

## **COURSE OUTCOMES FOR R18 REGULATION**

### **IYEAR**

#### **MA101BS: MATHEMATICS - I**

1. Write the matrix representation of a set of linear equations and to analyse the solution
2. Find the Eigen values and Eigen vectors
3. Reduce the quadratic form to canonical form using orthogonal transformations.
4. Analyse the nature of sequence and series.
5. Solve the applications on the mean value theorems.
6. Evaluate the improper integrals using Beta and Gamma functions
7. Find the extreme values of functions of two variables with/ without constraints.

#### **CH102BS/CH202BS: CHEMISTRY**

1. The knowledge of atomic, molecular and electronic changes, band theory related to conductivity.
2. The required principles and concepts of electrochemistry, corrosion and in understanding the problem of water and its treatments.
3. The required skills to get clear concepts on basic spectroscopy and application to medical and other fields.
4. The knowledge of configurational and conformational analysis of molecules and reaction mechanisms.

#### **EE103ES/EE203ES: BASIC ELECTRICAL ENGINEERING**

1. To analyze and solve electrical circuits using network laws and theorems.
2. To understand and analyze basic Electric and Magnetic circuits
3. To study the working principles of Electrical Machines
4. To introduce components of Low Voltage Electrical Installations

#### **ME105ES/ME205ES: ENGINEERING WORKSHOP**

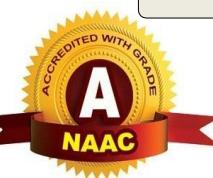
1. Study and practice on machine tools and their operations
2. Practice on manufacturing of components using workshop trades including plumbing, fitting, carpentry, foundry, house wiring and welding.
3. Identify and apply suitable tools for different trades of Engineering processes including drilling, material removing, measuring, chiseling.
4. Apply basic electrical engineering knowledge for house wiring practice.

#### **EN105HS/EN205HS: ENGLISH**

1. Use English Language effectively in spoken and written forms.
2. Comprehend the given texts and respond appropriately.
3. Communicate confidently in various contexts and different cultures.
4. Acquire basic proficiency in English including reading and listening comprehension, writing and speaking skills.

#### **CH106BS/CH206ES: ENGINEERING CHEMISTRY LAB**

1. Determination of parameters like hardness and chloride content in water.
2. Estimation of rate constant of a reaction from concentration – time relationships.
3. Determination of physical properties like adsorption and viscosity.



- Calculation of Rf values of some organic molecules by TLC technique.

### **EN107HS/EN207HS: ENGLISH LANGUAGE AND COMMUNICATION SKILLS LAB**

Better understanding of nuances of English language through audio- visual experience and group activities

- Neutralization of accent for intelligibility
- Speaking skills with clarity and confidence which in turn enhances their employability skills

### **EE108ES/EE208ES: BASIC ELECTRICAL ENGINEERING LAB**

- Get an exposure to basic electrical laws.
- Understand the response of different types of electrical circuits to different excitations.
- Understand the measurement, calculation and relation between the basic electrical parameters
- Understand the basic characteristics of transformers and electrical machines

### **MA201BS: MATHEMATICS - II**

- Identify whether the given differential equation of first order is exact or not
- Solve higher differential equation and apply the concept of differential equation to real world problems
- Evaluate the multiple integrals and apply the concept to find areas, volumes, centre of mass and Gravity for cubes, sphere and rectangular parallelopiped
- Evaluate the line, surface and volume integrals and converting them from one to another

### **AP102BS/AP202BS: APPLIED PHYSICS**

The student would be able to learn the fundamental concepts on Quantum behaviour of matter in its micro state.

