S.No	**Course No**	Course Outcomes
1.	MA20ABS303	• Apply mathematical concepts and logical reasoning to solve problems in different fields of Computer science and information technology (L3). • Apply the properties of Set theory to find Equivalence and Partial Ordering relations and Hasse Diagrams for different functions (L3). • Analyse the properties of Algebraic Structures to find the given sets are Semi group, Monoids and Groups (L4). • Analyse the concepts of Generating and Recurrence relations for solving Homogeneous and In-Homogeneous equations (L4). • Investigate the graphs are Isomorphic Graphs, Euler and Hamilton Graphs (L6).
2.	AM20APC301	• Analyze the complexity of the algorithms • Make use of various design techniques like divide and conquer, greedy, dynamic programming, backtracking, branch and bound to solve the problems. • Identify and analyze criteria and specifications appropriate to new problems, and choose the appropriate algorithmic design technique for their solution. • Able to prove that a certain problem is NP-Complete.
3.	AM20APC303	• Understand the computer organization concepts related to design of modern processors, memories and I/Os (L2) • Identify the hardware requirements for cache memory

		and virtual memory (L2) • Understand the importance and tradeoffs of different types of memories (L2) • Design algorithms to exploit pipelining and multiprocessors (L4) • Identify pipeline hazards and possible solutions to those hazards (L2)
4.	CS20APC303	• Design a database for a real world informationsystem (L6) • Define transactions which preserve the integrity of thedatabase (L1) • Generate tables for adatabase (L4) • Organize the data to preventredundancy (L4) • Pose queries to retrieve the information fromdatabase (L3)
5.	IT20APC301	• Apply the features of Python language in various real applications (L3). • Select appropriate core data structure of Python for solving a problem (L5). • Design object-oriented programs using Python for solving real-world problems (L4). • Apply modularity to programs (L3). • Design graphics using turtle module (L4).
6.	AM20APC302	• Apply the Divide and Conquer strategy to solve searching, sorting problems.(L3) • Analyze the efficiency of Greedy and Dynamic Programming design techniques to

		solve the optimization problems.(L2) • Relate Backtracking technique for solving constraint satisfaction problems.(L3)
7.	CS20APC304	• Work with the concepts of DDL, DML, DCL Commands (L3). • Design of databases for real life systems using Oracle (L5). • Learning of SQL queries on the real-life systems (L4). • Execution of PL/SQL programs for different problems (L6). • Implementation of procedure, function, trigger and cursor concepts in PL/SQL (L4).
8.	IT20APC302	• Design solutions to mathematical problems (L6). • Organize the data for solving the problem (L4). • Develop Python programs for numerical and text-based problems (L6). • Select appropriate programming construct for solving the problem (L5). • Illustrate object-oriented concepts (L3).
9.	AM20ASC301	● Understand shell script to create files and handle text documents. (L2) ● Analyze various methodologies in Linux administration. (L3) ● Implementation of IPC through shell programming in the Linux environment.(L5) ● Create child processes and background processes. (L5)

10.	CH20AMC201	• Understanding multidisciplinary nature of environmental studies and various renewable and nonrenewable resources. (L2) • Understand flow and bio-geo- chemical cycles and ecological pyramids. (L2) • Understand various causes of pollution and solid waste management and related preventive measures. (L2) • Apply the rainwater harvesting, watershed management, ozone layer depletion and waste land reclamation. (L3) • Apply the concepts of population explosion, value education and welfare programmes in society. (L3)
11	EG20AMC301	• Use English language, both written and spoken, competently and correctly. • Improve comprehension and fluency of speech. • Hone the communication skills to meet the challenges of their careers successfully. • Gain confidence in using English in verbal situations. • Strengthen communication skills in different contexts like formal and informal.

