# Fourth Year of Information Technology (2015 Course)

### 414453: Information and Cyber Security

#### Course Outcomes:
By the end of the course, students should be able to
1. Use basic cryptographic techniques in application development.
2. Apply methods for authentication, access control, intrusion detection and prevention.
3. To apply the scientific method to digital forensics and perform forensic investigations.
4. To develop computer forensics awareness.
5. Ability to use computer forensics tools.

### 414454: Machine Learning and Applications

#### Course Outcomes:
By the end of the course, students should be able to
1. Model the learning primitives.
2. Build the learning model.
3. Tackle real world problems in the domain of Data Mining and Big Data Analytics, Information Retrieval, Computer vision, Linguistics and Bioinformatics.

### 414455: Software Design and Modeling

#### Course Outcomes:
By the end of the course, students should be able to
1. Understand object oriented methodologies, basics of Unified Modeling Language (UML).
2. Understand analysis process, use case modeling, domain/class modeling
3. Understand interaction and behavior modeling.
4. Understand design process and business, access and view layer class design
5. Get started on study of GRASP principles and GoF design patterns.
6. Get started on study of architectural design principles and guidelines in the various type of application development.

### 414456A: Elective-I
### Wireless Communications

#### Course Outcomes:
By the end of the course, students should be able to
1. Understand the basics of propagation of radio signals.
2. Understand the basic concepts of basic Cellular System and the design requirements.
3. Have an understanding of the basic principles behind radio resource management techniques such as power control, channel allocation and handoffs.
4. Gain insights into various mobile radio propagation models and how the diversity can

beexploited to improve performance.
5. Gain knowledge and awareness of the technologies for how to effectively share spectrumthrough multiple access techniques i.e. TDMA, CDMA, FDMA etc.
6. Have in-depth understanding of the design consideration and architecture for different Wireless Systems like GSM, CDMA, GPRS etc.
7. Understanding of the emerging trends in Wireless communication like WiFi, WiMAX, Software Defined Radio (SDR) and related issues and challenges.

# Final Year E&TC Engineering (2015 Course)

**404181        VLSI Design & Technology**

**Course Outcomes:**
On completion of the course, student will be able to
1. Write effective HDL coding for digital design.
2. Apply knowledge of real time issues in digital design.
3. Model digital circuit with HDL, simulate, synthesis and prototype in PLDs.
4. Design CMOS circuits for specified applications.
5. Analyze various issues and constraints in design of an ASIC
6. Apply knowledge of testability in design and build self test circuit.

**404182 Computer Networks & Security**

**Course Outcomes:**
On completion of the course, student will be able to
1. Understand fundamental underlying principles of computer networking
2. Describe and analyze the hardware, software, components of a network and their interrelations.
3. Analyze the requirements for a given organizational structure and select the most appropriatenetworking architecture and technologies
4. Have a basic knowledge of installing and configuring networking applications.
5. Specify and identify deficiencies in existing protocols, and then go onto select new and betterprotocols.
6. Have a basic knowledge of the use of cryptography and network security.

**404183 Radiation  and Microwave  Techniques**

**Course Outcomes:**
On completion of the course, student will be able to
1. Differentiate various performance parameters of radiating elements.
2. Analyze various radiating elements and arrays.
3. Apply the knowledge of waveguide fundamentals in design of transmission lines.
4. Design and set up a system consisting of various passive microwave components.
5. Analyze tube based and solid state active devices along with their applications.
6. Measure various performance parameters of microwave components.

**404184 Digital Image and Video Processing  (Elective-I)**

**Course Outcomes:**
On completion of the course, student will be able to
1. Develop and implement basic mathematical operations on digital images.
2. Analyze and solve image enhancement and image restoration problems.

3. Identify and design image processing techniques for object segmentation and recognition.
4. Represent objects and region of the image with appropriate method.
5. Apply 2-D data compression techniques for digital images.
6. Explore video signal representation and different algorithm for video processing.

# Fourth Year of Computer Engineering (2015 Course)

### 410241: High Performance Computing

#### Course Outcomes:

On completion of the course, student will be able to–

- ☐ Describe different parallel architectures, inter-connect networks, programming models
- ☐ Develop an efficient parallel algorithm to solve given problem
- ☐ Analyze and measure performance of modern parallel computing systems
- ☐ Build the logic to parallelize the programming task

### 410242: Artificial Intelligence and Robotics

#### Course Outcomes:

On completion of the course, student will be able to–

- Identify and apply suitable  Intelligent agents for various AI applications
- Design smart system using different informed search / uninformed search or heuristicapproaches.
- Identify knowledge associated and represent it by ontological engineering to plan a strategyto solve given problem.
- Apply the suitable algorithms to solve AI problems

### 410243: Data Analytics

#### Course Outcomes:

On completion of the course, student will be able to–

- ☐ Write case studies in Business Analytic and Intelligence using mathematical models
- ☐ Present a survey on applications for Business Analytic and Intelligence
- ☐ Provide problem solutions for multi-core or distributed, concurrent/Parallel environments

### Elective I
### 410244(A): Digital Signal Processing

#### Course Outcomes:

On completion of the course, student will be able to–

- ☐ Understand the mathematical models and representations of DT Signals and Systems
- ☐ Apply different transforms like Fourier and Z-Transform from applications point of view.
- ☐ Understand the design and implementation of DT systems as DT filters with filter structuresand different transforms.
- ☐ Demonstrate the knowledge of signals and systems for design and analysis of systems
- ☐ Apply knowledge and use the signal transforms for digital processing applications

# Second Year of Computer Engineering (2019 Course)

## 210241: Discrete Mathematics

### *Course Outcomes:*

On completion of the course, learner will be able to–

**CO1: Formulate** problems precisely, solve the problems, apply formal proof techniques, andexplain the reasoning clearly.

