Vision of the Institution

To ignite the minds of the students through academic excellence so as to bring about social transformation and prosperity.

Mission of the Institution

- To expand the frontiers of knowledge through Quality Education.
- To provide valued added Research and Development.
- To embody a spirit of excellence in Teaching, Creativity, Scholarship and Outreach.
- To provide a platform for synergy of Academy, Industry and Community.
- To inculcate high standards of Ethical and Professional Behavior.

Vision of ECE Department

In pursuit of world class excellence in the field of Electronics& Communication Engineering by imparting quality education and promoting Research.

Mission of ECE Department

- To empower students with knowledge and competencies in the field of Electronics & Communication Engineering conforming to International standards.
- To produce creative solutions essential to local and global needs in the field of Electronics & Communication Engineering.
- To mould the students professionally with a consciousness of moral values and professional ethical code**.**

Program Educational Objectives (PEOs) of ECE Department

PEO1: To provide world class Education in the principles of engineering that incorporate open ended design experience and the use of software and hardware tools related to Electronics and Communication Engineering and hence improve the employability skills of the student.

PEO2: To make the students able to function with multi-disciplinary teams that will enhance the leadership qualities and to formulate and solve engineering problems as a team which helps the student to adopt better professional conduct.

PEO3: To provide learning environment that provides open interaction for the students with faculty and staff that makes them innovative and dynamic and encourages research and motivate them to solve the problems of the society.

Program Outcomes (POs) of ECE Department

Engineering Graduates will be able to:

1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

11. **Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes (PSOs) of ECE Department

1. Will be equipped with knowledge of innovative, dynamic complete design flow specialized in implementation of projects pertaining to communication system, signal processing, digital and analog IC design, embedded systems and will integrate all areas to illustrate the goal of digital India.
2. Will have the ability to analyze, design electronics and communication applications using software tools like, pSpice, XYLINX, MATLAB, Mentor Graphics and other related software's.
3. Can demonstrate the principles of semiconductor devices, digital system, Microprocessor and microcontrollers, signal processing, antenna design in fields of consumer electronics, medical, defence and spacecraft electronics industry.
4. Will have strong ethical moral values and sound fundamental foundation of technical knowledge in all core subjects which help them to explore scientific theories, ideas, methods and technologies that help in solving current and future universal societal problems through Assistive Technology Laboratory as a flat form.

ACADEMIC REGULATIONS

B.Tech. FOUR YEAR DEGREE COURSE

R19 Regulations

(Applicable for the batches admitted from 2019-2020)

VISHNU
UNIVERSAL LEARNING

VISHNU INSTITUTE OF TECHNOLOGY: BHIMAVARAM

(Autonomous)

Approved by AICTE & Affiliated to JNTUK, Kakinada

Accredited with 'A' Grade by NAAC & NBA

Vishnupur, Bhimavaram, West Godavari Dist., Andhra

Pradesh, India. PIN - 534202

Email: info@vishnu.edu.in, Website: www.vishnu.edu.in

I YEAR II SEMESTER							
S. No	**Course Name**	**L**	**T**	**P**	**C**	**I**	**E**
1	Mathematics-II (PDE& Vector Calculus Calculus)	2	1	-	3	40	60
2	Mathematics III (Transform Calculus & Complex Variables)	2	1	-	3	40	60
3	Applied Chemistry	3	-	-	3	40	60
4	Network Analysis	2	1	-	3	40	60
5	AI Tools, Techniques & Applications	2	1	-	3	40	60
6	Applied Chemistry Lab	-	-	3	1.5	40	60
7	AI Tools, Techniques & Applications Lab	-	-	3	1.5	40	60
8	Computer Programming Lab	-	-	2	1	40	60
9	Engineering Workshop & IT Workshop	-	-	3	1.5	40	60
10	Environmental Science	3	-	-	-	-	-
	Total	**14**	**4**	**11**	**20.5**	**360**	**540**
						900	

I YEAR II SEMESTER

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

R19 SYLLABUS

Course Name	Mathematics-II (PDE &Vector Calculus)				
Year/Semester	I B. Tech/II Sem	L	T	P	C
Regulation Year	2019-20	2	1	-	3

Course Objectives: To enable the students to

1. Make the students learn modeling various physical phenomena as first and second order PDE
2. Learn techniques to solve as first and second order PDE.