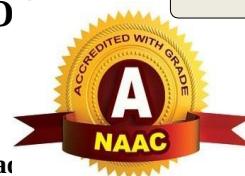
- The knowledge of fundamentals of Semiconductor physics, Optoelectronics, Lasers and fibre optics enable the students to apply to various systems like communications, solar cell, photo cells and so on.
- Design, characterization and study of properties of material help the students to prepare new materials for various engineering applications.
- The course also helps the students to be exposed to the phenomena of electromagnetism and also to have exposure on magnetic materials and dielectric materials

### **CS103ES/CS203ES: PROGRAMMING FOR PROBLEM SOLVING**

- To write algorithms and to draw flowcharts for solving problems.
- To convert the algorithms/flowcharts to C programs.
- To code and test a given logic in C programming language.
- To decompose a problem into functions and to develop modular reusable code.
- To use arrays, pointers, strings and structures to write C programs.
- Searching and sorting problems.

### **ME104ES/ME204ES: ENGINEERING GRAPHICS**

- Preparing working drawings to communicate the ideas and information.



2. Read, understand and interpret engineering drawings.

AP105BS/AP205BS: APPLIED PHYSICS LAB

### **CS106ES/CS206ES: PROGRAMMING FOR PROBLEM SOLVING LAB**

1. formulate the algorithms for simple problems
2. translate given algorithms to a working and correct program
3. correct syntax errors as reported by the compilers
4. identify and correct logical errors encountered during execution
5. represent and manipulate data with arrays, strings and structures
6. use pointers of different types
7. create, read and write to and from simple text and binary files
8. modularize the code with functions so that they can be reused

### **\*MC109ES/\*MC209ES: ENVIRONMENTAL SCIENCE**

1. Based on this course, the Engineering graduate will understand /evaluate / develop technologies on the basis of ecological principles and environmental regulations which in turn helps in sustainable development

## **IIYEAR**

### **CS301ES: ANALOG AND DIGITAL ELECTRONICS**

1. Know the characteristics of various components.
2. Understand the utilization of components.
3. Design and analyze small signal amplifier circuits.
4. Learn Postulates of Boolean algebra and to minimize combinational functions
5. Design and analyze combinational and sequential circuits
6. Know about the logic families and realization of logic gates

### **CS302PC: DATA STRUCTURES**

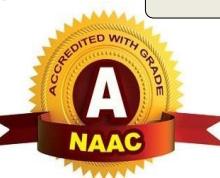
1. Ability to select the data structures that efficiently model the information in a problem.
2. Ability to assess efficiency trade-offs among different data structure implementations or combinations.
3. Implement and know the application of algorithms for sorting and pattern matching.
4. Design programs using a variety of data structures, including hash tables, binary and general tree structures, search trees, tries, heaps, graphs, and AVL-trees.

### **MA303BS: COMPUTER ORIENTED STATISTICAL METHODS**

1. Apply the concepts of probability and distributions to some case studies
2. Correlate the material of one unit to the material in other units
3. Resolve the potential misconceptions and hazards in each topic of study

### **IT304PC: COMPUTER ORGANIZATION AND MICROPROCESSOR**

1. Able to understand the basic components and the design of CPU, ALU and Control Unit.
2. Ability to understand memory hierarchy and its impact on computer cost/performance.



3. Ability to understand the advantage of instruction level parallelism and pipelining for high performance Processor design.
4. Ability to understand the instruction set, instruction formats and addressing modes of 8086.
5. Ability to write assembly language programs to solve problems.

### **CS305PC: OBJECT ORIENTED PROGRAMMING USING C++**

1. Able to develop programs with reusability
2. Develop programs for file handling
3. Handle exceptions in programming
4. Develop applications for a range of problems using object-oriented programming techniques

### **CS306ES: ANALOG AND DIGITAL ELECTRONICS LAB**

1. Know the characteristics of various components.
2. Understand the utilization of components.
3. Design and analyze small signal amplifier circuits.
4. Postulates of Boolean algebra and to minimize combinational functions
5. Design and analyze combinational and sequential circuits
6. Known about the logic families and realization of logic gates.

