M.Sc.-Information Technology

Course Description and Learning Outcome

SEMESTER - 1

Subject: PS01CINT 21- Introduction to Theoretical Computer Science

Faculty: Dr. Niky Jain & Dr. Suchita Patel

Course Description

Students will learn how to read, understand, devise and communicate proofs of mathematical statements. A number of proof techniques (contrapositive, contradiction, and especially induction) will be emphasized. Topics to be discussed include set theory (Cantor's notion of size for sets and gradations of infinity, maps between sets, equivalence relations, partitions of sets), basic logic (truth tables, negation, quantifiers), and number theory (divisibility, Euclidean algorithm, congruences).

Learning Outcomes/Capability Development

At the completion of this course, students should be able to

- Solid understanding of theoretical computer science.
- Understand the basic concepts and laws of various management concepts.
- Students will be able to formulate problems in the language of sets and perform set operations,
- Students will be able to model and solve real-world problems using graphs and trees, both quantitatively and qualitatively.

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Course Description and Learning Outcome

SEMESTER - 1

Subject: PS01CINT22- Advanced Programming Concepts & Data Structures

Faculty: Dr. Niky Jain

Course Description

The course provides an introduction to C++ and Data Structures practical application in industry. C++ is an important language to learn because of its compact syntax and ability to interact with hardware directly. Because compiled C++ interacts directly with the hardware it is running on, C++ is a good choice for programmers that are writing drivers for custom hardware. In addition, due its high-performance C++ is also a good choice for programming games that utilize fast-paced 3D graphics.

Learning Outcomes/Capability Development

At the completion of this course, students should be able to

- how an existing C++ program works
- Discover errors in a C++ program and describe how to fix them
- Choose and apply the required Linux commands to develop C++ programs in a command-line environment
- Define basic static and dynamic data structures and relevant standard algorithms for them: stack, queue, dynamically linked lists, trees, graphs, heap, priority queue, hash tables, sorting algorithms, min-max algorithm,
- Select basic data structures and algorithms for autonomous realization of simple programs or program parts
- Determine and demonstrate bugs in program, recognise needed basic operations with data structures

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Course Description and Learning Outcome

SEMESTER - 1

Subject: PS01CINT23: RDBMS & Client Server Computing

Faculty: Dr. Suchita Patel

Course Description

The course provides basic information about types of the concept behind the Client/Server solution is concurrent, cooperative processing. It is an approach, that presents a single systems view from a user's viewpoint, involves processing on multiple, interconnected machines provides coordination of activities in a manner transparent to end-users. Oracle Tools and Utilities : SQL , Pl/SQL Procedural Extension, PL/SQL data types & Control Structures ,Cursors , Stored Procedures & Functions , Database Triggers.

Learning Outcomes/Capability Development

At the completion of this course, students should be able to

- The broad level issues in Client' Server computing
- the product components of Client' Server model
- how to develop application in Client' Server model
- discuss the possible emerging scenario in Client/Server computing
- understand how dbmsworks and the importance of various concepts of dbms.
- This coursewill also help students to appreciate the role of various dbms tools.

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Course Description and Learning Outcome

SEMESTER - 1

Subject: PS01CINT 24- Operating System Concepts

Faculty: Dr. Suchita Patel

Course Description

This course will introduce the core concepts of operating systems, such as processes and threads, scheduling, synchronization, memory management, file systems, input and output device management and security. The course will consist of assigned reading, weekly lectures, a midterm and final exam, and a sequence of programming assignments. The goal of the readings and lectures is to introduce the core concepts. The goal of the programming assignments is to give students some exposure to operating system code. Students are expected to read the assigned materials prior to each class, and to participate in in-class discussions.

Learning Outcomes/Capability Development

At the completion of this course, students should be able to

- To understand the services provided by and the design of an operating system.
- To understand the structure and organization of the file system.
- To understand what a process is and how processes are synchronized and scheduled.
- To understand different approaches to memory management.
- Students should be able to use system calls for managing processes, memory and the file system.
- Students should understand the data structures and algorithms used to implement an OS.

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Course Description and Learning Outcome

SEMESTER - 1

Subject: PS01CINT25- System Analysis and Design

Faculty: Dr. Niky Jain

Course Description

- The course covers the development of information systems and of their software components. It focuses on the elicitation and initial modelling of information systems requirements that enable identification of information problems and the subsequent analysis and modelling of an efficient solution to those problems.
- The approach follows the object-oriented (OO) methods expressed by the Unified Process software development life-cycle. The course addresses the complete methodology of the Unified Process, including its methodological deliverables and models and tools, with exposure to manual and automated diagramming and modelling techniques.

