JAWAHARLAL TECHNOLOGICAL UNIVERSITY, KAKINADA
KAKINADA-533003, ANDHRA PRADESH, INDIA
COURSE STRUCTURE AND SYLLABUS
For UG –R20

B. TECH - COMPUTER SCIENCE & ENGINEERING

COURSE STRUCTURE

I Year – I SEMESTER

S. No	Course Code	Courses	Course outcomes
1	HS	Communicative English	• understand social or transactional dialogues spoken by native speakers of English and identifythe context, topic, and pieces of specific information • ask and answer general questions on familiar topics and introduce oneself/others • employ suitable strategies for skimming and scanning to get the general idea of a text and locatespecific information • recognize paragraph structure and be able to match beginnings/endings/headings with paragraphs • form sentences using proper grammatical structures and correct word forms
2	BS	Mathematics - I (Calculus And Differential Equations)	• utilize mean value theorems to real life problems (L3) • solve the differential equations related to various engineering fields (L3) • familiarize with functions of several variables which is useful in optimization (L3) • apply double integration techniques in evaluating areas bounded by region (L3) • students will also learn important tools of calculus in higher dimensions. Students will becomefamiliar with 2- dimensional and 3- dimensional coordinate systems(L5)
3	BS	Applied Physics	• Explain the need of coherent sources and the conditions for sustained interference (L2). Identify the applications of interference in engineering (L3). Analyze the differences between interference and diffraction with applications (L4). Illustrate the concept of polarization of light and its applications (L2). Classify ordinary refracted light and extraordinary refracted rays by their states of

			polarization (L2) • Explain various types of emission of radiation (L2). Identify the role of laser in engineering applications (L3). Describe the construction and working principles of various types of lasers (L1). Explain the working principle of optical fibers (L2). Classify optical fibers based on refractive index profile and mode of propagation (L2). Identify the applications of optical fibers in medical, communication and other fields (L2). Apply the fiber optic concepts in various fields (L3). • Describe the dual nature of matter (L1). Explain the significance of wave function (L2). Identify the role of Schrodinger's time independent wave equation in studying particle in one- dimensional infinite potential well (L3). Identify the role of classical and quantum free electron theory in the study of electrical conductivity (L3). Classify the energy bands of solids (L2). • Explain the concept of dielectric constant and polarization in dielectric materials (L2). Summarize various types of polarization of dielectrics (L2). Interpret Lorentz field and Claussius-Mosotti relation in dielectrics (L2). Classify the magnetic materials based on susceptibility and their temperature dependence (L2). Explain the applications of dielectric and magnetic materials (L2). Apply the concept of magnetism to magnetic devices (L3) • Outline the properties of charge carriers in semiconductors (L2). Identify the type of semiconductor using Hall effect (L2). Identify applications of semiconductors in electronic devices (L2). Classify superconductors based on Meissner's effect (L2). Explain Meissner's effect, BCS theory & Josephson effect in superconductors (L2).
4	ES	Programming for Problem Solving using C	• To write algorithms and to draw flowcharts for solving problems • To convert flowcharts/algorithms to C Programs, compile and debug programs • To use different operators, data types and write programs that use two-way/ multi-way selection • To select the best loop construct for a given problem • To design and implement programs to analyze the

			different pointer applications • To decompose a problem into functions and to develop modular reusable code • To apply File I/O operations
5	ES	Computer Engineering Workshop	• Assemble and disassemble components of a PC • Construct a fully functional virtual machine, Summarize various Linux operating system commands, • Recognize characters & extract text from scanned images, Create audio files and podcasts
6	HS	English Communication Skills Laboratory	-----------
7	BS	Applied Physics Lab	-----------
8	ES	Programming for Problem Solving using C Lab	• Gains Knowledge on various concepts of a C language. • Able to draw flowcharts and write algorithms. • Able design and development of C problem solving skills. • Able to design and develop modular programming skills. Able to trace and debug a program

I Year – II SEMESTER

S. No	Course Code	Courses	Course outcomes
1	BS	Mathematics – II (Linear Algebra And Numerical Methods)	• develop the use of matrix algebra techniques that is needed by engineers for practical applications (L6) • solve system of linear algebraic equations using Gauss elimination, Gauss Jordan, Gauss Seidel (L3) • evaluate the approximate roots of polynomial and transcendental equations by different algorithms (L5) • apply Newton's forward & backward interpolation and Lagrange's formulae for equal andunequal intervals (L3) • apply numerical integral techniques to different Engineering problems (L3) • apply different algorithms for approximating the solutions of ordinary differential equations with initial conditions to its analytical

Principal
IDEAL INSTITUTE OF TECHNOLOGY
VIDYUTNAGAR, KAKINADA

			computations (L3)
2	BS	Applied Chemistry	• Analyze the different types of composite plastic materials and interpret the mechanism of conduction in conducting polymers. • Utilize the theory of construction of electrodes, batteries and fuel cells in redesigning new engineering products and categorize the reasons for corrosion and study methods to control corrosion • Synthesize nanomaterials for modern advances of engineering technology. • Summarize the preparation of semiconductors; analyze the applications of liquid crystals and superconductors. • Analyze the principles of different analytical instruments and their applications. • Design models for energy by different natural sources. • Obtain the knowledge of computational chemistry and molecular machines
3	ES	Computer Organization	• Demonstrate and understanding of the design of the functional units of a digital computer system. • Relate Postulates of Boolean algebra and minimize combinational functions • Recognize and manipulate representations of numbers stored in digital computers • Build the logic families and realization of logic gates. • Design and analyze combinational and sequential circuits • Recall the internal organization of computers, CPU, memory unit and Input/Outputs and the relations between its main components • Solve elementary problems by assembly language programming •
4	ES	Python Programming	• Develop essential programming skills in computer programming concepts like data types, containers • Apply the basics of programming in the Python language • Solve coding tasks related conditional execution, loops • Solve coding tasks related to the

Principal
IDEAL INSTITUTE OF TECHNOLOGY
VIDYUTNAGAR, KAKINADA

			fundamental notions and techniques used in object- oriented programming
5	ES	Data Structures	• Summarize the properties, interfaces, and behaviors of basic abstract data types • Discuss the computational efficiency of the principal algorithms for sorting & searching • Use arrays, records, linked structures, stacks, queues, trees, and Graphs in writing programs • Demonstrate different methods for traversing trees
6	BS	Applied Chemistry Lab	--------------
7	ES	Python Programming Lab	• Develop essential programming skills in computer programming concepts like datatypes, containers • Apply the basics of programming in the Python language • Solve coding tasks related conditional execution, loops • Solve coding tasks related to the fundamental notions and techniques used in object-oriented programming
8	ES	Data Structures Lab	• Use basic data structures such as arrays and linked list. • Use various searching and sorting algorithms.
9	MC	Environment Science	-------------

Principal
IDEAL INSTITUTE OF TECHNOLOGY
VIDYUTNAGAR, KAKINADA

II Year – I SEMESTER

S. No	Course Code	Courses	Course outcomes
1	BS	Mathematics III	• Interpret the physical meaning of different operators such as gradient, curl and divergence (L5) • Estimate the work done against a field, circulation and flux using vector calculus (L5) • Apply the Laplace transform for solving differential equations (L3) • Find or compute the Fourier series of periodic signals (L3) • Know and be able to apply integral expressions for the forwards and inverse Fourier transform to a range of non-periodic waveforms (L3) • Identify solution methods for partial differential equations that model physical processes (L3)
2	CS	Object Oriented Programming through C++	• Classify object oriented programming and procedural programming • Apply C++ features such as composition of objects, operator overloads, dynamicmemory allocation, inheritance and polymorphism, file I/O, exception handling • Build C++ classes using appropriate encapsulation and design principles • Apply object oriented or non-object oriented techniques to solve bigger computingproblems
3	CS	Operating Systems	• Describe various generations of Operating System and functions of Operating System • Describe the concept of program, process and thread and analyze various CPUScheduling Algorithms and compare their performance • Solve Inter Process Communication problems using Mathematical Equations byvarious methods • Compare various Memory Management Schemes especially paging and Segmentationin Operating System and apply various Page Replacement Techniques • Outline File Systems in Operating System like UNIX/Linux and Windows

Principal
INSTITUTE OF TECHNOLOGY
NAGAR, KAKINADA

4	CS	Software Engineering	• Ability to transform an Object-Oriented Design into high quality, executable code • Skills to design, implement, and execute test cases at the Unit and Integration level • Compare conventional and agile software methods
5	CS	Mathematical Foundations of Computer Science	• Demonstrate skills in solving mathematical problems • Comprehend mathematical principles and logic • Demonstrate knowledge of mathematical modeling and proficiency in using mathematical software • Manipulate and analyze data numerically and/or graphically using appropriateSoftware • Communicate effectively mathematical ideas/results verbally or in writing
6	CS	Object Oriented Programming through C++ Lab	• Apply the various OOPs concepts with the help of programs.
7	CS	Operating Systems Lab	• To use Unix utilities and perform basic shell control of the utilities • To use the Unix file system and file access control • To use of an operating system to develop software • Students will be able to use Linux environment efficiently • Solve problems using bash for shell scripting
8	CS	Software Engineering Lab	• By the end of this lab the student is able to elicit, analyze and specify software requirements through a productive working relationship with various stakeholders ofthe project • prepare SRS document, design document, test cases and software configuration management and risk management related document. • develop function oriented and object oriented software design using tools like rationalrose. • use modern engineering tools necessary for software project management,estimations,

Principal
IDEAL INSTITUTE OF TECHNOLOGY
VIDYUTNAGAR, KAKINADA

			time management and software reuse • generate test cases for software testing
9	SO	Skill oriented Course - I 1) Applications of Python - Num Py 2) Web Application Development Using FullStack - Frontend Development – Module -1	• Explain how data is collected, managed and stored for processing • Understand the workings of various numerical techniques, different descriptive measures of Statistics, correlation and regression to solve the engineering problems • Understand how to apply some linear algebra operations to n-dimensional arrays • Use NumPy perform common data wrangling and computational tasks in Python.
10	MC	Constitution of India	• Understand historical background of the constitution making and its importance forbuilding 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 citizenof 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. 1. Know the sources, features and principles of Indian Constitution. 2. Learn about Union Government, State government and its administration. 3. Get acquainted with Local administration and Pachayati Raj. 4. Be aware of basic concepts and developments of Human Rights. 5. Gain knowledge on roles and functioning of Election Commission

Principal
IDEAL INSTITUTE OF TECHNOLOGY
VIDYUTNAGAR, KAKINADA

II Year – II SEMESTER

S. No	Course Code	Courses	Course outcomes
1	BS	Probability and Statistics	• Classify the concepts of data science and its importance (L4) or (L2) • Interpret the association of characteristics and through correlation and regression tools(L4) • Make use of the concepts of probability and their applications (L3) • Apply discrete and continuous probability distributions (L3) • Design the components of a classical hypothesis test (L6) • Infer the statistical inferential methods based on small and large sampling tests (L4)
2	CS	Database Management Systems	• Describe a relational database and object-oriented database • Create, maintain and manipulate a relational database using SQL • Describe ER model and normalization for database design • Examine issues in data storage and query processing and can formulate appropriate solutions • Outline the role and issues in management of data such as efficiency, privacy, security, ethical responsibility, and strategic advantage
3	CS	Formal Languages and Automata Theory	• Classify machines by their power to recognize languages. • Summarize language classes & grammars relationship among them with the help ofChomsky hierarchy • Employ finite state machines to solve problems in computing • Illustrate deterministic and non-deterministic machines • Quote the hierarchy of problems arising in the computer science
4	ES	Java Programming	• Able to realize the concept of Object Oriented Programming & Java ProgrammingConstructs • Able to describe the basic concepts of Java such as operators, classes, objects, inheritance, packages, Enumeration and