### **CS307PC: DATA STRUCTURES LAB**

1. Ability to develop C programs for computing and real-life applications using basic elements like control statements, arrays, functions, pointers and strings, and data structures like stacks, queues and linked lists.
2. Ability to Implement searching and sorting algorithms

### **IT308PC: IT WORKSHOP AND MICROPROCESSOR LAB**

### **CS309PC: C++ PROGRAMMING LAB**

1. Ability to develop applications for a range of problems using object-oriented programming Techniques

### **\*MC309/\*MC409: GENDER SENSITIZATION LAB**

1. Students will have developed a better understanding of important issues related to gender in contemporary India.
2. Students will be sensitized to basic dimensions of the biological, sociological, psychological and legal aspects of gender. This will be achieved through discussion of materials derived from research, facts, everyday life, literature and film.
3. Students will attain a finer grasp of how gender discrimination works in our society and how to counter it.
4. Students will acquire insight into the gendered division of labour and its relation to politics and economics.
5. Men and women students and professionals will be better equipped to work and live together as equals.
6. Students will develop a sense of appreciation of women in all walks of life.



7. Through providing accounts of studies and movements as well as the new laws that provide protection and relief to women, the textbook will empower students to understand and respond to gender violence.

### **CS401PC: DISCRETE MATHEMATICS**

1. Ability to understand and construct precise mathematical proofs
2. Ability to use logic and set theory to formulate precise statements
3. Ability to analyze and solve counting problems on finite and discrete structures
4. Ability to describe and manipulate sequences
5. Ability to apply graph theory in solving computing problems

### **SM402MS/SM305MS: BUSINESS ECONOMICS AND FINANCIAL ANALYSIS**

The students will understand the various Forms of Business and the impact of economic variables on the Business. The Demand, Supply, Production, Cost, Market Structure, Pricing aspects are learnt. The Students can study the firm's financial position by analysing the Financial Statements of a Company.

### **CS403PC: OPERATING SYSTEMS**

1. Will be able to control access to a computer and the files that may be shared
2. Demonstrate the knowledge of the components of computer and their respective roles in computing.
3. Ability to recognize and resolve user problems with standard operating environments.
4. Gain practical knowledge of how programming languages, operating systems, and architectures interact and how to use each effectively.

### **CS404PC: DATABASE MANAGEMENT SYSTEMS**

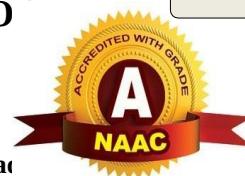
1. Gain knowledge of fundamentals of DBMS, database design and normal forms
2. Master the basics of SQL for retrieval and management of data.
3. Be acquainted with the basics of transaction processing and concurrency control.
4. Familiarity with database storage structures and access techniques

### **CS405PC: JAVA PROGRAMMING**

1. Able to solve real world problems using OOP techniques.
2. Able to understand the use of abstract classes.
3. Able to solve problems using java collection framework and I/o classes.
4. Able to develop multithreaded applications with synchronization.
5. Able to develop applets for web applications.
6. Able to design GUI based applications

### **CS406PC: OPERATING SYSTEMS LAB (Using UNIX/LINUX)**

1. Simulate and implement operating system concepts such as scheduling, deadlock management, file management and memory management.
2. Able to implement C programs using Unix system calls



### **CS407PC: DATABASE MANAGEMENT SYSTEMS LAB**

1. Design database schema for a given application and apply normalization
2. Acquire skills in using SQL commands for data definition and data manipulation.
3. Develop solutions for database applications using procedures, cursors and triggers

### **CS408PC: JAVA PROGRAMMING LAB**

1. Able to write programs for solving real world problems using java collection frame work.
2. Able to write programs using abstract classes.
3. Able to write multithreaded programs.
4. Able to write GUI programs using swing controls in Java

### **\*MC409/\*MC309: CONSTITUTION OF INDIA**

### **IIIYEAR**

### **CS501PC: FORMAL LANGUAGES AND AUTOMATA THEORY**

1. Able to understand the concept of abstract machines and their power to recognize the languages.
2. Able to employ finite state machines for modeling and solving computing problems.
3. Able to design context free grammars for formal languages.
4. Able to distinguish between decidability and undecidability.
5. Able to gain proficiency with mathematical tools and formal methods.