Learning Outcomes/Capability Development

At the completion of this course, students should be able to:

- Define and use common System Analysis and Design fundamental terminology
- Utilize current Analysis and Design tools to graphically characterize processes and flows in a business system
- Design and create effective Input/output including Web pages/forms Design Logical Databases
- Demonstrate the technical and communication skills required for developing a Systems Proposal

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Course Description and Learning Outcome

SEMESTER - II

Subject: PS02CINT21- Modern MIS Techniques

Faculty: Dr. Suchita Patel

Course Description

This course helps students see the connection between information systems (IS) and business performance. The use of information and communication technologies (ICT) by individuals and organizations dominates the business world. There is a fundamental change going on in the way that organizations run businesses and interact with each other. New types of infrastructure and applications are developed and utilized such as ERP (enterprise resource planning), IOS (inter-organizational systems), RFID (radio frequency identification), CRM (customer relationship management), to name a few. The aim of the course is to enable students to assess the opportunities and problems that managers in a wide range of organizations face as they attempt to use these IT applications to add value to their businesses. It also aims to help students understand transformational changes within and across industries. These changes have strategic implications for many businesses.

Learning Outcomes/Capability Development

At the completion of this course, students should be able to

- Explain basic concepts for IT/IS management
- Discuss organizational, business and strategic issues surrounding IT/IS.
- Analyse and evaluate uses of strategic IT/IS in practice.

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Course Description and Learning Outcome

SEMESTER - II

Subject: PS02CINT22 – Software Engineering

Faculty: Dr. Niky Jain

Course Description

This course is aimed at helping students build up an understanding of how to develop a software system from scratch by guiding them thru the development process and giving them the fundamental principles of system development with object oriented technology using UML. The course will initiate students to the different software process models, project management, software requirements engineering process, systems analysis and design as a problem-solving activity, key elements of analysis and design, and the place of the analysis and design phases within the system development life cycle.

Learning Outcomes/Capability Development

At the completion of this course, students should be able to

- Develop an understanding of project management, software process models and the ability to select the suitable model to use in software development.
- Develop an understanding of requirements engineering process and distinguish between different types of requirements.
- Ability to analyse, design and develop the system models using object oriented methodology (UML) for software development.
- Ability to prepare the software requirements specification document for a software project.

- Demonstrate the ability to research a particular topic and develop it for a specific audience and purpose.
- Develop and empower the presentation skills.
- Develop the teamwork management skills.

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Course Description and Learning Outcome

SEMESTER - II

Subject: PS02CINT23: Visual Programming

Faculty: Dr. Suchita Patel

Course Description

The course provides Visual programming languages are extensively used for the rapid development of graphical applications. This subject will introduce students to the essential principles of event-driven programming and to programming using a visual environment through the use of the Visual C# programming language. An important thrust of the course is to teach C# programming from an object-oriented viewpoint. It is often difficult for programmers trained originally in a procedural language to start "thinking in objects."

Learning Outcomes/Capability Development

At the completion of this course, students should be able to

- Create, compile and run object-oriented C# programs using Visual Studio.
- Write and understand C# language constructs, syntax and semantics
- Develop reusable .NET components via interface realization and standard design patterns.
- Leverage the major namespaces and classes of the .NET Framework
- Access databases using Language Integrated Query (LINQ)

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Course Description and Learning Outcome

SEMESTER - II

Subject: PS02CINT24 – Web Programming

Faculty: Dr. Niky Jain

Course Description

The course provides an overview to implement interactive web page(s) using HTML, CSS and JavaScript. Design a responsive web site using HTML and CSS. Demonstrate Rich Internet Application. Build Dynamic web site using server side PHP Programming and Database connectivity. Students will learn how to connect to MySQL database to create database-driven HTML forms and reports etc. Students also learn how to configure PHP and Wamp Web Server. Comprehensive lab exercises provide facilitated hands on practice crucial to develop competence web sites.