Principal
IDEAL INSTITUTE OF TECHNOLOGY
VIDYUTNAGAR, KAKINADA

			various keywords • Apply the concept of exception handling and Input/ Output operations • Able to design the applications of Java & Java applet • Able to Analyze & Design the concept of Event Handling and Abstract WindowToolkit
5	HS	Managerial Economics and Financial Accountancy	• The Learner is equipped with the knowledge of estimating the Demand and demand elasticities for a product • The knowledge of understanding of the Input-Output-Cost relationships and estimation of the least cost combination of inputs • The pupil is also ready to understand the nature of different markets and Price Output determination under various market conditions and also to have the knowledge of different Business Units • The Learner is able to prepare Financial Statements and the usage of various Accounting tools for Analysis • The Learner can able to evaluate various investment project proposals with the help of capital budgeting techniques for decision making
6	CS	Database Management Systems Lab	• Utilize SQL to execute queries for creating database and performing data manipulation operations • Examine integrity constraints to build efficient databases • Apply Queries using Advanced Concepts of SQL • Build PL/SQL programs including stored procedures, functions, cursors and triggers
7	CS	R Programming Lab	• Access online resources for R and import new function packages into the R workspace • Import, review, manipulate and summarize data-sets in R • Explore data-sets to create testable hypotheses and identify appropriate statistical tests • Perform appropriate statistical tests using R Create and edit visualizations with R

Principal
IDEAL INSTITUTE OF TECHNOLOGY
VIDYUTNAGAR, KAKINADA

8	ES	Java Programming Lab	
9	SO	**Skill Oriented Course - II** 1) Applications of Python-Pandas **OR** 2) Web Application Development Using Full Stack -Frontend Development – Module-II	• Use Pandas to create and manipulate data structures like Series and DataFrames. • Work with arrays, queries, and dataframes • Query DataFrame structures for cleaning and processing and manipulating files Understand best practices for creating basic charts
10	Minor	Operating Systems[$]	-----------
11	Honors	Any course from the Pool, as per the opted track	----------

Principal
IDEAL INSTITUTE OF TECHNOLOGY
VIDYUTNAGAR, KAKINADA

III Year – I SEMESTER

S.No	Course Code	Courses	Course outcomes
1	PC	Computer Networks	• Demonstrate different network models for networking links OSI, TCP/IP, B-ISDN, N-BISDN and getknowledge about various communication techniques, methods and protocol standards. • Discuss different transmission media and different switching networks. • Analyze data link layer services, functions and protocols like HDLC and PPP. • Compare and Classify medium access control protocols like ALOHA, CSMA, CSMA/CD, CSMA/CA, Polling, Token passing, FDMA, TDMA, CDMA protocols • Determine application layer services and client server protocols working with the client server paradigms like WWW, HTTP, FTP, e-mail and SNMP etc.
2	PC	Design and Analysis of Algorithms	• Analyze the performance of a given algorithm, denote its time complexity using the asymptotic notation for recursive and non-recursive algorithms • List and describe various algorithmic approaches and Solve problems using divide and conquer &greedy Method • Synthesize efficient algorithms dynamic programming approaches to solve in common engineering design situations. • Organize important algorithmic design paradigms and methods of analysis: backtracking, branchand bound algorithmic approaches • Demonstrate NP- Completeness theory , lower bound theory and String Matching
3	PC	Data Warehousing and Data Mining	• Illustrate the importance of Data Warehousing, Data Mining and its functionalities and Design schema for real time data warehousing applications. • Demonstrate on various Data Preprocessing Techniques viz. data cleaning, data integration, data transformation and data reduction and Process raw data to make it suitable for various data mining algorithms. • Choose appropriate classification technique to perform classification, model building and evaluation. • Make use of association rule mining techniques viz. Apriori and FP Growth algorithms and analyze on frequent itemsets generation. • Identify and apply various clustering algorithm.

Principal
INSTITUTE OF TECHNOLOGY
VIDYUTNAGAR, KAKINADA

			(with open source tools), interpret, evaluate and report the result.
4	Open Elective/ Job Oriented	**Open Elective-I** Open Electives offered by other departments/Optimization in Operations Research (Job oriented course)	
5	PE	**Professional Elective-I** 1. Artificial Intelligence 2. Software Project Management 3. Distributed Systems 4. Advanced Unix Programming	• Understand the fundamental concepts in Artificial Intelligence • Analyze the applications of search strategies and problem reductions • Apply the mathematical logic concepts. • Develop the Knowledge representations in Artificial Intelligence. Explain the Fuzzy logic systems
6	PC	Data Warehousing and Data Mining Lab	• Design a data mart or data warehouse for any organization • Extract knowledge using data mining techniques and enlist various algorithms used in information analysis of Data Mining Techniques • Demonstrate the working of algorithms for data mining tasks such as association rule mining,classification for realistic data • Implement and Analyze on knowledge flow application on data sets and Apply the suitable visualization techniques to output analytical results
7	PC	Computer Networks Lab	• Know how reliable data communication is achieved through data link layer. • Suggest appropriate routing algorithm for the network. • Provide internet connection to the system and its installation. • Work on various network management tools
8	SO	**Skill Oriented Course - III** 1. Animation course: Animation Design 2.Continuous Integration and Continuous Delivery using Dev Ops	• learn various tools of digital 2-D animation • understand production pipeline to create 2-D animation. • apply the tools to create 2D animation for films and videos • understand different styles and treatment of content in 3D model creation • apply tools to create effective 3D modelling texturing and lighting

Principal
IDEAL INSTITUTE OF TECHNOLOGY
VIDYUTNAGAR, KAKINADA

9	MC	Employability Skills-I	• Understand the corporate etiquette. • Make presentations effectively with appropriate body language • Be composed with positive attitude • Understand the core competencies to succeed in professional and personal life
10	PR	**Summer Internship 2 Months (Mandatory) after second year (to be evaluated during V semester**	-----------
11	Minor	Database Management Systems[5]	• Describe a relational database and object-oriented database • Create, maintain and manipulate a relational database using SQL • Describe ER model and normalization for database design • Examine issues in data storage and query processing and can formulate appropriate solutions • Outline the role and issues in management of data such as efficiency, privacy, security,ethical responsibility, and strategic advantage • Examine integrity constraints to build efficient databases • Apply Queries using Advanced Concepts of SQL • Build PL/SQL programs including stored procedures, functions, cursors and triggers
12	Honors	Any course from the Pool, as per the opted track	-------------

Principal
IDEAL INSTITUTE OF TECHNOLOGY
VIDYUTNAGAR, KAKINADA

III Year – II SEMESTER

S.No	CourseCode	Courses	Course outcomes
1	PC	Machine Learning	• Explain the fundamental usage of the concept Machine Learning system • Demonstrate on various regression Technique • Analyze the Ensemble Learning Methods • Illustrate the Clustering Techniques and Dimensionality Reduction Models in Machine Learning. • Discuss the Neural Network Models and Fundamentals concepts of Deep Learning
2	PC	Compiler Design	• Demonstrate phases in the design of compiler • Organize Syntax Analysis, Top Down and LL(1) grammars • Design Bottom Up Parsing and Construction of LR parsers • Analyze synthesized, inherited attributes and syntax directed translation schemes • Determine algorithms to generate code for a target machine
3	PC	Cryptography and Network Security	• Explain different security threats and countermeasures and foundation course of cryptography mathematics. • Classify the basic principles of symmetric key algorithms and operations of some symmetric key algorithms and asymmetric key cryptography • Revise the basic principles of Public key algorithms and Working operations of some Asymmetric key algorithms such as RSA, ECC and some more • Design applications of hash algorithms, digital signatures and key management techniques • Determine the knowledge of Application layer, Transport layer and Network layer security Protocols such as PGP, S/MIME, SSL,TSL, and IPsec .
4	PE	**Professional Elective-II** 1. Mobile Computing 2. Big Data Analytics 3. Object Oriented Analysis and Design 4. Network Programming	• Develop a strong grounding in the fundamentals of mobile Networks • Apply knowledge in MAC, Network, and Transport Layer protocols of Wireless Network • Comprehend, design, and develop a lightweight network stack • Analyze the Mobile Network Layer system working • Explain about the WAP Model

Principal
IDEAL INSTITUTE OF TECHNOLOGY
VIDYUTNAGAR, KAKINADA

5	Open Elective /Job Oriented	**Open Elective-II** Open Electives offered by other departments/ MEAN Stack Development (Job Oriented Course)	---------------
6	PC	Machine Learning using Python Lab	• Implement procedures for the machine learning algorithms • Design and Develop Python programs for various Learning algorithms • Apply appropriate data sets to the Machine Learning algorithms
7	PC	Compiler Design Lab	• Design simple lexical analyzers • Determine predictive parsing table for a CFG • Apply Lex and Yacc tools • Examine LR parser and generating SLR Parsing table • Relate Intermediate code generation for subset C language
8	PC	Cryptography and Network Security Lab	• Apply the knowledge of symmetric cryptography to implement encryption and decryption using Ceaser Cipher, Substitution Cipher, Hill Cipher • Demonstrate the different algorithms like DES, BlowFish, and Rijndael, encrypt the text "Hello world" using Blowfish Algorithm. • Analyze and implement public key algorithms like RSA, Diffie-Hellman Key Exchange mechanism, the message digest of a text using the SHA-1 algorithm
9	SO	**Skill Oriented Course - IV** • Big Data:Spark • MEAN Stack Technologies-Module I- MongoDB, Express.js, Angular JS Node.js and AJAX	• Develop MapReduce Programs to analyze large dataset Using Hadoop and Spark • Write Hive queries to analyze large dataset Outline the Spark Ecosystem and its components • Perform the filter, count, distinct, map, flatMap RDD Operations in Spark. • Build Queries using Spark SQL • Apply Spark joins on Sample Data Sets • Make use of sqoop to import and export data from hadoop to database and vice-versa
10	MC	Employability skills-II	• Solve various Basic Mathematics problems by following different methods • Follow strategies in minimizing time consumption in problem solving Apply shortcut methods to solve problems • Confidently solve any mathematical problems and utilize these mathematical skills both in their

Principal
IDEAL INSTITUTE OF TECHNOLOGY
VIDYUTNAGAR, KAKINADA

			professional as well as personal life. • Analyze, summarize and present information in quantitative forms including table, graphs and formulas
11	Minor	Data Structures and Algorithms$	• Use basic data structures such as arrays and linked list. • Programs to demonstrate fundamental algorithmic problems including Tree Traversals, Graph traversals, and shortest paths. • Use various searching and sorting algorithms.
12	Honors	Any course from the Pool, as per the opted track	----------------
Minor course through SWAYAM			

T.S.