### **CS502PC: SOFTWARE ENGINEERING**

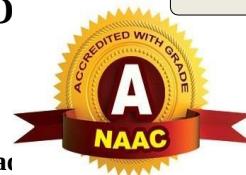
1. Ability to translate end-user requirements into system and software requirements, using e.g.  
UML, and structure the requirements in a Software Requirements Document (SRD).
2. Identify and apply appropriate software architectures and patterns to carry out high level design of a system and be able to critically compare alternative choices.
3. Will have experience and/or awareness of testing problems and will be able to develop a simple testing report

### **IT503PC: DATA COMMUNICATION AND COMPUTER NETWORKS**

1. Students should be understand and explore the basics of Computer Networks and Various Protocols. He/She will be in a position to understand the World Wide Web concepts.
2. Students will be in a position to administrate a network and flow of information further he/she can understand easily the concepts of network security, Mobile and ad hoc networks

### **IT504PC: WEB PROGRAMMING**

1. Design web pages.
2. Use technologies of Web Programming.
3. Apply object-oriented aspects to Scripting.
4. Create databases with connectivity using JDBC.
5. Build web-based application using sockets.



### **IT511PE: BIOMETRICS (Professional Elective - I)**

1. Identify the various Biometric technologies.
2. Design of biometric recognition for the organization.
3. Develop simple applications for privacy.
4. Understand the watermarking techniques of biometrics.
5. Understand the research on biometric techniques.
6. Understand the need of biometric in the society.

### **CS512PE: ADVANCED COMPUTER ARCHITECTURE (Professional Elective - I)**

1. Computational models and Computer Architectures.
2. Concepts of parallel computer models.
3. Scalable Architectures, Pipelining, Superscalar processors, multiprocessors

### **CS513PE: DATA ANALYTICS (Professional Elective - I)**

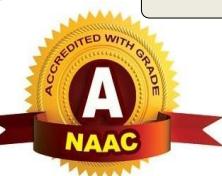
1. Understand the impact of data analytics for business decisions and strategy
2. Carry out data analysis/statistical analysis
3. To carry out standard data visualization and formal inference procedures
4. Design Data Architecture
5. Understand various Data Sources

### **CS514PE: IMAGE PROCESSING (Professional Elective - I)**

1. Demonstrate the knowledge of the basic concepts of two-dimensional signal acquisition, sampling, and quantization.
2. Demonstrate the knowledge of filtering techniques.
3. Demonstrate the knowledge of 2D transformation techniques.
4. Demonstrate the knowledge of image enhancement, segmentation, restoration and compression techniques.

### **CS515PE: PRINCIPLES OF PROGRAMMING LANGUAGES (Professional Elective - I)**

1. Acquire the skills for expressing syntax and semantics in formal notation
2. Identify and apply a suitable programming paradigm for a given computing application
3. Gain knowledge of and able to compare the features of various programming languages



### **CS521PE: COMPUTER GRAPHICS (Professional Elective - II)**

1. Acquire familiarity with the relevant mathematics of computer graphics.
2. Be able to design basic graphics application programs, including animation
3. Be able to design applications that display graphic images to given specifications

### **IT521PE: DATABASE SECURITY (Professional Elective - II)**

1. Ability to carry out a risk analysis for large database.
2. Ability to set up, and maintain the accounts with privileges and roles.

### **CS522PE: ADVANCED OPERATING SYSTEMS (Professional Elective - II)**

1. Understand the design approaches of advanced operating systems
2. Analyze the design issues of distributed operating systems.
3. Evaluate design issues of multi processor operating systems.
4. Identify the requirements Distributed File System and Distributed Shared Memory.
5. Formulate the solutions to schedule the real time applications.

### **IT523PE: MACHINE LEARNING (Professional Elective - II)**

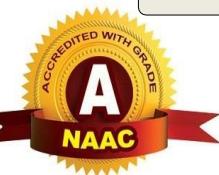
1. Understand the concepts of computational intelligence like machine learning
2. Ability to get the skill to apply machine learning techniques to address the real time problems in different areas
3. Understand the Neural Networks and its usage in machine learning application.