S. No	**Course No**	
1	MA20ABS401	• Apply different methods to find roots of algebraic and transcendental equations. (L3) • Apply different methods to find approximate solution of ordinary differential equations • and Numerical Integration. (L3) • Analyse the concepts of probability and their applications. (L4) • Apply discrete and continuous probability distributions in practical problems. (L3) • Analyse the statistical inferential methods based on small and large sampling tests. (L4)

2	CS20APC401	• To solve real world problems using OOP techniques (L3). • To apply code reusability through inheritance, packages and interfaces(L3) • To solve problems using java collection framework and I/O classes (L3). • To develop applications by using parallel streams for better performance (L4). • To build GUIs and handle events generated by user interactions (L4).
3	IT20APC401	• Understand theOS design structures, its services and basics of a Process. (L2) • Analyze various scheduling algorithms and examine concurrency mechanisms in Operating Systems. (L4) • Apply memory management techniques in the design of operating systems. (L3) • Compare and contrast various structures and organization of the file system and secondary storage structure. (L4) • Apply different concepts of Protection and Security services in OS. (L3)
4	EC20AES301	• To understand the concept of Logic circuits

		and analyze various Boolean algebra functions. • To understand the concept of CombinationalLogicand SequentialLogic Circuits. • To create combinational circuits using PLD's. • To understand and Analyze the counters, • To understand the concepts of 8085, 8086 Microprocessor and 8051 Microcontroller. • Apply knowledge and demonstrate programming proficiency using various addressing modes and instruction sets of 8086 & 8051
5	BA20AHS301	• To apply the basic inputs of Managerial Economics and Economic Environment of business • To analyze analytical skills in helping them take sound financial decisions for achieving higher organizational productivity
	BA20AHS302	
	BA20AHS303	
6	CS20APC402	• Recognize the Java programming environment (L3). • Select appropriate programming construct to solve a problem (L2). • Develop efficient programs using multithreading (L5). • Design reliable programs using Java exception handling features (L3).

		• Extend the programming functionality supported by Java (L4).
7	IT20APC402	• Trace different CPU Scheduling algorithm. (L2) • Implement Bankers Algorithms to Avoid and prevent the Dead Lock. (L3) • Evaluate Page replacement algorithms. (L5) • Illustrate the file organization techniques. (L4) • Illustrate shared memory process. (L4) • Design new scheduling algorithms. (L6)
8	EC20AES302	• Analyze the concepts ofLogic Gatesand Boolean functions. • Analyze CombinationalLogicand SequentialLogic Circuits. • Analyze the logic circuits using Programmable Logic Devices. • Apply knowledge and demonstrate programming proficiency using various addressing modes and instruction sets of 8086 & 8051.
9	IT20ASC401	• Install and use R for simple programming tasks (L3). • Extract data from files and other sources and perform various data manipulation tasks on them (L3).

		• Explore statistical functions in R (L4). • Use R Graphics and Tables to visualize results of various statistical operations on data (L3). • Apply the knowledge of R gained to data Analytics for real-life applications (L3).
10	CS20AMC401	• Generate and develop different design ideas.(L4) • Appreciate the innovation and benefits of design thinking.(L3) • Experience the design thinking process in IT and agile software development.(L2) • Understand design techniques related to variety of software services.(L2)
11	MA20AMC401	• Develop the use of matrix algebra techniques that is needed by engineers for practical applications (L6) • Utilize mean value theorems to real life problems (L3) • Solve the differential equations related to various engineering fields (L6) ☐ • Apply multiple integrals to find the area and volumes for different functions. (L3) • Estimate the work done against a field, circulation and flux using vector calculus (L6)

S.NO	**Course No**	
1	AM20APC501	• Apply searching techniques for solving a problem (L3) • Design Intelligent Agents (L6) • Develop Natural Language Interface for Machines (L6) • Design mini robots (L6) • Summarize past, present and future of Artificial Intelligence (L5)
2	AM20APC503	• Design a Data warehouse system and perform business analysis with OLAP tools. • Apply suitable pre-processing and visualization techniques for data analysis • Apply frequent pattern and association rule mining techniques for data analysis • Apply appropriate classification and clustering techniques for data analysis

3	AM20APC504	• Explain deterministic and non-deterministic machines. • Comprehend the hierarchy of problems arising in the computersciences. • Design a deterministic finite-state machine to accept a specifiedlanguage. • Explain how a compiler can be constructed for a simple context-free language. • Determine a language's location in the Chomsky hierarchy (regularsets, Context-free,context-sensitive, and recursively enumerable languages).