Principal

IDEAL INSTITUTE OF TECHNOLOGY

VIDYUTNAGAR, KAKINADA

IV B. Tech –I Semester

S.No	Course Code	Course Title	Course outcomes
1	PE	**Professional Elective-III** • Cloud Computing • Neural Networks and Soft Computing • Ad-hoc and Sensor Networks • Cyber Security & Forensics	• Illustrate the key dimensions of the challenge of Cloud Computing • Classify the Levels of Virtualization and mechanism of tools. • Analyze Cloud infrastructure including Google Cloud and Amazon Cloud. • Create Combinatorial Auctions for cloud resource and design scheduling algorithms for computingcloud • Assess control storage systems and cloud security, the risks involved its impact and develop cloudapplication
2	PE	**Professional Elective-IV** • Deep Learning Techniques • Social Networks & Semantic Web • Computer Vision • MOOCS-NPTEL/SWAYAM	• Demonstrate the fundamental concepts learning techniques of Artificial Intelligence, MachineLearning and Deep Learning. • Discuss the Neural Network training, various random models. • Explain the Techniques of Keras, TensorFlow, Theano and CNTK • Classify the Concepts of CNN and RNN • Implement Interactive Applications of Deep Learning.
3	PE	**Professional Elective-V** 1. Block-Chain Technologies 2. Wireless Network Security 3. Ethical Hacking 4. MOOCS-NPTEL/SWAYAM	• Demonstrate the block chain basics, Crypto currency • To compare and contrast the use of different private vs. public block chain and use cases • Design an innovative Bit coin Block chain and scripts, Block chain Science on varies coins • Classify Permission Block chain and use cases – Hyper ledger, Corda • Make Use of Block-chain in E-Governance, Land Registration, Medical Information Systems andothers
4	Open Elective /Job Oriented	**Open Elective-III** Open Electives offered by other departments/ API and Microservices (Job Oriented Course)	----------------

Principal
IDEAL INSTITUTE OF TECHNOLOGY
VIDYUTNAGAR, KAKINADA

5	Open Elective /Job Oriented	**Open Elective-IV** Open Electives offered by other departments/ Secure Coding Techniques (Job Oriented Course)	------------------
6	HS	Universal Human Values 2: Understanding Harmony	------------------
7	SO	1. PYTHON: Deep Learning /APSSDC offered Courses 2. MEAN Stack Technologies- Module II- MongoDB, Express.js, Angular JS Node.js, and AJAX	• Demonstrate the basic concepts fundamental learning techniques and layers. • Discuss the Neural Network training, various random models. • Apply various optimization algorithms to comprehend different activation • functions to understand hyper parameter tuning • Build a convolutional neural network, and understand its application to build a • recurrent neural network, and understand its usage to comprehend auto encoders to briefly explaintransfer learning
8	PR	**Industrial/Research Internship 2 months (Mandatory) after third year (to be evaluated during VII semester**	------------------
9	Minor	Software Engineering[5] / any other from PART-B (For Minor)	• Ability to transform an Object-Oriented Design into high quality, executable code • Skills to design, implement, and execute test cases at the Unit and Integration level • Compare conventional and agile software methods • Prepare SRS document, design document, test cases and software configuration management andrisk management related document. • Develop function oriented and object oriented software design using tools like rational rose. • Use modern engineering tools necessary for software project management, estimations, time management and software reuse • Generate test cases for software testing

Principal
IDEAL INSTITUTE OF TECHNOLOGY
VIDYUTNAGAR, KAKINADA

10	Honors	Any course from the Pool, as per the opted track	------------------
Minor course through SWAYAM			-

T. Sh
Principal
IDEAL INSTITUTE OF TECHNOLOGY
VIDYUTNAGAR, KAKINADA

IV B. Tech –II Semester

S.No	Course Code	Course Title	Course outcomes
1	Project	Major Project Work, Seminar Internship	-----------

T. S.
Principal
IDEAL INSTITUTE OF TECHNOLOGY
VIDYUTNAGAR, KAKINADA

Suggested Courses for Honors Program

POOL1- AI & ML 1. Mathematics for Machine Learning 2. Text Mining and Time Series Analysis 3. Natural Language Processing 4. Reinforcement Learning	**POOL2- Systems Engineering** 1. Data Communications and Information Coding Theory 2. Internet of Things 3. Service Oriented Architectures 4. Design of Secure Protocols 5. Network Coding
POOL3- Information Security 1. Computational Number Theory 2. Cryptanalysis 3. Elliptic Curve Cryptography 4. Introduction to Quantum Computing and Quantum Cryptography 5. Public Key Infrastructure and Trust Management 6. Information Security Analysis and Audit Principles of Cyber Security Cloud and IoT Security Web Security Block Chain Architecture Design and Use Cases	**POOL4 – Data Science** 1. Statistical Foundations for Data Science 2. Mining Massive Data Sets 3. Data Visualization 4. Medical Image Data Processing

Principal
IDEAL INSTITUTE OF TECHNOLOGY
VIDYUTNAGAR, KAKINADA

Suggested Courses for MINOR Engineering in CSE

Note:

1. Any THREE courses *(Any FOUR courses in case of MOOCS)* need to be studied from PART-A.
2. Any ONE course (*If it is in Regular Mode*) need to be studied from PART-B.
3. TWO, NPTEL courses of EIGHT week duration covering a total of 4 credits (offered by the department of CSE only), Student can register at any time after the completion of II B.Tech. I Sem.
4. Students can pursue suggested MOOC Courses via NPTEL from II B.Tech II Sem and onwards, by prior information to the concern.
5. **If sufficient numbers of students are not opted, as per the guidelines, dept can suggest students to pursue under MOOCS. In this case, department/students can select course such that there will not be any duplication.**

Eligibility for Minor in CSE:

PART A						
Regular Mode				**MOOCS***		
S.No	**Subject**	**L-T-P**	**Credits**	**Course available in NPTEL**	**NPTEL Link**	**Credits**
1	Operating Systems	3-0-2	4	Operating Systems	https://onlinecourses.swayam2.ac.in/cec21_cs20/preview	As recommended by the NPTEL (Dept need to verify the credits and suggest)
2	Data Structures and Algorithms	3-0-2	4	Data Structure and algorithms using Java	https://nptel.ac.in/courses/106105225	
3	Software Engineering	3-0-2	4	Software Engineering	https://onlinecourses.swayam2.ac.in/cec21_cs21/preview	
4	Computer Networks	3-0-2	4	Computer Networks	https://onlinecourses.swayam2.ac.in/cec22_cs05/preview	
5	Database Management Systems	3-0-2	4	Data Base Management System	https://onlinecourses.nptel.ac.in/noc22_cs51/preview	

* If sufficient number of students are not available to offer, can pursue under MOOCS

Principal
IDEAL INSTITUTE OF TECHNOLOGY
VIDYUTNAGAR, KAKINADA

PART B						
S.No	**Subject**	**L-T-P**	**Credits**	**Course available in NPTEL**	**NPTEL Link**	**Credits**
1	Computational Thinking	4-0-0	4			As recommended by the NPTEL (Dept need to verify the credits and suggest)
2	Object Oriented Programming through JAVA	3-0-2	4	Programming in JAVA	https://nptel.ac.in/courses/106105191	
3	Data Analytics using Python	3-0-2	4	Data Analytics with Python	https://nptel.ac.in/courses/106107220	
4	Artificial Intelligence	4-0-0	4	Artificial Intelligence: Knowledge Representation And Reasoning	https://nptel.ac.in/courses/106106140	
				OR		
				An Introduction to Artificial Intelligence	https://onlinecourses.nptel.ac.in/noc22_cs56/preview	
5	Unix and Shell Programming	3-0-2	4			
6	Cloud Computing	4-0-0	4	Cloud computing	https://onlinecourses.nptel.ac.in/noc22_cs20/preview	
				OR		
				Cloud Computing and Distributed Systems (TWO Credits)	https://onlinecourses.nptel.ac.in/noc21_cs15/preview	
* If sufficient number of students are not available to offer, can pursue under MOOCS						

T.S

Principal

INSTITUTE OF TECHNOLOGY

UTNAGAR, KAKINADA

Open Electives to be offered by CSE for other Branches:

Open Elective-I:	Open Elective-II:
1. Data Structures 2. Object Oriented Programming through JAVA 3. Data Base Management Systems 4. Computer Graphics 5. Advanced UNIX Programming 6. Computer Organization and Architecture 7. Operating Systems	1. Python Programming 2. Web Technologies 3. Soft Computing 4. Distributed Computing 5. AI and ML for Robotics 6. Computer Networks 7. Big Data Analytics 8. Computational Tools
Open Elective-III: 1. AI Tools & Techniques 2. Image Processing 3. Information Security 4. Mobile Application Development 5. Data Science 6. Cyber Security 7. Introduction to Internet of Things	**Open Elective-IV:** 1. MEAN Stack Technologies 2. Deep Learning Techniques 3. Cloud computing with AWS 4. Block Chain Technologies 5. Cryptography & Network Security 6. Introduction to Machine Learning 7. Machine Learning with Python

Principal
IDEAL INSTITUTE OF TECHNOLOGY
VIDYUTNAGAR, KAKINADA

CSE- ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

I Year – I SEMESTER			
S. No	**Course Code**	**Courses**	**Course outcomes**
1	HS1101	Communicative English	• understand social or transactional dialogues spoken by native speakers of English and identify the context, topic, and pieces of specific information • ask and answer general questions on familiar topics and introduce oneself/others • employ suitable strategies for skimming and scanning to get the general idea of a text and locate specific information • recognize paragraph structure and be able to match beginnings/endings/headings with paragraphs • form sentences using proper grammatical structures and correct word forms
2	BS1101	Mathematics – I	• utilize mean value theorems to real life problems (L3) • solve the differential equations related to various engineering fields (L3) • familiarize with functions of several variables which is useful in optimization (L3) • apply double integration techniques in evaluating areas bounded by region (L3) • students will also learn important tools of calculus in higher dimensions. Students will become familiar with 2-dimensional and 3-dimensional coordinate systems(L5)
3	BS1102	Applied Chemistry	----------------------
4	ES1101	Programming for Problem Solving using C	• To write algorithms and to draw flowcharts for solving problems • To convert flowcharts/algorithms to C Programs, compile and debug programs • To use different operators, data types and write programs that use two-way/ multi-way selection • To select the best loop construct for a given problem • To design and implement programs to analyze the different pointer applications • To decompose a problem into functions and to develop modular reusable code • To apply File I/O operations
5	ES1102	Computer Engineering Workshop	• Assemble and disassemble components of a PC • Construct a fully functional virtual machine, Summarize various Linux operating system commands, • Recognize characters & extract text from scanned images, Create audio files and podcasts
6	HS1102	English Communication	

Principal
IDEAL INSTITUTE OF TECHNOLOGY
Vidyutnagar, KAKINADA

		Skills Laboratory	-------------------
7	BS1103	Applied Chemistry Lab	--------------------
8	ES1103	Programming for Problem Solving using C Lab	• Gains Knowledge on various concepts of a C language. • Able to draw flowcharts and write algorithms. • Able design and development of C problem solving skills. • Able to design and develop modular programming skills. • Able to trace and debug a program
9	MC1101	Environmental Science*	--------------------

I Year – II SEMESTER			
S. No	**Course Code**	**Courses**	**Course outcomes**
1	BS1201	Mathematics – II	• develop the use of matrix algebra techniques that is needed by engineers for practical applications (L6) • solve system of linear algebraic equations using Gauss elimination, Gauss Jordan, Gauss Seidel (L3) • evaluate the approximate roots of polynomial and transcendental equations by different algorithms (L5) • apply Newton's forward & backward interpolation and Lagrange's formulae for equal and unequal intervals (L3) • apply numerical integral techniques to different Engineering problems (L3) • apply different algorithms for approximating the solutions of ordinary differential equations with initial conditions to its analytical computations (L3)
2	BS1202	Applied Physics	• Explain the need of coherent sources and the conditions for sustained interference (L2). Identify the applications of interference in engineering (L3). Analyze the differences between interference and diffraction with applications (L4). Illustrate the concept of polarization of light and its applications (L2). Classify ordinary refracted light and extraordinary refracted rays by their states of polarization (L2) • Explain various types of emission of radiation (L2). Identify the role of laser in engineering applications (L3). Describe the construction and working principles of various types of lasers (L1). Explain the working principle of optical fibers (L2). Classify optical fibers based on refractive index profile and mode of propagation (L2). Identify the applications of optical fibers in medical,

			communication and other fields (L2). Apply the fiber optic concepts in various fields (L3). • Describe the dual nature of matter (L1). Explain the significance of wave function (L2). Identify the role of Schrodinger's time independent wave equation in studying particle in one-dimensional infinite potential well (L3). Identify the role of classical and quantum free electron theory in the study of electrical conductivity (L3). Classify the energy bands of solids (L2). • Explain the concept of dielectric constant and polarization in dielectric materials (L2). Summarize various types of polarization of dielectrics (L2). Interpret Lorentz field and Claussius-Mosotti relation in dielectrics (L2). Classify the magnetic materials based on susceptibility and their temperature dependence (L2). Explain the applications of dielectric and magnetic materials (L2). Apply the concept of magnetism to magnetic devices (L3)
3	ES1201	Digital Logic Design	• An ability to define different number systems, binary addition and subtraction, 2's complement representation and operations with this representation. • An ability to understand the different switching algebra theorems and apply them for logic functions. • An ability to define the Karnaugh map for a few variables and perform an algorithmic reduction of logic functions. • Students will be able to design various logic gates starting from simple ordinary gates to complex programmable logic devices & arrays. • Students will be able to design various sequential circuits starting from flip-flop to registers and counters
4	ES1202	Python Programming	• Develop essential programming skills in computer programming concepts like data types, containers • Apply the basics of programming in the Python language • Solve coding tasks related conditional execution, loops • Solve coding tasks related to the fundamental notions and techniques used in object- oriented programming
5	CS1201	Data Structures	• summarize the properties, interfaces, and behaviors of basic