UNIT-I: First Order Partial Differential Equations

Formation of Partial differential equations by elimination of arbitrary constants and arbitrary functions– solutions of first order linear (Lagrange) equations and nonlinear equations-standard types

UNIT- II: Higher Order Partial Differential Equations

Solutions of Linear Partial differential equations with constant coefficients. RHS terms of the type e^{ax+by}, Sin(ax+by), Cos (ax+by), $x^m y^n$. Classification of second order partial differential equations-parabolic, elliptical and hyperbolic.

UNIT-III: Applications of Partial Differential Equations

Method of Separation of Variables-Applications to wave equation, heat conduction equation in one dimensions and Laplace equation in two dimensions

UNIT-IV: Laplace Transforms

Laplace transform-Definition-conditions for existence, – Linear Property -Shifting Theorems, Laplace transform of Standard Functions-Transforms of derivatives and integrals–Unit step function–Dirac delta function. Inverse Laplace transforms by Partial fractions–Convolution theorem (without proof) – inverse by convolution, Solving ordinary differential equations with constant coefficients.

UNIT-V: Vector Differentiation

Vector Differentiation - Scalar and Vector Fields, Level surfaces, Directional Derivative, Gradient of a Scalar Field, Divergence, Curl of a vector field and applications, Vector Identities

Unit-VI: Vector Integration

Vector Integration - Line integral, work done, areas, Surface integrals.

Vector integral theorems - Green's theorem, Stokes theorem and Gauss Divergence theorem (All theorems without proof) and applications areas, surface areas and volumes.

Text Books:

1. B. S. Grewal, Higher Engineering Mathematics, 42nd Ed., Khanna Publishers, New Delhi, 2012

2. Erwin .Kreyszig, Advanced Engineering Mathematics,9th Ed., Wiley, 2012

References Books:

1. T.K.V.Iyengar, B. Krishna Ghandhi, S. Ranganathan and M.V.S.S.N.Prasad, Engineering Mathematics, Volume-I, 12th Ed., S. Chand Publishers, 2014.

2. B. V. Ramana, Engineering Mathematics, 4th Ed., Tata McGraw Hill, New Delhi, 2009

3. D. S. Chandrashekharaiah, Engineering Mathematics, Volume 1, Prism Publishers, 2010

4. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, reprint, 2008

Course Outcomes: After completing this course, the students will be able to

- Model first order linear and non-linear partial differential equations and solve analytically
- Model higher order homogeneous & non homogeneous linear partial differential equations and solve analytically
- Model physical problems of engineering like steady and unsteady heat conduction, vibration of string
- Use of Laplace transforms in solving the differential equations with the initial and boundary conditions.
- Understand electric and magnetic fields and their physical significance
- Compute line, surface and volume integrals and evaluate the work done, flux, potential functions

Course Name	Mathematics III (Transform Calculus & Complex Variables)				
Year/Semester	I B. Tech/I Sem	L	T	P	C
Regulation Year	2019-20	2	1	-	3

Course Objectives: To enable the students to

- Learn the Fourier series of periodic functions and expand a function in sine and cosine series
- Solve problems related to engineering applications using integral transform techniques
- Evaluate the problems to engineering applications using Z- transform techniques
- Make use the significance of differentiability and analyticity for complex variable functions and be familiar with the Cauchy-Riemann equations.
- Find integrals along a path in the complex plane using the Cauchy's theorem and Residue theorem.
- Solve the singularities of complex variable function by expanding them into Taylor's and Laurent's series and finding residues

UNIT - I: **Fourier series**

Introduction, Periodic function, Dirichlet's conditions, Fourier series of periodic function, Fourier series in an arbitrary interval, Fourier series of even and odd functions, Fourier series at the point of discontinuity, Half-range Fourier Sine and Cosine series.

Unit- II: Fourier Transforms

Fourier integral theorem (only statement) – sine and cosine integrals, Fourier transforms – sine and cosine transforms –Inverse formulae-Properties- Finite Fourier Transforms.