4	CE20AOE501	• Understand various Civil Engineering in the overall infrastructural development • Identify various types of buildings • Understand the process of management of surveying • Apply various Modern construction materials • Obtain awareness on various Modern construction materials
	EC20AOE501	**CO1:** Outline the processing steps in the fabrication of a nMOS, pMOS and CMOS structure. **CO2:** Illustrate the Layout procedure of simple MOS circuit using Lambda based design rules. **CO3:** Summarize the scaling effects of various key parameters of MOSFET devices. **CO4:** Design various MOS based logic circuits. **CO5:** Develop algorithms for automatic test generation for combinational and sequential circuits.
		CO-1: Understand the concepts of control systems classification, feedback effect and Apply the concepts of Block diagram reduction, Signal flow graph **CO-2:**Analyse time response analysis, error constants, and stability characteristics of a given mathematical model using different methods. **CO-3:**Apply the concepts of RH and Root locus for stability calculations **CO-4:**Analyze system behavior of the system in frequency domain. frequency response characteristics, Bode, Nyquist, Polar plots for

	AM20APE501	1. Identify the software and hardware components of a Computer network (L3) 2. Develop new routing, and congestion control algorithms (L3) 3. Assess critically the existing routing protocols (L5) 4. Explain the functionality of each layer of a computer network (L2) 5. Choose the appropriate transport protocol based on the application requirements (L3)
5	AM20APE502	1.Thorough understanding of theoretical foundation of fundamental Digital Image manipulation and processing steps like acquisition; preprocessing; segmentation; Fourier domain processingSkills on exploration and appropriate use of image processing methods / tools for business and management applications
	AM20APE503	• IdentifytypeofNoSQLdatabaseto implementbusinessrequirements(L3) • ApplyNoSQLdatamodelingfromapplicationspecificqueries(L3) • Demonstrate Atomic Aggregates and de-normalization as data modeling techniquestooptimize queryprocessing(L2)

6	AM20APC502	1. Able to use lex and yacc tools for developing a scanner and a parser. 2. Able to design and implement LL and LR parsers.
7	AM20APC505	• Recognize the importance of verbal and non verbal skills • Develop the interpersonal and intrapersonal skills • Apply the knowledge in setting the SMART goals and achieve the set goals • Analyze difficult situations and solve the problems in stress-free environment • Create trust among people and develop employability skills

8	EG20ASC301	• At the end of the course, students will be able to • Understand historical background of the constitution making and its importance for • Building a democratic India. • Understand the functioning of three wings of the government ie., executive, legislative and judiciary. • Understand the value of the fundamental rights and duties for becoming good citizen of India. • Analyze the decentralization of power between central, state and local self-government • Apply the knowledge in strengthening of the constitutional institutions like CAG, • Election Commission and UPSC for sustaining democracy.

B. Tech III Year II Semester

S. No	Course No	
1	AM20APC601	• Understand and apply scaling up Hadoop techniques and associated technologies. (L2) • Explore the Anatomy of MapReduce. (L5) • Illustrate the Emergence of NoSQL.(L2) • Compare Hadoop and Spark(L4) • Explain the frameworks of Spark. (L2)

2	AM20APC603	• Learn the basics of learning problems with hypothesis and version spaces(L2) • Understand the features of machine learning to apply on real world problems(L1) • Understand how to evaluate models generated from data(L1) • Understand the Ensemble and clustering algorithms(L1) • Apply Clustering Techniques to real world problems (L3) • Understand how to evaluate models generated from data(L1)

3	AM20APC605	• Build NLP applications using Python. (L6) • Apply various Parsing techniques, Bayes Rule, Shannon game, Entropy and Cross Entropy. (L3) • Explain the fundamentals of CFG and parsers and mechanisms in ATN's. (L2) • Apply Semantic Interpretation and Language Modeling..(L3) • Interpret Machine Translation and multilingual Information Retrieval systems and Automatic Summarization.(L2)