IDEAL INSTITUTE OF TECHNOLOGY
Vidyut Nagar, KAKINADA

			abstract data types • Discuss the computational efficiency of the principal algorithms for sorting & searching • Use arrays, records, linked structures, stacks, queues, trees, and Graphs in writing programs • Demonstrate different methods for traversing trees
6	BS1203	Applied Physics Lab	--------------------
7	ES1203	Python Programming Lab	• Write, Test and Debug Python Programs • Use Conditionals and Loops for Python Programs • Use functions and represent Compound data using Lists, Tuples and Dictionaries • Use various applications using python
8	CS1202	Data Structures Lab	• Use basic data structures such as arrays and linked list. • Programs to demonstrate fundamental algorithmic problems including Tree Traversals, Graph traversals, and shortest paths. • Use various searching and sorting algorithms.
9	MC1201	Constitution of India *	• 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. 1. Know the sources, features and principles of Indian Constitution. 2. Learn about Union Government, State government and its administration. 3. Get acquainted with Local administration and Pachayati Raj. 4. Be aware of basic concepts and developments of Human Rights. 5. Gain knowledge on roles and functioning of Election Commission

Principal
IDEAL INSTITUTE OF TECHNOLOGY
Vidyutnagar, KAKINADA

II Year – I SEMESTER			
S. No	**Course Code**	**Courses**	**Course outcomes**
1	BS	Mathematics III	• Interpret the physical meaning of different operators such as gradient, curl and divergence (L5) • Estimate the work done against a field, circulation and flux using vector calculus (L5) • Apply the Laplace transform for solving differential equations (L3) • Find or compute the Fourier series of periodic signals (L3) • Know and be able to apply integral expressions for the forwards and inverse Fourier transform to a range of non-periodic waveforms (L3) • Identify solution methods for partial differential equations that model physical processes (L3)
2	CS	Mathematical Foundations of Computer Science	• Demonstrate skills in solving mathematical problems • Comprehend mathematical principles and logic • Demonstrate knowledge of mathematical modeling and proficiency in using mathematical software • Manipulate and analyze data numerically and/or graphically using appropriate Software • Communicate effectively mathematical ideas/results verbally or in writing
3	CS	Introduction to Artificial Intelligence and Machine Learning	• Enumerate the history and foundations of Artificial Intelligence • Apply the basic principles of AI in problem solving • Choose the appropriate representation of Knowledge • Enumerate the Perspectives and Issues in Machine Learning • Identify issues in Decision Tree Learning
4	CS	Object Oriented Programming with Java	• Able to realize the concept of Object Oriented Programming & Java Programming Constructs • Able to describe the basic concepts of Java such as operators, classes, objects, inheritance, packages, Enumeration and various keywords • Apply the concept of exception handling and Input/ Output operations • Able to design the applications of Java & Java applet • Able to Analyze & Design the concept of Event Handling and Abstract Window Toolkit
5	CS	Database	• Describe a relational database and object-oriented

		Management Systems	database • Create, maintain and manipulate a relational database using SQL • Describe ER model and normalization for database design • Examine issues in data storage and query processing and can formulate appropriate solutions • Outline the role and issues in management of data such as efficiency, privacy, security, ethical responsibility, and strategic advantage
6	CS	Introduction to Artificial Intelligence and Machine Learning Lab	• Apply the basic principles of AI in problem solving using LISP/PROLOG • Implement different algorithms using LISP/PROLOG • Develop an Expert System using JESS/PROLOG
7	CS	Object Oriented Programming with Java Lab	• Evaluate default value of all primitive data type, Operations, Expressions, Control-flow, Strings • Determine Class, Objects, Methods, Inheritance, Exception, Runtime Polymorphism, User defined Exception handling mechanism • Illustrating simple inheritance, multi-level inheritance, Exception handling mechanism • Construct Threads, Event Handling, implement packages, developing applets
8	CS	Database Management Systems Lab	• Utilize SQL to execute queries for creating database and performing data manipulation operations • Examine integrity constraints to build efficient databases • Apply Queries using Advanced Concepts of SQL • Build PL/SQL programs including stored procedures, functions, cursors and triggers
9	SO	Mobile App Development	• Identify various concepts of mobile programming that make it unique from programming for other platforms • Critique mobile applications on their design pros and cons • Utilize rapid prototyping techniques to design and develop sophisticated mobile interfaces, • Program mobile applications for the Android operating system that use basic and advanced phone features and Deploy applications to the Android marketplace for distribution
10	MC	Essence of Indian Traditional Knowledge	• Understand the significance of Indian Traditional Knowledge • Classify the Indian Traditional Knowledge • Compare Modern Science with Indian Traditional Knowledge system. • Analyze the role of Government in protecting the

			Traditional Knowledge • Understand the impact of Philosophical tradition on Indian Knowledge System.

II Year – II SEMESTER			
S. No	**Course Code**	**Courses**	**Course outcomes**
1	BS	Probability and Statistics	• Classify the concepts of data science and its importance • Interpret the association of characteristics and through correlation and regression tools • Make use of the concepts of probability and their applications • Apply discrete and continuous probability distributions • Design the components of a classical hypothesis test • Infer the statistical inferential methods based on small and large sampling tests
2	CS	Computer Organization	• Develop a detailed understanding of computer systems • Cite different number systems, binary addition and subtraction, standard, floating-point, and micro operations • Develop a detailed understanding of architecture and functionality of central processing unit • Exemplify in a better way the I/O and memory organization • Illustrate concepts of parallel processing, pipelining and inter processor communication
3	CS	Data Warehousing and Mining	• Summarize the architecture of data warehouse • Apply different preprocessing methods, Similarity, Dissimilarity measures for any given raw data. • Construct a decision tree and resolve the problem of model overfitting • Compare Apriori and FP-growth association rule mining algorithms for frequent itemset generation • Apply suitable clustering algorithm for the given data set
4	ES	Formal Languages and Automata Theory	• Classify machines by their power to recognize languages. • Summarize language classes & grammars relationship among them with the help of Chomsky hierarchy

Principal
IDEAL INSTITUTE OF TECHNOLOGY
Vidyutnagar, KAKINADA.

			• Employ finite state machines to solve problems in computing • Illustrate deterministic and non-deterministic machines • Quote the hierarchy of problems arising in the computer science
5	HS	Managerial Economics and Financial Accountancy	• The Learner is equipped with the knowledge of estimating the Demand and demand elasticities for a product • The knowledge of understanding of the Input-Output-Cost relationships and estimation of the least cost combination of inputs • The pupil is also ready to understand the nature of different markets and Price Output determination under various market conditions and also to have the knowledge of different Business Units • The Learner is able to prepare Financial Statements and the usage of various Accounting tools for Analysis • The Learner can able to evaluate various investment project proposals with the help of capital budgeting techniques for decision making
6	CS	R Programming Lab	• Implement basic concepts of R programming, and its different module that includes conditional, looping, lists, Strings, Functions, Frames, Arrays, and File programming. • Implement the concepts of R Script to extract the data from data frames and file operations. • Implement the various statistical techniques using R. • Extend the functionality of R by using add-on packages • Use R Graphics and Tables to visualize results of various statistical operations on data
7	CS	Data Mining using Python Lab	• Apply preprocessing techniques on real world datasets • Apply apriori algorithm to generate frequent itemsets. • Apply Classification and clustering algorithms on different datasets.
8	ES	Web Application Development Lab	• Develop Single Page Applications • Develop NodeJS & ReactJS Reusable Service • Store the data in MySQL • Get acquainted with the latest web application development trends in the IT industry
9	SO	Natural Language Processing with Python	• Explore natural language processing (NLP) libraries in Python • Learn various techniques for implementing NLP including parsing & text processing • Understand how to use NLP for text feature engineering

Principal
IDEAL INSTITUTE OF TECHNOLOGY
Vidyutnagar, KAKINADA.

10	Minor	Introduction to Artificial Intelligence and Machine Learning[$]	------------------

Principal
IDEAL INSTITUTE OF TECHNOLOGY
Vidyutnagar, KAKINADA

III B. Tech – I Semester			
S.No	**Course Code**	**Courses**	**Course outcomes**
1	PC	Compiler Design	• Demonstrate phases in the design of compiler • Organize Syntax Analysis, Top Down and LL(1) grammars • Design Bottom Up Parsing and Construction of LR parsers • Analyze synthesized, inherited attributes and syntax directed translation schemes Determine algorithms to generate code for a target machine
2	PC	Operating Systems	• Describe various generations of Operating System and functions of Operating System • Describe the concept of program, process and thread and analyze various CPU Scheduling Algorithms and compare their performance • Solve Inter Process Communication problems using Mathematical Equations by various methods • Compare various Memory Management Schemes especially paging and Segmentation in Operating System and apply various Page Replacement Techniques • Outline File Systems in Operating System like UNIX/Linux and Windows
3	PC	Machine Learning	• **Explain the fundamental usage of the concept Machine Learning system** • **Demonstrate on various regression Technique** • **Analyze the Ensemble Learning Methods** • **Illustrate the Clustering Techniques and Dimensionality Reduction Models in Machine Learning.** • **Discuss the Neural Network Models and Fundamentals concepts of Deep Learning**
4	Open Elective/ Job Oriented	**Open Elective-I** Open Electives offered by other departments/ Optimization in Operations Research(Job oriented course)	

Principal
IDEAL INSTITUTE OF TECHNOLOGY
Vidyutnagar, KAKINADA

5	PE	**Professional Elective-I** 1. Software Engineering 2. Computer Vision 3. Data Visualization 4. DevOps 5. Machine Learning for Engineering and Science Applications (NPTEL) (https://nptel.ac.in/courses/106106198)	• Ability to transform an Object-Oriented Design into high quality, executable code • Skills to design, implement, and execute test cases at the Unit and Integration level Compare conventional and agile software methods
6	PC	Operating Systems & Compiler Design Lab	• Implement various scheduling, page replacement algorithms and algorithms related to deadlocks • Design programs for shared memory management and semaphores • Determine predictive parsing table for a CFG • Apply Lex and Yacc tools • Examine LR parser and generating SLR Parsing table
7	PC	Machine Learning Lab	• Implement procedures for the machine learning algorithms • Design and Develop Python programs for various Learning algorithms • Apply appropriate data sets to the Machine Learning algorithms • Develop Machine Learning algorithms to solve real world problems
8	SO	**Skill Oriented Course - III** Continuous Integration and Continuous Delivery using DevOps	• Understand the why, what and how of DevOps adoption • Attain literacy on Devops • Align capabilities required in the team • Create an automated CICD pipeline using a stack of tools
9	MC	Employability Skills-I	• Understand the corporate etiquette. • Make presentations effectively with appropriate body language • Be composed with positive attitude • Understand the core competencies to succeed in professional and personal life
10	PR	**Summary Internship 2 Months (Mandatory) after second year(to be evaluated during V**	