**CO2: Apply** appropriate mathematical concepts and skills to solve problems in both familiar andunfamiliar situations including those in real-life contexts.

**CO3: Design and analyze** real world engineering problems by applying set theory, propositionallogic and to construct proofs using mathematical induction.

**CO4: Specify, manipulate and apply** equivalence relations; construct and use functions and applythese concepts to solve new problems.

**CO5: Calculate** numbers of possible outcomes using permutations and combinations; to modeland analyze computational processes using combinatorics.

**CO6: Model and solve** computing problem using tree and graph and solve problems usingappropriate algorithms.

**CO7: Analyze** the properties of binary operations, apply abstract algebra in coding theory andevaluate the algebraic structures**.**

## 210242: Fundamentals of Data Structures

### *Course Outcomes:*

On completion of the course, learner will be able to–

**CO1: Design** the algorithms to solve the programming problems, **identify** appropriate algorithmic strategy for specific application, and **analyze** the time and space complexity.

**CO2: Discriminate** the usage of various structures, **Design**/**Program/Implement** the appropriate data structures; use them in implementations of abstract data types and Identity the appropriate data structure in approaching the problem solution.

**CO3: Demonstrate** use of sequential data structures- Array and Linked lists to store and process data.

**CO4: Understand** the computational efficiency of the principal algorithms for searching and sorting and choose the most efficient one for the application.

**CO5: Compare** and **contrast** different implementations of data structures (dynamic and static).

**CO6: Understand, Implement and apply** principles of data structures-stack and queue to solve computational problems.

## 210243: Object Oriented Programming (OOP)

*Course Outcomes:*

On completion of the course, learner will be able to–
**CO1: Apply** constructs- sequence, selection and iteration; classes and objects, inheritance, useof predefined classes from libraries while developing software.
**CO2: Design** object-oriented solutions for small systems involving multiple objects.
**CO3: Use** virtual and pure virtual function and complex programming situations.
**CO4: Apply** object-oriented software principles in problem solving.
**CO5: Analyze** the strengths of object-oriented programming.
**CO6: Develop** the application using object oriented programming language (C++).

## 210244: Computer Graphics

*Course Outcomes:*

On completion of the course, learner will be able to–
**CO1: Identify** the basic terminologies of Computer Graphics and interpret the mathematical foundation of the concepts of computer graphics.
**CO2: Apply** mathematics to develop Computer programs for elementary graphic operations.
**CO3: Illustrate** the concepts of windowing and clipping and **apply** various algorithms to fill and clippolygons.
**CO4: Understand** and **apply** the core concepts of computer graphics, including transformation intwo and three dimensions, viewing and projection.
**CO5: Understand** the concepts of color models, lighting, shading models and hidden surface elimination.
**CO6: Create** effective programs using concepts of curves, fractals, animation and gaming.

## 210245: Digital Electronics and Logic Design

*Course Outcomes:*

On completion of the course, learner will be able to–
**CO1: Simplify** Boolean Expressions using K Map.
**CO2: Design and implement** combinational circuits.
**CO3: Design and implement** sequential circuits.
**CO4: Develop** simple real-world application using ASM and PLD.
**CO5: Differentiate and choose** appropriate logic families IC packages as per the given design specifications.
**CO6: Explain** organization and architecture of computer system

# Third Year of Computer Engineering (2019 Course)

## 310241: Database Management Systems
### Course Outcomes:

After completion of the course, students should be able to

**CO1**: Analyze and design database management system using different data models

**CO2**: Implement database queries using database languages

**CO3**: Normalize the database design using normal forms

**CO4**: Design & develop transaction processing approach for relational databases.

**CO5**: Use NoSQL databases for processing unstructured data

**CO6**: Understand advances in databases

## 310242: Theory of Computation

### Course Outcomes:

After completion of the course, students should be able to

**CO1**: Understand formal language, translation logic, essentials of translation, alphabets, languagerepresentation and apply it to design Finite Automata and its variants

**CO2**: Construct regular expression to present regular language and understand pumping lemma forRE

**CO3**: Design Context Free Grammars and learn to simplify the grammar

**CO4**: Construct Pushdown Automaton model for the Context Free Language

**CO5**: Design Turing Machine for the different requirements outlined by theoretical computerscience

**CO6**: Understand different classes of problems, classify and analyze them and study concepts ofNP completeness

## 310243: Systems Programming & Operating System

### Course Outcomes:

On completion of the course, students should be able to

**CO1:** Analyze basic system software

**CO2:** Design & implement system software

**CO3:** Analyze different schemes for designing loader and linker

**CO4:** Use language translation tools like LEX & YACC

**CO5:** Understand Operating System concepts

**CO6:** Analyze the organization of memory and memory management

## 310244: Computer Networks and Security

**Course Outcomes:**

On completion of the course, students should be able to

**CO1:** Analyze computer networks, architectures, protocols and technologies

**CO2:** Illustrate the working and functions of data link layer

**CO3:** Analyze the working of different routing protocols and mechanisms

**CO4:** Implement client-server applications using sockets

**CO5:** Illustrate role of application layer with its protocols, Client-Server architectures

**CO6:** Comprehend the basics of information security

## 310245(A): Internet of Things and Embedded Systems

**Course Outcomes:**

On completion of the course, students should be able to

**CO1:** Understand the fundamentals and need of embedded system for the Internet of Things

**CO2:** Apply IoT enabling technologies for developing IoT systems

**CO3:** Apply design methodology for designing and implementing IoT applications

**CO4:** Analyze IoT protocols for making IoT devices communication

**CO5:** Design cloud based IoT systems

**CO6:** Design and Develop secured IoT applications