

## **PROGRAMME NAME: MASTER OF SCIENCE (INFORMATION TECHNOLOGY)**

Students are expected to achieve the following objectives by the end of the program.

### **Program Specific Outcomes**

**PSO1:** Ability to apply the knowledge of Information Technology with recent trends aligned with research and industry.

**PSO2:** Ability to apply IT in the field of Computational Research, Soft Computing, Big Data Analytics, Data Science, Image Processing, Artificial Intelligence, Networking and Cloud Computing.

**PSO3:** Ability to provide socially acceptable technical solutions in the domains of Information Security, Machine Learning, Internet of Things and Embedded System, Infrastructure Services as specializations.

**PSO4:** Ability to apply the knowledge of Intellectual Property Rights, Cyber Laws and Cyber Forensics and various standards in interest of National Security and Integrity along with IT Industry.

**PSO5:** Ability to write effective project reports, research publications and content development and to work in multidisciplinary environment in the context of changing technologies.

## **MASTER OF SCIENCE (INFORMATION TECHNOLOGY) SEM I**

### **PROGRAMME CODE: S01121**

### **COURSE NAME: RESEARCH IN COMPUTING**

#### **COURSE OUTCOME:**

**CO1:** Solve real world problems with scientific approach.

**CO2:** Develop analytical skills by applying scientific methods.

**CO3:** Recognize, understand and apply the language, theory and models of the field of business analytics.

**CO4:** Foster an ability to critically analyze, synthesize and solve complex unstructured business problems.

**CO5:** Understand and critically apply the concepts and methods of business analytics

**CO6:** Identify, model and solve decision problems in different settings.

**CO7:** Interpret results/solutions and identify appropriate courses of action for a given managerial situation whether a problem or an opportunity.

**CO8:** Create viable solutions to decision making problems.

## **COURSE NAME: DATA SCIENCE**

### **COURSE OUTCOME:**

**CO1:** Apply quantitative modeling and data analysis techniques to the solution of real world business problems, communicate findings, and effectively present results using data visualization techniques.

**CO2:** Recognize and analyze ethical issues in business related to intellectual property, data security, integrity, and privacy.

**CO3:** Apply ethical practices in everyday business activities and make well-reasoned ethical business and data management decisions.

**CO4:** Demonstrate knowledge of statistical data analysis techniques utilized in business decision making.

**CO5:** Apply principles of Data Science to the analysis of business problems.

**CO6:** Use data mining software to solve real-world problems.

**CO7:** Employ cutting edge tools and technologies to analyze Big Data.

**CO8:** Apply algorithms to build machine intelligence.

**CO9:** Demonstrate use of team work, leadership skills, decision making and organization theory.

## **COURSE NAME: CLOUD COMPUTING**

### **COURSE OUTCOME:**

**CO1:** Analyze the Cloud computing setup with its vulnerabilities and applications using different architectures

**CO2:** Design different workflows according to requirements and apply map reduce programming model

**CO3:** Apply and design suitable Virtualization concept, Cloud Resource Management and design scheduling algorithms

**CO4:** Create combinatorial auctions for cloud resources and design scheduling algorithms for computing clouds

**CO5:** Assess cloud Storage systems and Cloud security, the risks involved, its impact and develop cloud application

**CO6:** Broadly educate to know the impact of engineering on legal and societal issues involved in addressing the security issues of cloud computing

### **COURSE NAME: SOFT COMPUTING TECHNIQUES**

#### **COURSE OUTCOME:**

**CO1:** Identify and describe soft computing techniques and their roles in building intelligent machines

**CO2:** Recognize the feasibility of applying a soft computing methodology for a particular problem

**CO3:** Apply fuzzy logic and reasoning to handle uncertainty and solve engineering problems

**CO4:** Apply genetic algorithms to combinatorial optimization problems

**CO5:** Apply neural networks for classification and regression problems.

**CO6:** Effectively use existing software tools to solve real problems using a soft computing approach

**CO7:** Evaluate and compare solutions by various soft computing approaches for a given problem

### **MASTER OF SCIENCE (INFORMATION TECHNOLOGY) SEM II**

#### **PROGRAMME CODE: S01122**

### **COURSE NAME: BIG DATA ANALYTICS**

#### **COURSE OUTCOME:**

**CO1:** Understand the key issues in big data management and its associated applications in intelligent business and scientific computing