T-S

Principal
IDEAL INSTITUTE OF TECHNOLOGY
Vidyutnagar, KAKINADA

		semester	
11	Minor	Machine Learning[5]	• Implement procedures for the machine learning algorithms • Design and Develop Python programs for various Learning algorithms • Apply appropriate data sets to the Machine Learning algorithms • Develop Machine Learning algorithms to solve real world problems

Principal
IDEAL INSTITUTE OF TECHNOLOGY
Vidyutnagar, KAKINADA

III B. Tech – II Semester			
S.No	**Course Code**	**Courses**	**Course outcomes**
1	PC	Computer Networks	• Demonstrate different network models for networking links OSI, TCP/IP, B-ISDN, N-BISDN and get knowledge about various communication techniques, methods and protocol standards. • Discuss different transmission media and different switching networks. • Analyze data link layer services, functions and protocols like HDLC and PPP. • Compare and Classify medium access control protocols like ALOHA, CSMA, CSMA/CD, CSMA/CA, Polling, Token passing, FDMA, TDMA, CDMA protocols • Determine application layer services and client server protocols working with the client server paradigms like WWW, HTTP, FTP, e-mail and SNMP etc.
2	PC	Deep Learning	• Demonstrate the fundamental concepts learning techniques of Artificial Intelligence, Machine Learning and Deep Learning. • Discuss the Neural Network training, various random models. • Explain the Techniques of Keras, TensorFlow, Theano and CNTK • Classify the Concepts of CNN and RNN • Implement Interactive Applications of Deep Learning.
3	PC	Design and Analysis of Algorithms	• **Analyze the performance of a given algorithm, denote its time complexity using the asymptotic notation for recursive and non-recursive algorithms** • **List and describe various algorithmic approaches and Solve problems using divide and conquer &greedy Method** • **Synthesize efficient algorithms dynamic programming approaches to solve in common engineering design situations.** • **Organize important algorithmic design paradigms and methods of analysis: backtracking, branch and bound algorithmic approaches** • **Demonstrate NP- Completeness theory ,lower bound theory and String Matching**

Principal
IDEAL INSTITUTE OF TECHNOLOGY
Vidyutnagar, KAKINADA.

4	PE	**Professional Elective-II** 1. Software Project Management 2. Distributed Systems 3. Internet of Things 4. Network Programming	• Apply the process to be followed in the software development life-cycle models • Apply the concepts of project management & planning • Implement the project plans through managing people, communications and change • Conduct activities necessary to successfully complete and close the Software projects • Implement communication, modeling, and construction & deployment practices in software development
5	Open Elective/Job Oriented	**Open Elective-II** Open Electives offered by other departments/ MEAN Stack Development (Job Oriented Course)	• Build static web pages using HTML 5 elements. • Apply JavaScript to embed programming interface for web pages and also to perform Client side validations. • Build a basic web server using Node.js, work with Node Package Manager (NPM) and recognize the need for Express.js. • Develop JavaScript applications using typescript and work with document database using MongoDB. • Utilize Angular JS to design dynamic and responsive web pages.
6	PC	Computer Networks Lab	• Know how reliable data communication is achieved through data link layer. • Suggest appropriate routing algorithm for the network. • Provide internet connection to the system and its installation. Work on various network management tools
7	PC	Algorithms for Efficient Coding Lab	• Analyze the program execution time
8	PC	Deep Learning with Tensorflow	• Implement deep neural networks to solve real world problems • Choose appropriate pre-trained model to solve real time problem • Interpret the results of two different deep learning models

Principal
IDEAL INSTITUTE OF TECHNOLO
Vidyutnagar, KAKINADA

9	SO	**Skill Oriented Course - IV** MEAN Stack Technologies- Module I- HTML 5, JavaScript, Node.js, Express.js and TypeScipt **OR** Big Data : Apache Spark	• Develop professional web pages of an application using HTML elements like lists, navigations, tables, various form elements, embedded media which includes images, audio, video and CSS Styles. • Utilize JavaScript for developing interactive HTML web pages and validate form data. • Build a basic web server using Node.js and also working with Node Package Manager (NPM). • Build a web server using Express.js Make use of Typescript to optimize JavaScript code by using the concept of strict type checking
10	MC	Employability skills-II	• Solve various Basic Mathematics problems by following different methods • Follow strategies in minimizing time consumption in problem solving Apply shortcut methods to solve problems • Confidently solve any mathematical problems and utilize these mathematical skills both in their professional as well as personal life. • Analyze, summarize and present information in quantitative forms including table, graphs and formulas
11	Minor	Deep Learning[$]	• Implement deep neural networks to solve real world problems • Choose appropriate pre-trained model to solve real time problem Interpret the results of two different deep learning models
Minor courses through SWAYAM			

Principal
IDEAL INSTITUTE OF TECHNOLOGY
Vidyutnagar, KAKINADA

IV B. Tech –I Semester (Tentative)			
S.No	Course Code	Course Title	Course outcomes
1	PE	**Professional Elective-III** 1.Reinforcement Learning 2.Soft Computing 3. Cryptography and Network Security 4. Block Chain Technologies 5. Speech Processing	• Understand basic concepts of Reinforcement learning • Identifying appropriate learning tasks for Reinforcement learning techniques • Understand various methods and applications of reinforcement learning
2	PE	**Professional Elective-IV** 1. Robotic Process Automation 2. Cloud Computing 3. Big Data Analytics 4. NOSQL Databases 5. Video Analytics	• Describe RPA, where it can be applied and how it's implemented. • Describe the different types of variables, Control Flow and data manipulation techniques. • Identify and understand Image, Text and Data Tables Automation. • Describe how to handle the User Events and various types of Exceptions and strategies. • Understand the Deployment of the Robot and to maintain the connection.
3	PE	**Professional Elective-V** 1. Social Network Analysis 2. Recommender Systems 3. AI Chatbots 4. Object Oriented Analysis and Design 5. Semantic Web	• Analyze the nature of complex system and its solutions. • Illustrate & relate the conceptual model of the UML, identify & design the classes and relationships • Analyze &Design Class and Object Diagrams that represent Static Aspects of a Software System and apply basic and Advanced Structural Modeling Concepts for designing real time applications. • Analyze & Design behavioral aspects of a Software System using Use Case, Interaction and Activity Diagrams. • Analyze & Apply techniques of State Chart Diagrams and Implementation Diagrams to model behavioral aspects and Runtime environment of Software Systems.

Principal
IDEAL INSTITUTE OF TECHNOLOGY
Vidyutnagar, KAKINADA

4	Open Elective /Job Oriented	**Open Elective-III** Open Electives offered by other departments/API and Microservices (Job Oriented Course)	--------------
5	Open Elective /Job Oriented	**Open Elective-IV** Open Electives offered by other departments/Secure Coding Techniques (Job Oriented Course)	---------------
6	HS	Universal Human Values 2: Understanding Harmony	---------------
7	SO	1.Machine Learning with Go (Infosys Spring Board) **OR** 2.MEAN Stack Technologies-Module II-Angular JS and MongoDB	• Build a component-based application using Angular components and enhance their functionality using directives. • Utilize data binding for developing Angular forms and bind them with model data. • Apply Angular built-in or custom pipes to format the rendered data. • Develop a single page application by using synchronous or asynchronous Angular routing. • Make use of MongoDB queries to perform CRUD operations on document database.
8	PR	**Industrial/Research Internship 2 months (Mandatory) after third year (to be evaluated during VII semester**	------------------
9	Minor	Reinforcement Learning	• Understand basic concepts of Reinforcement learning • Identifying appropriate learning tasks for Reinforcement learning techniques Understand various methods and applications of reinforcement learning
		Minor courses through SWAYAM	

Principal
IDEAL INSTITUTE OF TECHNOLO
Vidyutnagar, KAKINADA

S. No	Course Code	Subjects	Course outcomes
1		Power Systems-II	• understand parameters of various types of transmission lines during different operating conditions. • understand the performance of short and medium transmission lines. • understand travelling waves on transmission lines. • understand various factors related to charged transmission lines. understand sag/tension of transmission lines and performance of line insulators.
2		Power Electronics	• explain the characteristics of various power semiconductor devices and analyze the static and dynamic characteristics of SCR's. • design firing circuits for SCR. • explain the operation of single phase full–wave converters and analyze harmonics in the input current. • explain the operation of three phase full–wave converters. • analyze the operation of different types of DC-DC converters. • explain the operation of inverters and application of PWM techniques for voltage control and harmonic mitigation. • analyze the operation of AC-AC regulators.
3		Linear IC Applications	• design circuits using operational amplifiers for various applications. • analyze and design amplifiers and active filters using Op-amp. • diagnose and trouble-shoot linear electronic circuits. • understand the gain-bandwidth concept and frequency response of the amplifier configurations. • understand thoroughly the operational amplifiers with linear integrated circuits.

Principal
IDEAL INSTITUTE OF TECHNOLOGY
Vidyut Nagar, KAKINADA

4		Digital Signal Processing	• understand the concepts of signal processing& transforms. • appraise the Fat Fourier algorithm. • design FIR and IIR filters. • appreciate the concepts of multirate signal processing.
5		Microprocessors and Microcontrollers	• understand the Microprocessor capability in general and explore the evaluation of microprocessors. • understand the addressing modes of Microprocessors • understand the Microcontroller capability • program Microprocessors and Microcontrollers. • interface Microprocessors and Microcontrollers with other electronic devices • develop cyber physical systems
6		Electrical Machines-II Laboratory	• assess the performance of single phase and three phase induction motors. • control the speed of three phase induction motor. • predetermine the regulation of three–phase alternator by various methods. • find the Xd/ Xq ratio of alternator and asses the performance of three–phase synchronous motor. determine the performance single phase AC series motor
7		Control Systems Laboratory	• analyze the performance and working Magnetic amplifier, D.C and A.C. servo motors and synchros. • design P,PI,PD and PID controllers • design lag, lead and lag–lead compensators • control the temperature using PID controller • determine the transfer function of D.C Motor • control the performance of D.C and A.C Servo Motor. • test the controllability and observability. • judge the stability in time and frequency domain.

Principal
IDEAL INSTITUTE OF TECHNOLOGY
Vidyutnagar, KAKINADA

8		Electrical Measurements & Instrumentation Laboratory	• measure the electrical parameters voltage, current, power, energy and electrical characteristics of resistance, inductance and capacitance. • known the characteristics of transducers. • measure the strains, frequency and phase difference.
9		Socially Relevant Projects	**The student(s) are be able to provide a solutions the technological problems of society** **The student(s) is able suggest technological changes which suits current needs of society** The student(s) are able to explain new technologies available for problems of the society.

III Year – II SEMESTER

S. No	Course Code	Subjects	Course outcomes
1		Electric Drives	• explain the fundamentals of electric drive and different electric braking methods. • analyze the operation of three phase converter fed dc motors and four quadrant operations of dc motors using dual converters. • describe the converter control of dc motors in various quadrants of operation • know the concept of speed control of induction motor by using AC voltage controllers and voltage source inverters. • differentiate the stator side control and rotor side control of three phase induction motor, explain the speed control mechanism of synchronous motors.
2		Power System Analysis	• draw impedance diagram for a power system network and to understand per unit quantities. • form a Ybus and Zbus for a power system networks. • understand the load flow solution of a power system using different methods.

			• find the fault currents for all types faults to provide data for the design of protective devices. • find the sequence components of currents for unbalanced power system network. • analyze the steady state, transient and dynamic stability concepts of a power system.
3		Data Structures	• data structures concepts with arrays, stacks, queues. • linked lists for stacks, queues and for other applications. • traversal methods in the Trees. • various algorithms available for the graphs. • sorting and searching in the data ret retrival applications.
4		Digital Control Systems	• learn the advantages of discrete time control systems and the "know how" of various associated accessories. • understand z–transformations and their role in the mathematical analysis of different systems(like Laplace transforms in analog systems). • learn the stability criterion for digital systems and methods adopted for testing the same are explained. • understand the conventional and state space methods of design are also introduced.