### **IT524PE: PATTERN RECOGNITION (Professional Elective - II)**

1. Understand the theory, benefits, inadequacies and possible applications of various machine learning and pattern recognition algorithms
2. Identify and employ suitable machine learning techniques in classification, pattern recognition, clustering and decision problems.

### **CS505PC: SOFTWARE ENGINEERING LAB**

1. Ability to translate end-user requirements into system and software requirements



2. Ability to generate a high-level design of the system from the software requirements
3. Will have experience and/or awareness of testing problems and will be able to develop a simple testing report

#### **IT506PC: COMPUTER NETWORKS & WEB PROGRAMMING LAB**

1. Implement data link layer farming methods
2. Analyze error detection and error correction codes.
3. Implement and analyze routing and congestion issues in network design.
4. Implement Encoding and Decoding techniques used in presentation layer
5. To be able to work with different network tools

#### **EN508HS: ADVANCED COMMUNICATION SKILLS LAB**

#### **\*MC510: INTELLECTUAL PROPERTY RIGHTS**

#### **IT601PC: INTRODUCTION TO EMBEDDED SYSTEMS**

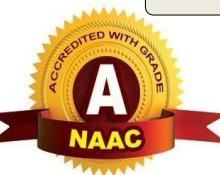
1. Expected to understand the selection procedure of processors in the embedded domain.
2. Design procedure of embedded firm ware.
3. Expected to visualize the role of realtime operating systems in embedded systems.
4. Expected to evaluate the correlation between task synchronization and latency issues

#### **IT602PC: PRINCIPLES OF COMPILER CONSTRUCTION**

1. Ability to design, develop, and implement a compiler for any language.
2. Able to use lex and yacc tools for developing a scanner and a parser.
3. Able to design and implement LL and LR parsers.
4. Able to design algorithms to perform code optimization in order to improve the performance of a program in terms of space and time complexity.
5. Ability to design algorithms to generate machine code

#### **IT603PC: ALGORITHM DESIGN AND ANALYSIS**

1. Ability to analyze the performance of algorithms



2. Ability to choose appropriate data structures and algorithm design methods for a specified application
3. Ability to understand how the choice of data structures and the algorithm design methods impact the performance of programs

### **IT604PC: INTERNET OF THINGS**

1. Interpret the impact and challenges posed by IoT networks leading to new architectural models.
2. Compare and contrast the deployment of smart objects and the technologies to connect them to network.
3. Appraise the role of IoT protocols for efficient network communication.
4. Elaborate the need for Data Analytics and Security in IoT.
5. Illustrate different sensor technologies for sensing real world entities and identify the applications of IoT in Industry.

### **IT611PE: ETHICAL HACKING (Professional Elective - III)**

1. Gain the knowledge of the use and availability of tools to support an ethical hack
2. Gain the knowledge of interpreting the results of a controlled attack
3. Understand the role of politics, inherent and imposed limitations and metrics for planning of a test
4. Comprehend the dangers associated with penetration testing

### **CS612PE: NETWORK PROGRAMMING (Professional Elective - III)**

1. To write socket API based programs
2. To design and implement client-server applications using TCP and UDP sockets
3. To analyze network programs

### **CS613PE: SCRIPTING LANGUAGES (Professional Elective - III)**

1. Comprehend the differences between typical scripting languages and typical system and application programming languages.
2. Gain knowledge of the strengths and weakness of Perl, TCL and Ruby; and select an appropriate language for solving a given problem.
3. Acquire programming skills in scripting language



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**CS614PE: MOBILE APPLICATION DEVELOPMENT (Professional Elective - III)**

1. Student understands the working of Android OS Practically.
2. Student will be able to develop Android user interfaces
3. Student will be able to develop, deploy and maintain the Android Applications.

**CS615PE: SOFTWARE TESTING METHODOLOGIES (Professional Elective - III)**

Design and develop the best test strategies in accordance to the development model.