**CO2:** Acquire fundamental enabling techniques and scalable algorithms like Hadoop, Map Reduce and NO SQL in big data analytics

**CO3:** Interpret business models and scientific computing paradigms, and apply software tools for big data analytics

**CO4:** Achieve adequate perspectives of big data analytics in various applications like recommender systems, social media applications etc

**CO5:** To enable students to have skills that will help them to solve complex real world problems in for decision support

### **COURSE NAME: MODERN NETWORKING**

#### **COURSE OUTCOME:**

**CO1:** Demonstrate in-depth knowledge in the area of Computer Networking.

**CO2:** Understand the state-of-the-art in network protocols, architectures and applications

**CO3:** To demonstrate scholarship of knowledge through performing in a group to identify, formulate and solve a problem related to Computer Networks.

**CO4:** Prepare a technical document for the identified Networking System Conducting experiments to analyze the identified research work in building Computer Networks.

**CO5:** To investigate novel ideas in the area of Networking via term-long research projects.

### **COURSE NAME: MICROSERVICES ARCHITECTURE**

#### **COURSE OUTCOME:**

**CO1:** Develop web applications using Model View Control.

**CO2:** Create MVC Models and write code that implements business logic within Model methods, properties, and events

**CO3:** Create Views in an MVC application that display and edit data and interact with Models and Controllers

**CO4:** Boost your hire ability through innovative and independent learning

**CO5:** Gaining a thorough understanding of the philosophy and architecture of .NET Core

**CO6:** Understanding packages, metapackages and frameworks.

**CO7:** Acquiring a working knowledge of the .NET programming model

**CO8:** Implementing multi-threading effectively in .NET applications.

### **COURSE NAME: IMAGE PROCESSING**

#### **COURSE OUTCOME:**

**CO1:** Understand the relevant aspects of digital image representation and their practical implications.

**CO2:** Have the ability to design pointwise intensity transformations to meet stated specifications.

**CO3:** Understand 2-D convolution, the 2-D DFT, and have the ability to design systems using these concepts.

**CO4:** Have a command of basic image restoration techniques.

**CO5:** Understand the role of alternative color spaces, and the design requirements leading to choices of color space.

**CO6:** Appreciate the utility of wavelet decompositions and their role in image processing systems.

**CO7:** Have an understanding of the underlying mechanisms of image compression, and the ability to design systems using standard algorithms to meet design specifications.

## **MASTER OF SCIENCE (INFORMATION TECHNOLOGY) SEM III**

**PROGRAMME CODE: S01113**

### **COURSE NAME: EMBEDDED SYSTEMS**

#### **COURSE OUTCOME:**

**CO1:** Students learn to define an embedded system with examples.

**CO2:** Students learn to differentiate between an Embedded System application and a General purpose computer.

**CO3:** Students understand the components in the making of an embedded system.

**CO4:** Students understand the characteristics of an embedded systems application in general

**CO5:** Students understand the steps for creating an embedded system in accordance to EDLC framework.

**CO6:** Students are able to identify different approaches for modelling and Embedded System application

**CO7:** Students learn tools Embedded Systems hardware and firmware Development.

**CO8:** Students learn Operating Systems concepts with respect to Embedded Systems and learn about Real Time Embedded Operating Systems.

**CO9:** Students understand the Memory related basic concepts like: memory types, memory hierarchy, mapping, caching,

**CO10:** Students understand Memory architecture for different types of memory

**CO11:** Students gain knowledge of how a memory sub system required for an embedded system can be designed

**CO12:** Students gain knowledge of different ways of Embedded Systems Programming like Assembly, C/C++, Java

**CO13:** Students learn the steps in creation of final code (hex file) to be run on embedded platform

**CO14:** Students understand different program elements in languages C/ Java.

**CO15:** Students learn the trends and challenges in Embedded System Industry with respect to embedded systems processor, operating system and development languages.