Principal
IDEAL INSTITUTE OF TECHNOLOGY
Vidyutnagar, KAKINADA

5		**Elective - I**	• understand the structure of commercially available digital integrated circuit families. • learn the IEEE Standard 1076 Hardware Description Language (VHDL). • model complex digital systems at several levels of abstractions, behavioral, structural, simulation, synthesis and rapid system prototyping. • analyze and design basic digital circuits with combinatorial and sequential logic circuits using VHDL.
6		**Open Elective - I**	• understand the basics of communication system, analog and digital modulation techniques. • apply the knowledge of digital electronics and understand the error control coding techniques. • summarize different types of communication systems and its requirements.
7		Power Electronics Laboratory	• understand OSI and TCP/IP models • analyze MAC layer protocols and LAN technologies • design applications using internet protocols • understand routing and congestion control algorithms • understand how internet works
8		Microprocessors & Microcontrollers Laboratory	• **know the various fundamentals, architectures and technologies of Internet of Things.** • **understand various communication technologies used in the Internet of Things.** • **understand the various device connectivity methods using web and internet in the IoT environment.** • **understand various data acquisition methods, data handling using cloud for IoT applications.** • **know the implementation of IoT from the case studies like Smart Home, Smart city, etc.**

Principal
IDEAL INSTITUTE OF TECHNOLOGY
Vidyutnagar, KAKINADA

9		Employability Skills	• understand the insights of the MOS devices and its characteristics. • appreciate the different VLSI process technologies. • design the CMOS combinational logic circuits and its layout. • develop the sequential circuits and clocking schemes. • realize the Design flow of application-specific Integrated circuit.

IV Year – I SEMESTER

S. No	Course Code	Subjects	Course outcomes
1		Switchgear & Protection	• understand the principles of arc interruption for application to high voltage circuit breakers of air, oil, vacuum, SF6 gas type. • understand the working principle and operation of different types of electromagnetic protective relays. • students acquire knowledge of faults and protective schemes for high power generator and transformers. • improves the ability to understand various types of protective schemes used for feeders and bus bar protection. • understand different types of static relays and their applications. • understand different types of over voltages and protective schemes required for insulation co-ordination.
2		OOPs through JAVA	• understand Java programming concepts and utilize Java Graphical User Interface in Program writing. • write, compile,

Principal
IDEAL INSTITUTE OF TECHNOLOGY
Vidyutnagar, KAKINADA

			execute and troubleshoot Java programming for networking concepts. • build Java Application for distributed environment. • design and Develop multi-tier applications. • identify and Analyze Enterprise applications.
3		Renewable Energy Systems	• analyze solar radiation data, extraterrestrial radiation, and radiation on earth's surface. • design solar thermal collectors, solar thermal plants. • design solar photo voltaic systems. • develop maximum power point techniques in solar PV and wind energy systems. • explain wind energy conversion systems, wind generators, power generation. • explain basic principle and working of hydro, tidal, biomass, fuel cell and geothermal systems.
4		**Elective – II**	• understand various levels of illuminosity produced by different illuminating sources and able to estimate the illumination levels produced by various sources and recommend the most efficient illuminating sources and should be able to design different lighting systems by taking inputs and constraints in view. • identify most appropriate heating and welding techniques for suitable applications. • identify a suitable motor for electric drives and industrial applications • determine the speed/time characteristics of different types of traction systems and determination of various traction parameters. • know the necessity and usage of different energy storage schemes for different applications.

Principal
IDEAL INSTITUTE OF TECHNOLOGY
Vidyutnagar, KAKINADA

5		**Elective - III**	• understand various levels of illuminosity produced by different illuminating sources and able to estimate the illumination levels produced by various sources and recommend the most efficient illuminating sources and should be able to design different lighting systems by taking inputs and constraints in view. • identify most appropriate heating and welding techniques for suitable applications. • identify a suitable motor for electric drives and industrial applications • determine the speed/time characteristics of different types of traction systems and determination of various traction parameters. • know the necessity and usage of different energy storage schemes for different applications.
6		Linear & Digital IC Applications Laboratory	• formulate different state models in canonical forms. • design of state feedback control using the pole placement technique and state observer design for a given control system. • analyse of nonlinear system using the describing function technique and determine the stability of a linear autonomous system using lypnov method. • determine minimization of functionals using calculus of variation studied. • formulate and solve the LQR problem and riccati equation.
7		Power Systems& Simulation Laboratory	• design main dimensions of rotating machines. • design transformers and determine main dimensions. • design field circuit of DC machines and

Principal
Vidyutnagar,

			Synchronous machines. • design armature of DC machines and AC machines.
		Industrial Training /Skill Development Programmes / Research Project	• know the concept of electric vehicles and hybrid electric vehicles. • familiar with different configuration of hybrid electric vehicles. • understand the power converters used in hybrid electric vehicles • know different batteries and other energy storage systems.

IV Year – II SEMESTER

S. No	Course Code	Subjects	Course outcomes
1		Power System Operation & Control	• compute optimal scheduling of Generators. • understand hydrothermal scheduling. • understand the unit commitment problem. • understand importance of the frequency. • understand importance of PID controllers in single area and two area systems. • understand reactive power control and compensation for transmission line.
2		**Open Elective - II**	• choose right type of instrument for measurement of ac and dc Electrical quantities. • choose right type of instrument for measurement of power and power factor. • select right type for measurement of R, L,C. • understand the effectiveness of Transducer. • understand Digital Meters.
3		**Elective - IV**	• learn about various methods used for electrical energy

Principal
INSTITUTE OF TECHNOLOGY
Vidyutnagar, KAKINADA.

			based heating and welding applications. • know about the mechanisms, equipment and technology used in the electric traction. • understand the importance of electrical earthing, earthing equipment and electrical earthing measurement methods.
4		Project-II	--

I Year – I SEMESTER

Sl. No	Course Code	Subjects	Course Outcomes
1	HS1101	English	--
2	BS1101	Mathematics - I	--
3	BS1106	Applied Chemistry	• understand the principles of differ analyticalinstruments. • explain the different applications analyticalinstruments. • design sources of energy by differ naturalsources.
4	ES1101	Programming for Problem Solving Using C	• To write algorithms and to flowcharts for solvingprobl • To convert flowcharts/algoritl C Programs, compile and debugprograms • To use different operators, data types and write programs that use two-way/ multi-wayselection

IDEAL INSTITUTE OF TECHNOLOGY
Vidyutnagar, KAKINADA

			• To select the best loop constr a givenproblem • To design and implement pro to analyze the different pointerapplications • To decompose a problem i functions and to develop mo reusablecode • To apply File I/Ooperatio
5	ES1103	Engineering Drawing	The student will learn how to visualize 2D & 3D objects.
6	HS1102	English Lab	--
7	BS1107	Applied Chemistry Lab	**The students entering into the professional course have practically very little exposure to lab classes. The experiments introduce volumetric analysis; redox titrations with different indicators; EDTA titrations; then they are exposed to a few instrumental methods of chemical analysis. Thus at the end of the lab course, the student is exposed to different methods of chemical analysis and use of some commonly employed instruments. They thus acquire some experimental skills.**
8	ES1102	Programming for Problem Solving Using C Lab	--
9	MC1101	Environmental Science	--

I Year – II SEMESTER

Sl. No	Course Code	Subjects	Course outcomes
1	BS1202	Mathematics – II	• develop the use of matrix algebra techniques that is needed by engineers for practical applications(L6) • solve system of linear

				algebraic equations using Gauss elimination, Gauss Jordan, GaussSeidel(L3) • evaluate approximating the roots of polynomial and transcendental equations by differentalgorithms(L5) • apply Newton's forward & backward interpolation and Lagrange's formulae for equaland unequal intervals(L3) • apply different algorithms for approximating the solutions of ordinary differential equations to its analytical computations(L3)
2	BS1203	Mathematics – III		• interpret the physical meaning of different operators such as gradient, curl anddivergence(L5) • estimate the work done against a circulation and flux using vect calculus(L5) • apply the Laplace transform for sc differential equations(L3) • find or compute the Fourier seri periodic signals(L3) • know and be able to apply integral expressions for the

			forwards and inverse Fouriertransform to a range of non-periodic waveforms(L3) • identify solution methods for partial differential equations that model physical processes(L3)
3	BS1204	Applied Physics	--
4	ES1209	Network Analysis	• gain the knowledge on bas networkelements. • will analyze the RLC circu behavior indetailed. • analyze the performance periodicwaveforms. • gain the knowledge in characteristics of two port network parameters (Z,Y,ABCD,h&g). • analyze the filter design conce real worldapplications.
5	ES1211	Basic Electrical Engineering	• Able to explain the operation of DC generator and analyze the characteristics of DCgenerator. • Able to explain the principle of operation of DC motor and analyze their characteristics. Acquire the skills to analyze the starting and speed control methods of DCmotors. • Ability to analyze the performance and speed – torque characteristics of a 3-phaseinduction motor and understand starting

Principal
IDEAL INSTITUTE OF TECHNOLOGY
Vidyutnagar, KAKINADA

			methods of 3-phase inductionmotor. • Able to explain the operation SynchronousMachines • Capability to understand the opera various specialmachines.
6	ES1215	Electronic workshop	--
7	ES1208	Basic Electrical Engineering Lab	• Determine and predetermine tl performance of DC machine andtransformers. • Control the DC shunt machine • Compute the performance of phasetransformer. • Perform tests on 3-phase induction motor and alternator to determine theirperformance characteristics.
8	BS1205	Applied Physics Lab	--
9	HS1203	Communication Skills Lab	--
10	PR1201	Engineering Exploration Project	--

II Year – ISemester

S. No.	Course	Course outcomes
1	Electronic Devices and Circuits	• Apply the basic concepts of semiconductor physics. • Understand the formation of p-n junction and how it can be used as a p-n junction asdiode in different modes of operation. • Know the construction, working principle of rectifiers with and without filters withrelevant expressions and necessary comparisons. • Understand the construction, principle of operation of transistors, BJT and FET withtheirV-I

IDEAL INSTITUTE OF TECHNOLOGY
KAKINADA

			characteristics in different configurations. • Know the need of transistor biasing, various biasing techniques for BJT and FET andstabilization concepts with necessary expressions.
2	Switching Theory and Logic Design		• Classify different number systems and a to generate variouscodes. • Use the concept of Boolean algebra i minimization of switchingfunctions • Design different types of combination logiccircuits. • Apply knowledge of flip-flops in designi Registers andcounters • The operation and design methodology for synchronous sequential circuits andalgorithmic statemachines. • Produce innovative designs by modifyin traditional designtechniques.
3	Signals and Systems		• Differentiate the various classification signals andsystems • Analyze the frequency domain representation of signals using Fourierconcepts • Classify the systems based on their properties and determine the response ofLTISystems. • Know the sampling process and vari types of samplingtechniques. • Apply Laplace and z-transforms to ana signals and Systems (continuous &disc
4	Random Variables and Stochastic Processes		• Mathematically model the random phenomena and solve simple probabilisticproblems. • Identify different types of random variables and compute statistical averages ofthese

Principal
[illegible] INSTITUTE OF TECHNOL
Vidyutnagar, KAKINADA

		randomvariables. • Characterize the random processes in the and frequencydomains. • Analyze the LTI systems with randomin
5	Object Oriented Programming throughJava	• Show competence in the use of the Java programming language in the development of small to medium-sized application programs that demonstrate professionally acceptable coding and performance standard • Illustrate the basic principles of the object-orie programming • Demonstrate an introductory understanding of graphical user interfaces, multithreaded programming, andevent-driven programming.
6	Managerial Economics & Financial Analysis	• Show competence in the use of the Java programming language in the development of small to medium-sized application programs that demonstrate professionally acceptable coding and performance standard • Illustrate the basic principles of the object-orie programming • Demonstrate an introductory understanding of graphical user interfaces, multithreaded programming, andevent-driven programming
7	Electronic Devices and Circuits - Lab	--
8	Switching Theory and Logic Design - Lab	--
9	Constitution of India	• Understand historical background of the constitution making and its importance forbuilding a democraticIndia. • Understand the functioning of three wings of the government ie.,executive, legislative andjudiciary. • Understand the value of the fundamental rights and duties for becoming good citizen ofIndia.