Learning Outcomes/Capability Development

At the completion of this course, students should be able to

- The student will be able to develop website using PHP and My SQL
- Explain web application requirement using existing World Wide Web technologies and solving web based application exercises
- Classify the differences between client & server side web application and designing/ developing a client & server web based application
- Build a web based application in a team using & combining the World Wide Web technologies such as HTML, CSS, JavaScript and Server-Side Language (PHP, Java Servlet etc)

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Course Description and Learning Outcome

SEMESTER - II

Subject: PS02EINT21- E- Commerce & M-Commerce

Faculty: Dr. Suchita Patel & Dr. Niky Jain

Course Description

This course introduces the concepts, vocabulary, and procedures associated with E-Commerce and the Internet. The student gains an overview of all aspects of E-Commerce. Topics include development of the Internet and E-Commerce, options available for doing business on the Internet, features of Web sites and the tools used to build an E-Commerce web site, marketing issues, payment options, security issues, and customer service. Mobility has become an important extension to the business strategies of present-day organizations. Thus, organizations are increasingly seeking managers with knowledge of value chain related to mobile-oriented business activities, usually referred to as mobile commerce (m-commerce). Accordingly, business management schools are interesting in designing their curricula to respond to the need for m-commerce knowledge and, in particular, the scope of the content for an m-commerce course. The general conception of m-commerce is that it is a component of e-business or e-commerce.

Learning Outcomes/Capability Development

At the completion of this course, students should be able to:

- Understand the basic concepts and technologies used in the field of management information systems.
- Have the knowledge of the different types of management information systems.

- Understand the processes of developing and implementing information systems.
- Be aware of the ethical, social, and security issues of information systems.
- To expose the students to the business model of E-Commerce and M-Commerce.
- To provide them with conceptual knowledge about E-Commerce, E-Business, E-marketing , M-Commerce, M-marketing and its legal framework.

M.Sc.-Information Security

Course Description and Learning Outcome

SEMESTER - III

Subject: PS03CINT21 – Java Programming

Faculty: Dr. Niky Jain

Course Description

This course introduces computer programming using the JAVA programming language with object-oriented programming principles. Emphasis is placed on event-driven programming methods, including creating and manipulating objects, classes, and using object-oriented tools such as the class debugger Java's unique architecture enables programmers to develop a single application that can run across multiple platforms seamlessly and reliably. In this hands-on course, students gain extensive experience with Java and its object-oriented features. Students learn to create robust console and GUI applications and store and retrieve data from relational databases.

Learning Outcomes/Capability Development

At the completion of this course, students should be able to:

- Design, create, build, and debug Java applications and applets.
- Apply algorithmic thinking to solve programming problems.
- Implement syntax rules in Java programs.
- Write and apply decision structures for determining different operations.
- Write and apply loop structures to perform repetitive tasks.
- Identify and implement arrays, array lists, and multidimensional arrays.
- Write Java programs using object-oriented programming techniques

including classes, objects, methods, instance variables, composition, inheritance, and polymorphism.

- Write programs using graphical user interface (GUI) components and Java's Event Handling Model

M.Sc.-Information Technology

Course Description and Learning Outcome

SEMESTER - III

Subject: PS03CINT22 – Data Communication And Networking

Faculty: Dr. Niky Jain

Course Description

This course is to provide students with an overview of the concepts and fundamentals of data communication and computer networks. Topics to be covered include: data communication concepts and techniques in a layered network architecture, communications switching and routing, types of communication, network congestion, network topologies, network configuration and management, network model components, layered network models (OSI reference model, TCP/IP networking architecture) and their protocols, various types of networks (LAN, MAN, WAN and Wireless networks) and their protocols. The course is supplemented by a practical component covered in CS335 concurrently.

Learning Outcomes/Capability Development

At the completion of this course, students should be able to:

- Independently understand basic computer network technology.
- Understand and explain Data Communications System and its components.
- Identify the different types of network topologies and protocols.
- Enumerate the layers of the OSI model and TCP/IP
- Identify the different types of network devices and their functions within a network

- Understand and building the skills of subnetting and routing mechanisms.
- Familiarity with the basic protocols of computer networks, and how they can be used to assist in network design and implementation.

M.Sc.-Information Security

Course Description and Learning Outcome

SEMESTER - III

Subject: PS03CINT23 – Information Security

Faculty: Dr. Suchita Patel

Course Description

The first part of the course aims to introduce basic concepts and principles of Security attacks, mechanisms, and services. Network security and access security models. Overview of secret-key and public-key cryptography. Authentication protocols and key management. Network security practice. Email security. IP security and web security. Intrusion detection and prevention systems. Firewalls and virtual private networks. Wireless network security.

The second part of the course introduces the concept of JAVA and CGI security.