**CO16:** Students learn the architecture of AVR, ATMEL and PIC Family of microcontrollers.

## **COURSE NAME: INFORMATION SECURITY MANAGEMENT**

### **COURSE OUTCOME:**

**CO1:** Students understand how to keep information secure

**CO2:** Students understand the use of different types of keys to encrypt and decrypt a message

**CO3:** Students learn what is the use of encryption and decryption is

**CO4:** Students understand how to recover from a disaster and what measures are to be taken

**CO5:** Students learn what is forensic science and process of forensic science

**CO6:** Students learn specifying and enforcing security policies

**CO7:** Students understand what is audit and why it is done

## **COURSE NAME: ARTIFICIAL NEURAL NETWORKS**

### **COURSE OUTCOME:**

**CO1:** Students understand the brain metaphor

**CO2:** Students learn to write down the detail about perceptron's

**CO3:** Students understand support vector machine

**CO4:** Students understand Dynamic system review

**CO5:** Students learn evolutionary algorithm

### **COURSE NAME: ETHICAL HACKING**

#### **COURSE OUTCOME:**

**CO1:** Students learn the types of Hackers, Perform Foot printing on any website using tools like Smartwhois, scan, sniff and enumerate the network using tools like nmap, superscanetc for finding open ports, vulnerable applications and insecure systems.

**CO2:** Students understand the Perform System Hacking to crack passwords, LM hashes using various tools like PwDump7, LCP, and Rainbow Crack etc. and learn the defenses against these attacks. Differentiate between and identify the telling signs of Trojans, Viruses and worms.

**CO3:** Students learn to recognize the different Social Engineering tactics used to launch attacks. Execute Denial of Service Attacks using HPing (Kali Linux) and web server attack using tools like HTTPRecon, IDSServeetc; and the corresponding defenses.

**CO4:** Students learn to identify vulnerabilities in database by performing SQL injections using DVWA. Classify the different attacks launched on Mobile and wireless platforms and mitigate against these attacks.

**CO5:** Students learn to implement techniques for evasion and securing IDS, Firewall and other security devices. Use cryptographic techniques and tools like Truecrypt, BC4 etc. to secure sensitive data.

### **MASTER OF SCIENCE (INFORMATION TECHNOLOGY) SEM IV**

#### **PROGRAMME CODE: S01114**

### **COURSE NAME: ARTIFICIAL INTELLIGENCE**

#### **COURSE OUTCOME:**

**CO1:** Students understand the basics of the theory and practice of Artificial Intelligence as a discipline and about intelligent agents capable of problem formulation.

**CO2:** Students learn to evaluate different uninformed search algorithms on well formulated problems along with stating valid conclusions that the evaluation supports.

**CO3:** Students are able to design and Analysis of informed search algorithms on well formulated problems.

**CO4:** Students are able to formulate and solve given problem using Propositional and first order logic.

**CO5:** Students are able to analyze the AI problem using different planning techniques

**CO6:** Students understand various symbolic knowledge representations to specific multidisciplinary domains and reasoning tasks of a software agent.

### **COURSE NAME: IT INFRASTRUCTURE MANAGEMENT**

#### **COURSE OUTCOME:**

**CO1:** Students understand process, Functions and service strategy

**CO2:** Students understand service design

**CO3:** Students learn service transition

**CO4:** Students gain knowledge of Event Management, problem Management

**CO5:** Students are able to analyze continual process

### **COURSE NAME: COMPUTER FORENSICS**

#### **COURSE OUTCOME:**

**CO1:** Students understand data acquisition in detail

**CO2:** Students understand Processing crime and incident scenes

**CO3:** Students are able to compute the computer forensics analysis

**CO4:** Students learn to write in detail network forensic

**CO5:** Students learn to write the report writing on high tech investigations

### **COURSE NAME: CLOUD MANAGEMENT**



**COURSE OUTCOME:**

**CO1:** Students learn the types of cloud infrastructures and service provider

**CO2:** Students understand the working of storage network design

**CO3:** Students understand the importance of hybrid storage network technologies

**CO4:** Students are able to work with System center 2012

**CO5:** Students gain knowledge of managing Hyper-V environment with SCVMM 2012

**CO6:** Students understand provisioning self -service with App controller

**CO7:** Students learn to use data protection manager for backup and recovery?

**CO8:** Students learn to use Orchestrator for automation-

**CO9:** Students learn to implement Windows Azure pack

**C10:** Students understand the concept of managing private cloud with App controller.