UNIT - III: Z-Transforms

Z-transform – properties – Damping rule – Shifting rule – Initial and final value theorems – Inverse Z –transform - Convolution theorem – solving difference equations by using Z-transforms.

UNIT - IV: Functions of Complex Variables

Continuity and differentiability, Analyticity, properties, Cauchy Riemann equations in Cartesian and polar coordinates, harmonic and conjugate harmonic functions, Milne – Thompson method.

Unit – V: Complex Integration

Integration of complex functions – Line Integrals, Cauchy's Integral theorem, Cauchy's Integral Formula - Generalized Cauchy's Integral formula.

Unit -VI: Complex power series

Complex power series-Taylor's Series and Laurent's Series, Singularities, Poles and Residues-Cauchy Residues theorem (without proof) and applications

Text Books:

1. B. S. Grewal, Higher Engineering Mathematics, 42nd Ed., Khanna Publishers, New Delhi, 2012
2. Erwin Kreyszig, Advanced Engineering Mathematics, 9th Ed., Wiley, 2012.

References Books:

1. T.K.V.Iyengar, B. Krishna Ghandhi, S. Ranganatham and M.V.S.S.N.Prasad, Engineering Mathematics, Volume-I, 12th Ed., S. Chand Publishers, 2014
2. D. S. Chandrashekharaiah, Engineering Mathematics, Volume 1, Prism Publishers, 2010
3. B. V. Ramana, Engineering Mathematics, 4th Ed., Tata McGraw Hill, New Delhi, 2009
4. S. KaleshaValli, G. VenkataRao and A.V. Papa Rao, Engineering Mathematics-I, Cengage Publications, 2018.

Course Outcomes: After completing this course, the students will be able to

- Compute Fourier series of periodic functions
- Identify and solve problems related to engineering application using integral transform techniques
- Identify and solve problems related to engineering applications using Z-transform techniques
- Understand differentiability and analyticity for complex variable functions and learn sufficient conditions for analyticity
- Evaluate integration of complex valued functions
- Classify the singularities of complex function of one variable

Course Name	Applied Chemistry				
Year/Semester	I B. Tech/II Sem	L	T	P	C
Regulation Year	2019-20	3	-	-	3

Course Objectives: To enable the students to

- Plastics are nowadays used in household appliances; also they are used as composites in aerospace industries.
- Fuels as a source of energy are a basic need of any industry, particularly industries like thermal power stations, steel industry, fertilizer industry etc., and hence they are introduced.
- The basics for the construction of galvanic cells. Also if corrosion is to be controlled, one has to understand the mechanism of corrosion which itself is explained by electrochemical theory.
- Increases in demand, a wide variety of materials are coming up; some of them have excellent engineering properties and these materials are introduced.
- Understanding of crystal structures will help to understand the conductivity, semiconductors and superconductors.
- Increase in demand for power and also with depleting sources of fossil fuels, the demand for alternative sources of fuels is increasing. Some of the prospective fuel sources are introduced.

UNIT I: High Polymers and Plastics

Polymerization: Introduction- Methods of polymerization --Thermoplastics and Thermosetting plastics – Compounding and fabrication (4/5 techniques)- Preparation, properties and applications of polyethylene, PVC, Bakelite Teflon. Conducting polymers, Fiber Reinforced Plastics and Biodegradable Polymers. Elastomers – Natural rubber - vulcanization – Synthetic rubbers: Buna S, Buna N and Thiokol – Applications of elastomers.

UNIT II: Fuel Technology

Introduction – Calorific value - HCV and LCV – Bomb calorimeter – Numerical problems – Coal — Proximate and ultimate analysis –Significance of the analyses – Liquid fuels – Petroleum- Refining – Cracking – Petrol knocking – Diesel knocking - Octane and Cetane ratings – Anti-knock agents –Gaseous fuels – Natural gas, LPG and CNG. – Biofuels- Biodiesel and Power alcohol

UNIT III: Electrochemical Cells and Corrosion

Galvanic cells (Construction and working) – Electro chemical series and uses of this series- Standard electrodes (Hydrogen and Calomel electrodes) Batteries: Dry Leclanche Cell - Ni-Cd cells - Li cells.