Learning Outcomes/Capability Development

At the completion of this course, students should be able to:

- To understand the information security governance, and related legal and regulatory issues.
- To master understanding external and internal threats to an organization,
- To be familiarity with information security awareness and a clear understanding of its importance.
- To be familiar with how threats to an organization are discovered,

analysed, and dealt with.

- To master fundamentals of secret and public cryptography.
- To master protocols for security services.
- To be familiar with network security threats and countermeasures.
- To be familiar with network security designs using available secure solutions (such as PGP, SSL, IPsec, etc.).
- To be familiar with advanced security issues and technologies (such as DDoS attack detection and containment, and anonymous communications,).
- To be exposed to original research in network security.
- To be exposed to the importance of integrating people, processes and technology.

M.Sc.-Information Technology

Course Description and Learning Outcome

SEMESTER - III

Subject: PS03CINT24 **-** Distributed Application Development Technology

Faculty: Dr. Suchita Patel

Course Description

The course is designed to provide the knowledge of Dot Net Frameworks along with ASP.Net and C#. Utilizes C#.NET to access streams and relational databases. Includes how to follow UML diagrams to create objects, arrays and collections that solve advanced, real world, business oriented problems. Advanced server-side programming course also create server-side, database-driven websites using the ASP.NET framework in combination with markup, style sheets and client-side scripting. Introduces building an interactive web page using ASP.NET. The subject matter of the course is object-oriented development in the ASP.NET MVC using the C# language.

Learning Outcomes/Capability Development

At the completion of this course, students should be able to:

- Create a Web form with server controls.
- Separate page code from content by using code-behind pages, page controls, and components.
- Display dynamic data from a data source by using Microsoft ADO.NET and data binding.
- Debug ASP.NET pages by using trace.

M.Sc.-Information Technology

Course Description and Learning Outcome

SEMESTER - III

Subject: PS03EINT24- Mobile Application Development Using Android and Windev

Faculty: Dr. Suchita Patel & Dr. Niky Jain

Course Description

The course provides exposure to students for developing apps for mobile devices on the Android operating system. The course begins with the fundamentals of programming using Java. Later the student will move on to Android development using Android Studio. The primary learning outcome for this course is that students will be able to design and create Android apps. Students will do so by leveraging the Java programming language, the Android SDK, and Android Studio developer tools. Students will gain fundamental knowledge essential to not only Android development, but mobile development in general.

Learning Outcomes/Capability Development

- Understand the purpose different development tools for Android.
- Design a graphical user interface.
- Integrate applications with pre-existing third party libraries.
- Access location based services
- Utilize Android Studio to create simple and complex applications
- Plan, prepare and build an original Android from concept to working program.
- Publish an application to the Android Market

M.Sc.-Information Technology

Course Description and Learning Outcome

SEMESTER - IV

Subject: PS04CINT21- Project Work

Faculty: Dr. Niky Jain & Dr. Suchita Patel

Course Description

One of the important criteria of "Project Work" is to develop the ability of "learning to Learn" on its own. This would go a long way helping the students in keeping pace with future changes in technology and in the acquisition of knowledge and skills as and when needed. The course of the "Project Work" is designed with an aim to all these requirements of the students. This will include planning of the Programme, which must be completed within the time allocated. The Project should never have a single solution and process of arriving at a particular solution, the student must be required to make number of decisions after study information as he has gathered from experiments, surveys, analysis etc. The Project is also included with Seminar with the aim to develop certain set communication skills (preparation of report, writing survey report writing lab. experiment results writing conclusions of the work done and physical phenomenon observed, participating in group discussions, verbally defending the project in the form of Seminar etc.).The programme aims at developing in the student, knowledge and skills to match the current and projected needs of industry/ user systems and professional attitudes.

Learning Outcomes/Capability Development

The theory should be taught and practical should be carried out in such a manner that students are able to acquire different learning outcomes in cognitive, psychomotor and affective domain to demonstrate following course outcomes. The students will be able to

- Know the questions to which he is finding answers through experimental work
- Perform the practical work with appropriate accuracy
- Reduce the experimental readings to the form of answers required
- Understand clearly what the reader will want to know
- Give brief but clear answers
- Convince the reader that the answers are valid.
- To develop of inquisitive rush, innovative skill and confidence to work independently
- To participate effectively in group work
- To collect relevant data
- To plan and organize the work
- To relate knowledge various courses in lacking a live problem
- To make appropriate decision
- To prepare the technical reports