar will be in the form of a proposal. It will highlight the introduction, problems of study, objectives of the study, literature review, methodology/system design, achievements. The literature review will be such that current and relevant literature will be cited to establish currency of the topic. The above must be given in a manner that permits proper understanding of the work done in other to facilitate suggestions/criticisms.

CSC 929 Seminar II (2 Credit Units)

The second seminar will be given when the candidate has completed the work but before his/her application for approval of title (synopsis). It will take such form as the synopsis such as introduction, methodology/system design, implementation, results. The implementation as well as results of the research will be presented in detail.

CSC 939 Seminar III (2 Credit Units)

The third seminar will be a mock defence and must be given when the candidate's title of thesis (synopses) has been approved, but just before external examiner is invited. It will take such form as introduction, methodology/system design, implementation, results. Emphasis will be laid on implementation and contribution to research and development.

CSC 949 Thesis (12 Credit Units)

A very high degree of independent work is required. All requirements for the MSc project apply. Candidates must as well demonstrate a mastery of their field of research. Should demonstrate additional contribution he/she has made. Evidence of their publications in impact factor journals is an added advantage.