II Year – IISemester

Principal
IDEAL INSTITUTE OF TECHNOLOGY
Vidyutnagar, KAKINADA

		• Analyze the decentralization of power between central, state and localself-government.

S. No.	Course	Course outcomes
1	Electronic Circuit Analysis	• Design and analysis ofsmall signal high frequency transistor amplifier using BJT andFET. • Designandanalysisofmult istageamplifiersusing BJTandFETandDifferent ialamplifier usingBJT. • Derive the expressions for frequency ofoscillation and condition for oscillation ofRC and LC oscillators and their amplitude and frequency stabilityconcept. • Know the classification of the power and tuned amplifiers and their analysiswith performance comparison.
2	Linear Control Systems	• This course introduces the concepts of feedback and its advantages to various controlsystems • The performance metrics to design the control system in time-domain and frequencydomain areintroduced. • Control systems for various applications can be designed using time-domain and frequency domainanalysis. • In addition to the conventional approach, the state space approach for the analysis ofcontrol systems isalsointroduced.
3	Electromagnetic Waves and	• Determine E and H using various laws an applications of electric & magneticfields

Principal
IDEAL INSTITUTE OF TECHNOL

	TransmissionLines		Apply the Maxwell equations to analyze the ti varying behavior of EMwaves Gain the knowledge in uniform plane wave concept and characteristics of uniformplanewave invariousmedia Calculate Brewster angle, critical angle and to internalreflection Derive andCalculate the expressions for input impedance of transmission lines,reflectioncoefficient, VSWR etc. using smithchart
4	Analog Communications		• Differentiate various Analog modulation and demodulationschemes and theirspectralcharacteristics • Analyze noise characteristics of various an modulationmethods • Analyze various functional blocks of rad transmitters andreceivers • Design simple analog systems for variou modulationtechniques.
5	Computer Architecture and Organization		• Students can understand the architecture ofmoderncomputer. • They can analyze the Performance of a comp usingperformanceequation • Understanding of differentinstructiontype • Students can calculate the effective address o operand byaddressingmodes • They can understand how computer stores po andnegativenumbers. • Understand the concepts of I/O Organization Memorysystems.
6	Management and Organizational Behavior		• Students can understand the architecture ofmoderncomputer. • They can analyze the Performance of a comp usingperformanceequation • Understanding of differentinstructiontype • Students can calculate the effective address operand byaddressingmodes • They can understand how computer stores pc andnegativenumbers. • Understand the concepts of I/O Organizatio Memorysystems.

Principal
IDEAL INSTITUTE OF TECHNOLO

7	Electronic Circuit Analysis - Lab	• Design circuits using operational amplifiers f variousapplications. • Analyze and design amplifiers and active filte usingOp-amp. • Diagnose and trouble-shoot linear electroniccirc • Understand the gain-bandwidth concept and frequency response of the amplifierconfigurations. • Understand thoroughly the operational amplifi with linear integratedcircuits.
8	Analog Communications - Lab	--

II Year – I Semester

S. No.	Course	Course outcomes
1	Linear Integrated Circuits and Applications	--
2	Microprocessor and Microcontrollers	--
3	Digital Communications	• Analyze the performance of a Digital Communication System for probability of error andare able to design a digital communication system. • Analyze various source coding technique • Compute and analyze Block codes, cyclic co and convolution codes. • Design a coded communication system.
4	Electronic Measurements & Instrumentation	• Select the instrument to be used based on th requirements. • Understand and analyze different signal gener and analyzers. • Understand the design of oscilloscopes for diff applications. • Design different transducers for measuremen different parameters.
5	Professional Elective (PE 1)	--
6	Linear Integrated Circuits and Applications -Lab	--
7	Digital Communications Lab	--
8	Microprocessor and Microcontrollers - Lab	--

Principal
IDEAL INSTITUTE OF TECHNO
Vidyutnagar, KAKINADA

9	Mini Project with Hardware Development	--
10	Essence of Indian Traditional Knowledge	• Understand the concept of Traditiona knowledge and itsimportance • Know the need and importance of protec traditionalknowledge • Know the various enactments related to protection of traditionalknowledge • Understand the concepts of Intellectu property to protect the traditionalknowle

III Year – IISemester

S. No.	Course	Course Outcomes
1	Wired and Wireless Transmission Devices	• Identify basic antenna parameters. • Design and analyze wire antennas, loop antennas, reflector antennas, lens antennas,horn antennas and micro strip antennas • Quantify the fields radiated by various typ antennas • Design and analyze antenna arrays • Analyze antenna measurements to asse antenna's performance • Identify the characteristics of radio wa propagation
2	VLSI Design	• Demonstrate a clear understanding of CMOS fabrica flow and technology scaling. • Apply the design Rulesand draw layout of a given lc circuit. • Design MOSFET based logic circuit. • Design basic building blocks in Analog IC design • Analyze the behaviour of amplifier circuits with vari loads. • Design various CMOS logic circuits for design o Combinational logic circuits. • Design amplifier circuits using MOS transistors. • Design MOSFET based logic circuits using various l styles like static and dynamic CMOS. • Analyze the behaviour of static and dynamic logic cir
3	Digital Signal Processing	• Formulate engineering problems in terms DSPoperations • Analyze digital signals andsystems • Analyze discrete time signals in frequencyd

IDEAL INSTITUTE OF TECHNOLO
Vidyutnagar, KAKINADA.

		• Design digital filters and implement with differentstructures • Understand the keyarchitectural
4	Professional Elective (PE2)	• Formulate engineering problems in terms DSPoperations • Analyze digital signals andsystems • Analyze discrete time signals in frequencydo • Design digital filters and implement with differentstructures • Understand the keyarchitectural
5	Open Elective (OE1)	• Understand the concepts ofMOSDesign • Design and analysis of Combinational ar SequentialMOSCircuits. • Extend the Digital IC Design toDifferentApplications. • Understand the Concepts of Semiconductor Memories, Flash Memory, RAM arrayorganization
6	Internet of Things	• Understand internet of Things and its hardw and softwarecomponents. • Interface I/O devices, sensors &communicationmodules. • Remotely monitor data and controldevice • Design real time IoT basedapplications
7	VLSI Lab	--
8	Digital Signal Processing Lab	--
9	Intellectual Property Rights (IPR) & Patents	• IPR Laws and patents pave the way for innovative ideas which are instrumental for inventions to seekPatents • Student get an insight on Copyrights, Patents and Software patents which are instrumentalfor furtheradvancements • advanced Technical and Scientific disciplin • Imparting IPR protections and regulations for further advancement, so that the students can familiarize with the latestdevelopments

IV Year – ISemester

Principal
IDEAL INSTITUTE OF TECHNO
Vidyutnagar, KAKINADA

S. No.	Course	Course outcomes
1	Microwave and Optical Communication Engineering	• Design different modes in waveguidestruc • Calculate S-matrix for various waveguide components and splitting the microwaveenergy in a desireddirection • Distinguish between Microwave tubes and Solid State Devices, calculation of efficiencydevices. • Measure various microwave parameters us Microwave testbench
2	Data Communications & Computer networks	• Design different modes in waveguidestruc • Calculate S-matrix for various waveguide components and splitting the microwaveenergy in a desireddirection • Distinguish between Microwave tubes and Solid State Devices, calculation of efficiencydevices. • Measure various microwave parameters us Microwave testbench
3	Digital Image and Video Processing	• Defining the digital image, representation of digital image, importance of imageresolution, applications in imageprocessing. • Know the advantages of representation of digital images in transform domain, applicationof various imagetransforms. • Know how an image can be enhanced by using histogram techniques, filtering techniquesetc • Understand image degradation, image restoration techniques using spatial filtersand frequencydomain • Know the detection of point, line and edges in images, edge linking through local processing, globalprocessing. • Understand the redundancy in images, va image compressiontechniques. • Know the video technology from analog color TV systems to digital video systems,howvideo signal is

		sampled and filtering operations in videoprocessing. • Know the general methodologies for 2D motion estimation, various coding used invideoprocessing.
4	Professional Elective (PE3)	• Able to develop sensornetworks • Able to communicate data via Wired/Wirelesscommunication • Configure and test communicationtechnol
5	Professional Elective (PE4)	• Model and simulate different MOS Devices small signalModel. • Design and analyze any Analog Circuits i timeapplications. • Apply the concepts Analog Circuit Desig develop various Applications in RealTi • Analyze and comparedifferentOpen-Lo Comparators andOscillators.
6	Internet of Things Lab	--
7	Microwave and Optical Communication Engineering LAB	--
8	Project - Part I	--

IV Year – II Semester

S. No.	Course	Course outcomes
1	Professional Elective (PE5)	• Know about the Wireless systems and Standa (1G/2G/3Gsystems). • Concept and analysis of CDMA-based wirelessnetworks. • Understand the concepts of Multiple-Input Mult Output(MIMO). • Understand the modern wireless systems usingO • Analysis of Satellite-Based Wirelesssystems
2	Open Elective (OE2)	• Identify the importance of RP in presentscen • Gain the knowledge on3DP • Application of 3DP in electronics. • Minimize various errors that are occurring du conversion of CADmodels. • Applications ofRP.
3	Project - Part II	--

Principal
IDEAL INSTITUTE OF TECH
Vidyutnagar, KAKINAD

DEPARTMENT OF CIVIL ENGINEERING

III YEAR: I- SEMESTER

Sl. No.	Course Code	Course Title	Course Outcomes
1	PC501	Structural Analysis	• Distinguish between the determinate and indeterminatestructures. • Identify the behaviour of structures due to the expected loads, including the moving loads, acting on thestructure. • Estimate the bending moment and shear forces in beams for different fixity conditions. • Analyze the continuous beams using various methods -, three moment method, slope deflection method, energytheorems. • Draw the influence line diagrams for various types of moving loads on beams/bridges. • Analyze the loads in Pratt and Warren trusses when loads of different types and spans are passing over thetruss.
2	PC502	Concrete Technology	• understand basic concepts of concrete. • realize importance of quality ofconcrete. • familiarize basic ingredients of concrete and their role in concrete and their behaviour in thefield. • test fresh concrete properties and hardened concreteproperties. • evaluate ingredients of concrete through lab tests. design concrete mix by ISmethod. • familiarize basic concepts of special concrete and their production and applications. understand the behaviour of concrete in variousenvironments.
3	PC503	Water Resources Engineering - I	• be able to quantify major hydrologic components and apply key concepts to several practical areas of engineering hydrology and related designaspects • develop Intensity-Duration-Frequency and Depth-Area Duration curves to design hydraulicstructures. • ability to develop design storms and carry out frequencyanalysis • be able to determine storage capacity and life ofreservoirs and develop unit hydrograph and

Principal
IDEAL INSTITUTE OF TECHNOLOGY
Vidyutnagar, KAKINADA.

			synthetic hydrograph. • be able to estimate flood magnitude and carry out flood routing. • be able to determine aquifer parameters and yield ofwells. • Ability to develop the hydrological models.
4	PC504	Environmental Engineering - II	• By the end of successful completion of this course, the students will be able to: Plan and design the sewerage systems by estimating the flow • Design of Plumbing for an apartment, Gated community or Hotels or Individual houses and Select the appropriate appurtenances in the sewerage systems • Estimation of BOD and COD and Suggest a suitable disposal method with respect to effluent standards, and Identify the critical point of pollution in a river for a specific amount of pollutant disposal into the river • Analyze sewage and design suitable treatment system for sewage treatment for a village/City. • Design of sewage treatment systems like Septic tank soak pit system and FAB reactor for buildings and understanding tertiary treatment of sewage.
5	PE501	Program Elective – I	• Recognize the mechanisms of degradation of concrete structures and to design durable concrete structures. • Conduct field monitoring and non-destructive evaluation of concrete structures. • Design and suggest repair strategies for deteriorated concrete structures including repairing with composites. • Understand the methods of strengthening methods for concrete structures • Assessment of the serviceability and residual life span of concrete structures by Visual inspection and in situ tests • Evaluation of causes and mechanism of damage • Evaluation of actual capacity of the concrete structure Maintenance strategies • Repair / Rehabilitate / Strengthening techniques by using traditional and advanced materials and techniques. • Prepare EMP, EIS and EIA report, estimate cost