4	AM20APE601 AM20APE602 AM20APE603	• Outline the procedure for Cloud deployment (L2) • Distinguish different cloud service models and deployment models (L4) • Compare different cloud services. (L5) • Design applications for an organization which use cloud environment. (L6) • know about the various steps which are related to computer and Software and their application in Food Industries • know about the various steps which are necessary to implement the programs in 'C' • Describe and determine the purpose and importance of project management from theperspectives of planning, tracking and completion of project. (L1) • Compare and differentiate organization structures and project structures. (L4) • Implement a project to manage project schedule, expenses and resources with theapplication of suitable project management tools. (L3) • Design software projects (L6)

5	ME20AOE501 EE20AOE503	1. Understand the basic concepts of Industrial automation 2. Design and analysis of automation methods, placing and assembling of various parts 3. Design of various processing and control circuits using pneumatic and hydraulic elements 4. Selection of sensors based on the industrial application 5. Role of robotics in industrial applications **CO1:** Explain the basic concepts of solar radiation and solar collectors **CO2:**Develop the Bio - Energy Concepts **CO3:** Explain the geothermal Energy ,Tidal and Wave Energy **CO4:** Apply the principles of electrical technology to develop MHD power generator & Utilize different wind parameters for design of rotor **CO5:** Make use of power curve for energy estimation and fuel cell Technology

S. No	Course No	
1	AM20APE701 AM20APE702 AM20APE703	• Understand the theoretical basis behind the standard models of IR. • Understand the Experimental evaluation of IR. • To be able to implement ,Text Representation. • To be able to implement Text Categorization. • To be Familiar with clustering algorithms. • Understand general concepts of Internet of Things. • Apply design concept to IOT solutions • AnalyzevariousM2MandIoTarchitectures • Evaluate design issues in IOT applications • Create IOT solutions using sensors, actuators and Devices

		• Create customized blockchain solutions (L6) • Make use of the specific mechanics of Ethereum(L3) • Experiment with Smart contracts (L3) • Develop Enterprise applications using Blockchain(L6)
2	AM20APE704 AM20APE705 AM20APE706	1. Present data with visual representations for the target audience, task, and data 2. Analyze, critique, and revise data visualizations 3. Apply appropriate design principles in the creation of presentations and visualizations • Gain the knowledge of the use and availability of tools to support an ethical hack • Gain the knowledge of interpreting the results of a controlled attack • Understand the role of politics, inherent and imposed limitations and metrics for planning of a test • Comprehend the dangers associated with penetration testing

		□ Adopt Extreme Programming(L1) Create own agile method by customizing XP to a particular situation (L6)
3	AM20APE707 AM20APE708 AM20APE709	• Illustrate Recurrent and Recursive Neural Networks(L2) • Apply Auto encoders and Deep Generative Models(L3) • Identify the appropriate design patterns to solve object oriented design problems(L1). • Develop design solutions using creational patterns(L3). • Apply structural patterns to solve design problems (L3). • Construct design solutions by using behavioral patterns(L4).

4	CE20AOE701 EE20AOE603 ME20AOE602 EC20AOE702	• Identify the major sources of air pollution • Understand their effects on health and environment. • Evaluate the dispersion of air pollutants in the atmosphere and to develop air quality models. • Choose and design control techniques for particulate and gaseous emissions. • Understand the noise pollution and control methods. **CO1:**Use optimization terminology and concepts, and understand how to classify an optimization problem. **CO2:**Apply optimization methods to engineering problems. **CO3:**Implement optimization algorithms. **CO4:**Compare different genetic algorithms. **CO5:**Solve multivariable optimization problems.

		CO1: Understand the selection procedure of Processors in the embedded domain. CO2: Explain different components of embedded system. CO3: Design Procedure for Embedded Firmware. CO4: Describe the role of Real time Operating Systems in Embedded Systems. CO5: Evaluate the Correlation between task synchronization and latency issues.
5	EE20AOE701 EC20AOE705 CE20AOE705 ME20AOE702	**CO1:** Understand fundamentals of digital image processing and apply engineering mathematics in processing of digital image. **CO2:** Compute the relationship between the pixels in image processing **CO3:** Analyze different image enhancement techniques in spatial domain. **CO4:** Describe various image spatial filters and Analyze different image enhancement techniques in frequency domain **CO5:** Analyze various techniques in image segmentation and apply various algorithms to perform image compression.