**IT605PC: EMBEDDED SYSTEMS & INTERNET OF THINGS LAB**

**IT606PC: COMPILER CONSTRUCTION LAB**

1. Design and develop interactive and dynamic web applications using HTML, CSS, JavaScript and XML
2. Apply client-server principles to develop scalable and enterprise web applications.
3. Ability to design, develop, and implement a compiler for any language.
4. Able to use lex and yacc tools for developing a scanner and a parser.
5. Able to design and implement LL and LR parsers.

**IT621PE: ETHICAL HACKING LAB (Professional Elective - III)**

1. Gain the knowledge of the use and availability of tools to support an ethical hack
2. Gain the knowledge of interpreting the results of a controlled attack

**CS622PE: NETWORK PROGRAMMING LAB (Professional Elective - III)**

1. To write socket API based programs
2. To design and implement client-server applications using TCP and UDP sockets
3. To analyze network programs

**CS623PE: SCRIPTING LANGUAGES LAB (Professional Elective - III)**

1. Ability to understand the differences between Scripting languages and programming languages
2. Able to gain some fluency programming in Ruby, Perl, TCL



### **CS624PE: MOBILE APPLICATION DEVELOPMENT LAB (Professional Elective - III)**

1. Student understands the working of Android OS Practically.
2. Student will be able to develop user interfaces.
3. Student will be able to develop, deploy and maintain the Android Applications.

### **CS625PE: SOFTWARE TESTING METHODOLOGIES LAB (Professional Elective - III)**

1. Design and develop the best test strategies in accordance to the development model.

### **\*MC609: ENVIRONMENTAL SCIENCE**

Based on this course, the Engineering graduate will understand /evaluate / develop technologies on the

basis of ecological principles and environmental regulations which in turn helps in sustainable development

**IVYEAR**

### **IT701PC: INFORMATION SECURITY**

1. Demonstrate the knowledge of cryptography, network security concepts and applications.
2. Ability to apply security principles in system design.

### **CS702PC: DATA MINING**

1. Ability to understand the types of the data to be mined and present a general classification of tasks and primitives to integrate a data mining system.
2. Apply preprocessing methods for any given raw data.
3. Extract interesting patterns from large amounts of data.
4. Discover the role played by data mining in various fields.
5. Choose and employ suitable data mining algorithms to build analytical applications
6. Evaluate the accuracy of supervised and unsupervised models and algorithms.

### **IT711PE: WEB SECURITY (Professional Elective - IV)**

1. Understand the Web architecture and applications
2. Understand client side and service side programming
3. Understand how common mistakes can be bypassed and exploit the application
4. Identify common application vulnerabilities

### **IT712PE: HIGH PERFORMANCE COMPUTING (Professional Elective - IV)**

1. Understanding the concepts in grid computing
2. Ability to set up cluster and run parallel applications
3. Ability to understand the cluster projects and cluster OS
4. Understanding the concepts of pervasive computing & quantum computing.

### **CS713PE: ARTIFICIAL INTELLIGENCE (Professional Elective - IV)**

1. Ability to formulate an efficient problem space for a problem expressed in natural language.
2. Select a search algorithm for a problem and estimate its time and space complexities.
3. Possess the skill for representing knowledge using the appropriate technique for a given problem.
4. Possess the ability to apply AI techniques to solve problems of game playing, and machine learning.

### **CS714PE: CLOUD COMPUTING (Professional Elective - IV)**

1. Ability to understand various service delivery models of a cloud computing architecture.
2. Ability to understand the ways in which the cloud can be programmed and deployed.
3. Understanding cloud service providers.

### **CS715PE: AD-HOC & SENSOR NETWORKS (Professional Elective - IV)**

1. Ability to understand the state-of-the-art research in the emerging subject of Ad Hoc and Wireless Sensor Networks
2. Ability to solve the issues in real-time application development based on ASN.