Principal
IDEAL INSTITUTE OF TECHNOLOGY
Vidyutnagar, KAKINADA.

			benefit ratio of a project • Selection of an appropriate EIA methodology • Evaluation of impacts on environment • Evaluation of risk assessment • Know the latest acts and guidelines of MoEF & CC • Prepare EMP, EIS and EIA report, estimate cost benefit ratio of a project • Selection of an appropriate EIA methodology • Evaluation of impacts on environment • Evaluation of risk assessment • Know the latest acts and guidelines of MoEF & CC • Determine traffic speed, volume, travel time and density. • Design traffic signals • Determine highway capacity and LOS • appreciate the importance of construction planning • understand the functioning of various earth moving equipment • know the methods of production of aggregate products and concreting and usage of machinery required for the works. • apply the gained knowledge to project management and construction techniques
6	OE501	Open Elective – I	----------------------
7	PC506	Concrete Technology Lab	• Determine consistency and fineness of cement. • Determine setting times ofcement. • Determine specific gravity and soundness ofcement. • Determine compressive strength ofcement. • Determine workability of cement concrete by compaction factor, slump and Vee – Beetests • Determine specific gravity of coarse aggregate and fine aggregate by Sieve analysis. • Determine flakiness and elongation index ofaggregates. • Determine bulking ofsand. • Understand non-destructive testing procedures on concrete.
8	PC507	Surveying Field Work - II	-------------------

Principal
IDEAL INSTITUTE OF TECHNOLOGY
Vidyutnagar, KAKINADA

III YEAR: II- SEMESTER

Sl. No.	Course Code	Course Title	Course Outcomes
1	PC601	Design & Drawing of Reinforced Concrete Structures	• Work on different types of design methods • Carryout analysis and design of flexural members anddetailing • Design structures subjected to shear, bond andtorsion • Design different type of compression members andfootings
2	PC602	Water Resources Engineering – II	• **be able to estimate irrigation water requirements** • **ability to design irrigation canals and canal network** • **plan an irrigation system** • **design irrigation canal structures** • **plan and design diversion head works** • **analyse stability of gravity and earth dams** • **design ogee spillways and energy dissipation works**
3	PC603	Geotechnical Engineering - I	• The student must know the definition of the various quantities related to soil mechanics and establish their inter-relationships. • The student should be able to know the methods of determination of the various index properties of the soils and classify the soils. • The student should be able to know the importance of the different engineering properties of the soil such as compaction, permeability, consolidation and shear strength and determine them in the laboratory. • The student should be able to apply the above concepts in day-to-day civil engineering practice.
4	HS601	Managerial Economics &Financial Analysis	• The Learner is equipped with the knowledge of estimating the Demand and demand elasticities for a product. • The knowledge of understanding of the Input-Output-Cost relationships and estimation of the least cost combination of inputs. • The pupil is also ready to understand the nature of different markets and Price Output determination under various market conditions and also to have the knowledge of different Business Units. • The Learner is able to prepare Financial Statements and the usage of various Accounting tools for Analysis. • The Learner can able to evaluate various

			investment project proposals with the help of capital budgeting techniques for decision making.
5	PE601	Program Elective – II	• At the end of this course the student will be able to • Understand different methods of prestressing • Estimate effective prestress including short and long termlosses • Analyze and design prestressed concrete beams under flexure andshear • Understand the relevant IS Code provisions for prestressed concrete • Calculate watershed parameters and analyse watershed characteristics to take appropriate management action. • Quantify soil erosion and design control measures. • Apply land grading techniques for proper land management . • Suggest suitable harvesting techniques for better watershed management. • Apply appropriate models for watershed management. • compute the safe bearing capacity of footings subjected to vertical and inclined loads. • understand the advanced methods of settlement computations and proportion foundation footings. • appreciate the methods of computing the pull-out capacity and negative skin friction of piles and compute the settlements of pile groups in clays. • appreciate the problems posed by expansive soils and the different foundation practices devised. • appreciate the difference between isolated footings and combined footings and mat foundations. • Estimate travel demand for an urban area • Plan the transportation network for a city • Identify the corridor and plan for providing good transportation facilities. • Evaluate various alternative transportation proposals • The student should be able to distinguish architectural styles of eastern and western world. • The student should understand the importance of Orders of architecture. • Should be able to compose spaces of buildings using design concepts, planning principles. • Should understand the town planning

			standards, landscaping features and regulations controlling expansion of the towns and the cities.
6	OE601	Open Elective – II	----------------------
7	PC604	CAD Lab	• **Model** the geometry of real-world structure Represent the physical model of structural element/structure • Perform **analysis** • **Interpret** from the Post processing results • **Design** the structural elements and a system as per IS Codes
8	PC605	Environmental Engineering Lab	• Estimate some important characteristics of water, wastewater and soil in the laboratory • Draw some conclusion and decide whether the water is suitable for Drinking/Construction / Agriculture/ Industry. • Estimate Chloride, EC and Salinity of Soil and suggest their suitability for Construction/Agriculture • Estimation of the strength of the sewage in terms of BOD and COD and Decide whether the water body is polluted or not with reference to the stated parameters in the list of experiments • Demonstration of various instruments used in testing of water and soil and study of Drinking water standards, WHO guidelines, Effluent standards and standards for Construction/ Agriculture/ Industry.
9	PR601	Socially Relevant Project	• **The student(s) are be able to provide a solutions the technological problems of society** • **The student(s) is able suggest technological changes which suits current needs of society** • (2) The student(s) are able to explain new technologies available for problems of the society.
10	MC601	Employability Skills	• **solve aptitude and reasoning problems, (ii) apply the soft skills in dealing the issues related to employability, (iii) successful in getting employment in campus placement interview**

Principal
IDEAL INSTITUTE OF TECHNOLOGY
Vidyutnagar, KAKINADA.

IV YEAR: I- SEMESTER

Sl. No.	Course Code	Course Title	Course Outcomes
1	PC701	Design & Drawing of Steel Structures	• Work with relevant IScodes • Carryout analysis and design of flexural members anddetailing • Design compression members of different types with connectiondetailing • Design Plate Girder and Gantry Girder with connection detailing • Produce the drawings pertaining to different components of steelstructures
2	PC702	Geotechnical Engineering - II	• The student must be able to understand the various types of shallow foundations and decide on their location based on soil characteristics. • The student must be able to compute the magnitude of foundation settlement and decide on the size of the foundation accordingly. • The student must be able to use the field test data and arrive at the bearing capacity. • The student must be able to apply the principles of bearing capacity of piles and design them accordingly.
3	PC703	Remote Sensing & GIS	• Be familiar with ground, air and satellite based sensor platforms. • interpret the aerial photographs and satellite imageries • create and input spatial data for GIS application • apply RS and GIS concepts for application in Civil Engineering
4	PE701	Program Elective – III	• Explain different types of Bridges with diagrams and Loading standards • Carryout analysis and design of Slab bridges, T Beam bridges and suggest structural detailing • Carryout analysis and design of Plate girderbridges • Organize for attending inspections and maintenance of bridges and preparereports. • Know the quality and quantity of water for various industries and Advanced water treatment methods • Learn the common methods of treatment of wastewaters and Biological treatment methods • Study of methods to reduce impacts of disposal of wasters into environment and CETPs.

T. S.
Principal
IDEAL INSTITUTE OF TECHNOLOGY
Vidyutnagar, KAKINADA

			• Study of methods of treatment of wastewaters from specific industries like steel plants, refineries, and power plants, that imply biological treatment methods • Study of methods of treatment of wastewaters from industries like Aqua, dairy, sugar plants, and distilleries that imply biological treatment methods • Able to design earth and rock fill dams • get familiarity with slope stability calculations, • prevention techniques for slope failures • Identify the benefits of ITS from various types • Determine various sensor applications and ITS data collection techniques • Identify ITS user services and functional areas • Determine various ITS models, evaluation methods and ITSplanning. • Determine the suitable ITS technology and assess its effectiveness to solve transportation problems • Types of air conditioning, • Types of transportation system, • Firefighting, electrical services, • Concepts of green building and energy efficient systems
5	OE701	Open Elective – III	
6	PC704	Remote Sensing & GIS Lab	• Work comfortably on GIS software • Digitize and create thematic map and extract important features • Develop digital elevation model • Interpretation and Estimation of features from satellite imagery. • Analyze and Modelling using GIS software.
7	PC705	Geotechnical Engineering Lab	• Determine index properties of soil and classify them. • Determine permeability of soils. • Determine Compaction, Consolidation and shear strength characteristics.
8	PR701	Industrial Training/ Internship or Seminar	----------------------
9	PR702	Project Work Phase-I	----------

T-SL
Principal
IDEAL INSTITUTE OF TECHNOLOGY
Vidyutnagar, KAKINADA.

IV YEAR: II- SEMESTER

Sl. No.	Course Code	Course Title	Course Outcomes
1	PC801	Estimation Specifications and Contract	• The student should be able to determine the quantities of different components of buildings. • The student should be in a position to find the cost of various buildingcomponents. • The student should be capable of finalizing the value ofstructures.
2	PE801	Program Elective - IV	• Solve simple boundary value problems using Numerical technique of Finite element method • Develop finite element formulation of one and two dimensional problems and solve. • Assemble Stiffness matrices, apply boundary conditions and solve for displacements • Compute Stresses and Strains and interpret theresult. • student will be able to To design various irrigation structures. • Use theory of vibrations to find the behavior of soil under dynamic loading. • Design machine foundations under different loads and soil conditions. • Understand the liquefaction phenomena. • Conduct various laboratory and filed tests to determine the dynamic soil prosperities and its interpretation. • Design vibration isolators under any vibratory machines. • To understand fundamental of Traffic Engg. • To investigate & determine the collective factors & remedies of accident involved. • To design & planning various road geometrics. • To massage the traffic system from road safety point of view. • the application of Disaster Concepts to Management • Analyzing Relationship between Development and Disasters. • Ability to understand Categories of Disasters and • realization of the responsibilities to society
3	PE802	Program Elective – V	• Differentiate Determinate and Indeterminate Structures • Carryout lateral Load analysis ofstructures • Analyze Cable and Suspension Bridgestructures • Analyze structures using Moment Distribution, Kani's Method and Matrixmethods • develop intensity duration frequency curves for urban drainage systems • develop design storms to size the various components of drainage systems. • apply best management practices to manage urban flooding. • prepare master drainage plan for an urbanizedarea

			• By the end of the course, the student should be able to possess the knowledge of various methods of ground improvement and their suitability to different field situations. • The student should be in a position to design a reinforced earth embankment and check its stability. • The student should know the various functions of Geosynthetics and their applications in Civil Engineering practice. • The student should be able to understand the concepts and applications of grouting. • Understand the features and functions of pavement management systems • Asses pavement performance by observing different models • Evaluate the pavement functionally and structurally • Identify and select suitable design strategies and decide the maintenance and rehabilitation measures required for a given pavement • Acquire knowledge of expert systems for managing pavements
4	PR801	Project Work Phase-II	• Apply all levels of Engineering knowledge in solving the Engineeringproblems. • Work together with teamspirit. • Use Civil Engineering software at leastone. • Document theprojects

Principal
IDEAL INSTITUTE OF TECHNOLOGY
Vidyutnagar, KAKINADA.