		• Understand business ethics and ethical practices in management. • Understand the role of ethics in management • Apply the knowledge in cross cultural ethics • Analyze law and ethics • Evaluate corporate governance
6	BA20AHS701 BA20AHS705	• Understand the concepts &principles of management and designs of organization in a practical world • Apply the knowledge of Work-study principles & Quality Control techniques in industry • Analyze the concepts of HR Min Recruitment, Selection and Training& Development. • Evaluate PERT/CPM Techniques for projects of an enterprise and estimate time &cost of project & to analyze the business through SWOT. • Create Modern technology in management science.

R23 Regulation

S. No	Course Code	
1	MA23ABS101	**CO 1:** Understanding the concepts of matrix algebra techniques to solve the system of linear equations. **CO 2:** Develop the use of matrix algebra techniques that is needed by engineers for practical applications. **CO 3:** Apply mean value theorems to solve real life problems in engineering. **CO 4:** Make use of partial differentiation to solve optimization problems. **CO 5:** Familiarize with double and triple integrals of functions of several variables in two dimensions using Cartesian and polar coordinates

		and in three dimensions using cylindrical and spherical coordinates.
2	CS23AES101	**CO 1:** Solve computational problems. **CO 2:** Select the features of C language appropriate for solving a problem. **CO 3:** Design computer programs for real world problems. **CO 4:** Organize the data which is more appropriated for solving a problem. Understanding the basic concept of structures and file handling
3	CH23ABS101	**CO 1:** Understand Schrodinger Wave equation, MOT, energy level diagrams Apply the knowledge of linear differential equations related to various engineering fields. **CO 2:** Apply the principle of Band

		diagrams in the application of conductors and semiconductors. **CO 3:** Compare the materials for construction of a battery and electrochemical sensors. **CO 4:** Explain the preparation, properties, and applications of thermoplastics & thermosetting & elastomers conducting polymers. **CO 5:** Explain the principles of spectrometry and separation of solid and liquid mixtures by chromatography
4	EE23AES101	**CO 1:** Apply the knowledge of theorems/laws to analyze the simple AC and DCcircuits. **CO 2:** Illustrate the operatingprinciplesofvariouselectricalmachines and electrical measuring equipment's. **CO 3:** Understand the basic concepts of electrical power generation, Electricity Bill and Safety

		Measures.
5	ME23AES102	**CO 1:** Apply the concept of science and mathematics to understand the working principles of electronic devices. **CO 2:** Analyze the working principle of a DC power supply system andAmplifiers. **CO 3:** Solve digital logic circuits and implement using different logic gates.
6	CS23AES102	**CO 1:** Draw various engineering curves, scales. **CO 2:** Draw and Interpret orthographic projections of points, lines, planes. **CO 3:** Draw the projection of solids in various positions. **CO 4:** Draw and Explorethe sections of solids and development of surfaces. **CO 5:** Draw an isometric and orthographic views of simple solids.

7	CH23ABS102	**CO 1:** Read, understand and trace the execution of programs written in C language. **CO 2:** Select the right control structure for solving the problem. **CO 3:** Develop C programs which utilize the memory efficiently using programming constructs like pointers. **CO 4:** Develop, Debug and Execute programs to demonstrate the applications of arrays, functions, basic concepts of pointers in C.
8	CS23AES103	**CO 1:** To verify Beer Lambert's law **CO 2:** To analyse the IR and NMR spectra of some organic compounds **CO 3:** To apply electro analytical techniques foe sample analysis. **CO 4:** To measure the

		strength of an acid present in the samples. **CO 5:** To prepare advanced polymer materials.
9	EE23AES102	**CO 1:** Perform Hardware troubleshooting. **CO 2:** Understand Hardware components and inter dependencies. **CO 3:** Safeguard computer systems from viruses/worms. **CO 4:** Document/ Presentation preparation. **CO 5:** Perform calculations using spreadsheets
10	CH23ABS106	**CO 1:** Understand the importance of discipline, character and service motto. **CO 2:** Solve some societal issues by applying acquired knowledge, facts, and techniques. **CO 3:** Explore human relationships by analyzing social problems. **CO 4:** Determine to extend their help for the

		fellow beings and downtrodden people. **CO 5:** Develop leadership skills and civic responsibilities