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- 3. Ability to conduct further research in the domain of ASN

**IT721PE: INTRUSION DETECTION SYSTEMS (Professional Elective - V)**

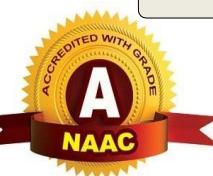
- 1. Possess a fundamental knowledge of Cyber Security.
- 2. Understand what vulnerability is and how to address most common vulnerabilities.
- 3. Know basic and fundamental risk management principles as it relates to Cyber Security and Mobile Computing.
- 4. Have the knowledge needed to practice safer computing and safeguard your information using Digital Forensics.
- 5. Understand basic technical controls in use today, such as firewalls and Intrusion Detection systems.
- 6. Understand legal perspectives of Cyber Crimes and Cyber Security.

**CS722PE: REAL TIME SYSTEMS (Professional Elective - V)**

- 1. Be able to explain real-time concepts such as preemptive multitasking, task priorities, priority inversions, mutual exclusion, context switching, and synchronization, interrupt latency and response time, and semaphores.
- 2. Able describe how a real-time operating system kernel is implemented.
- 3. Able explain how tasks are managed.
- 4. Explain how the real-time operating system implements time management.
- 5. Discuss how tasks can communicate using semaphores, mailboxes, and queues.
- 6. Be able to implement a real-time system on an embedded processor.
- 7. Be able to work with real time operating systems like RT Linux, Vx Works, MicroC /OSII, Tiny Os

**CS723PE: SOFT COMPUTING (Professional Elective - V)**

- 1. Identify the difference between Conventional Artificial Intelligence to Computational Intelligence.**
- 2. Understand fuzzy logic and reasoning to handle and solve engineering problems**
- 3. Apply the Classification and clustering techniques on various applications.**



4. Understand the advanced neural networks and its applications
5. Perform various operations of genetic algorithms, Rough Sets.
6. Comprehend various techniques to build model for various applications

**IT724PE: DISTRIBUTED DATABASES (Professional Elective - V)**

1. Understand theoretical and practical aspects of distributed database systems.
2. Study and identify various issues related to the development of distributed database system.
3. Understand the design aspects of object-oriented database system and related development.

**CS725PE: SOFTWARE PROCESS & PROJECT MANAGEMENT (Professional Elective - V)**

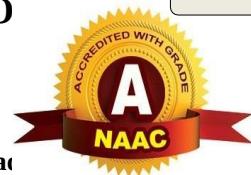
1. Gain knowledge of software economics, phases in the life cycle of software development, project organization, project control and process instrumentation
2. Analyze the major and minor milestones, artifacts and metrics from management and technical perspective
3. Design and develop software product using conventional and modern principles of software project management

**IT703PC: INFORMATION SECURITY LAB**

**SM801MS: ORGANIZATIONAL BEHAVIOUR**

**IT811PE: NATURAL LANGUAGE PROCESSING (Professional Elective - VI)**

1. Show sensitivity to linguistic phenomena and an ability to model them with formal grammars.
2. Understand and carry out proper experimental methodology for training and evaluating empirical NLP systems
3. Able to manipulate probabilities, construct statistical models over strings and trees, and estimate parameters using supervised and unsupervised training methods.
4. Able to design, implement, and analyze NLP algorithms
5. Able to design different language modeling Techniques.



**CS812PE: DISTRIBUTED SYSTEMS (Professional Elective - VI)**

1. Ability to understand Transactions and Concurrency control.
2. Ability to understand Security issues.
3. Understanding Distributed shared memory.
4. Ability to design distributed systems for basic level applications.

**CS813PE: NEURAL NETWORKS & DEEP LEARNING (Professional Elective - VI)**

1. Ability to understand the concepts of Neural Networks
2. Ability to select the Learning Networks in modeling real world systems
3. Ability to use an efficient algorithm for Deep Models
4. Ability to apply optimization strategies for large scale applications

**CS814PE: HUMAN COMPUTER INTERACTION (Professional Elective - VI)**

1. Ability to apply HCI and principles to interaction design.
2. Ability to design certain tools for blind or PH people.

**CS815PE: CYBER FORENSICS (Professional Elective - VI)**

1. Students will understand the usage of computers in forensic, and how to use various forensic tools for a wide variety of investigations.
2. It gives an opportunity to students to continue their zeal in research in computer forensics