S. No	Course Code	
1	MA23ABS201	**CO 1:** Familiarize to solve the first and higher order differential equations. **CO 2:** Apply the knowledge of linear differential equations related to various engineering fields. **CO 3:** Identify solution methods for partial differential equations that model physical processes. **CO 4:** Interpret the physical meaning of different operators such as gradient, curl and divergence. **CO 5:** Evaluate the work done by force field, circulation and transformation between single, double and triple integrals using vector calculus.
2	CS23APC201	**CO 1:** Analyzetheproblem susingasymptoticn otations. **CO 2:** ApplyStack,Queues

		andlinked list tosolvedifferentapplications. **CO 3:** Demonstrate suitable sorting techniques for the real world problem. **CO 4:** Implement tree structures in different patterns of representation of data. **CO 5:** Analyze thegivenproblemusinggraphtraversaltechniques.
3	PH23ABS101	**CO 1:** Understand the intensity variation of light due to interference, diffraction and polarization. **CO 2:** Apply the basic concepts of crystal structures and X-ray diffraction tostudy the behavior of materials for engineering applications. **CO 3:** Summarizethe fundamental propertiesof dielectricandmagneticmaterials for engineering applications. **CO 4:** Analyze the properties of quantum particles to interpret the energy band formation and classification of solids **CO 5:** Assess the current flow mechanism to understand the

		transportphenomenon of charge carriers in semiconductors.
4	EG23AHS101	**CO 1:** Understand the context, topic, and pieces of specific information from socialor Transactional dialogues. **CO 2:** Apply grammatical structures to formulate and correct word forms. **CO 3:** Analyzediscoursemarkerstospeakclearlyonaspecifictopicininformaldiscussions. **CO 4:** Evaluatereading/listeningtextsandwritesummariesbasedonglobalcomprehensionofthesetexts. **CO 5:** Create a coherent paragraph, essay,and resume.
5	ME23AES101	**CO 1:** Understand various sub-divisions of Civil Engineering and to appreciate their role in ensuring better society and the basic characteristics of Construction Materials. **CO 2:** Gain knowledge regarding Structural and Geotechnical Engineering.

		CO 3: Explain the concepts of surveying and Transportation Engineering, Water Resources and Environmental Engineering.
6	ME23AES103	**CO 1:** Understand the different manufacturing processes. **CO 2:** Explain the basics of thermal engineering and its applications. **CO 3:** Describe the working of different mechanical power transmission systems and power plants and describe the basics of robotics and its applications.
7	CS23APC202	**CO 1:** Fabricate sheet metal components manually. **CO 2:** Construct wood joints such as half-lap, mortise, and tenon. **CO 3:** Assemble the components to create joints like a V-fit. **CO 4:** Demonstrate the plumbing, welding, foundry, and fitting jobs to form the components.

		CO 5: Connect &Check the basic house wiring circuit connections for various applications.
8	PH23ABS102	**CO 1:** Demonstrate the concept of Recursion for solving a problem. **CO 2:** Chooseandimplementlineardatastructuretosolveproblems. **CO 3:** Developprogramsforsearchingandsorting algorithms. **CO 4:** Selectandimplement suitablenonlineardatastructure forsolvingaproblem.
9	EG23AHS102	**CO1:** Compare the wavelengths of different colours using diffraction grating. **CO2:** Utilize optical instruments like travelling microscope and spectrometer. **CO3:** Analyze the intensity of the magnetic field of circular coil carryingcurrent with distance. **CO4:** Evaluate dielectric constant for a dielectric material. **CO5:** Estimate the band gap of a given semiconductor and the type of semiconductor using Hall effect.

10	CH23ABS105	**CO 1:** Understand the different aspects of the English language proficiency with anemphasis on LSRW skills. **CO 2:** Apply communication skills through various language learning activities. **CO 3:** Analyze the English speech sounds, stress, rhythm, intonation, and syllable division for better listening and speaking comprehension. **CO 4:** Evaluate and exhibit professionalism in participating in debates and group discussions. **CO 5:** Create effective Course Objectives.