Corrosion:- Definition – Theories of Corrosion (dry & wet corrosion) – Formation of galvanic cells by different metals, differential aeration - waterline corrosion – Pitting corrosion - Factors which influence the rate of corrosion - Protection from corrosion: Methods of application on metals (Galvanizing, Tinning, Electroplating, Electro less plating)

UNIT IV: Chemistry of Advanced Materials

Nano materials:- Introduction – Bottom up and Top down approach- Sol gel method- Self assembled layers Characterization of Nano materials by BET and TEM - Carbon Nano tubes and fullerenes: Types, Preparation (Arc discharge and Laser ablation and Chemical Vapour Deposition methods) properties and applications

Liquid crystals: - Introduction – Types – Applications

Superconductors: - Type-I & Type-II, properties &applications.

Green synthesis: - Principles – Aqueous phase method, super critical fluid Extraction method and Bio catalytic methods of synthesis-Applications.

UNIT V: Solid State Chemistry

Types of solids – Crystal defects- Frenkel and Schottky defects – Spinel and Inverse spinel. Hall effect and applications.

Semiconductors: Preparation of pure semiconductors by Zone refining, distillation and Czochralski crytal pulling technique- Doping- Epitaxy, diffusion and Ion implantation technique- Intrinsic and Extrinsic semiconductors - Applications.

Insulators: Electrical Insulators and their applications.

UNIT VI: Non-Conventional Energy Sources

Solar Energy: Introduction, application of solar energy – photovoltaic cell: design, working and its importance.

Non-conventional energy sources: Hydropower include setup a hydropower plant (schematic diagram), Geothermal energy (Introduction-schematic diagram of a geothermal power plant), Tidal and wave power (Introduction- Design and working-movement of tides and their effect on sea level), Biomass energy.

Fuel cells: - Introduction - cell representation, H_2-O_2 fuel cell: Design and working, advantages and limitations. Types of fuel cells: methanol-oxygen - phosphoric acid fuel cells.

Text Books:

1. Engineering Chemistry by Jain and Jain; Dhanpat Rai Publicating Co.
2. Engineering Chemistry by Shikha Agarwal; Cambridge University Press, 2015 edition.

Reference Books:

1. Engineering Chemistry by Prasanth Rath, Cengage Learning, 2015 edition.
2. A text book of engineering Chemistry by S. S. Dara; S. Chand & Co Ltd., Latest Edition.

Course Outcomes: After completing this course, the students will be able to

- The advantages and limitations of plastic materials and their use in design would be understood.
- Fuels which are used commonly and their economics, advantages and limitations are discussed.
- Reasons for corrosion and some methods of corrosion control would be understood.
- The students would be now aware of materials like nano-materials and fullerenes and their uses. Similarly liquid crystals and superconductors are understood. The importance of green synthesis is well understood and how they are different from conventional methods is also explained.
- Conductance phenomenon is better understood.
- The students are exposed to some of the alternative fuels and their advantages and limitations.

Course Name	Network Analysis				
Year/Semester	I B. Tech/II Sem	L	T	P	C
Regulation Year	2019-20	2	1	-	3

Course Objectives: To enable the students to

- Prepare the students to have a basic knowledge in the analysis of Electric Networks
- Introduce Electrical Circuits and various problem solving methods
- Analyze the various R-L-C circuits, star and delta connections.
- Analyze the various coupled circuits and resonance
- Solve the given circuit with various theorems and methods.
- Distinguish between tie set and cut set methods for solving various circuits.

UNIT – I: Fundamentals

Definitions of terms associated with periodic functions: Time period, Angular velocity and frequency, RMS value, Average value, Form factor and peak factor- problem solving, Phase angle, Phasor representation, Addition and subtraction of phasors, mathematical representation of sinusoidal quantities, explanation with relevant theory, problem solving. Principal of Duality with examples.

UNIT-II: Introduction to Electrical Circuits

Network elements classification, Electric charge and current, Electric energy and potential, Resistance parameter – series and parallel combination, Inductance parameter – series and parallel combination, Capacitance parameter – series and parallel combination. Energy sources: Ideal, Non-ideal, Independent and dependent sources, Source transformation, Kirchoff's laws, Mesh analysis and Nodal analysis problem solving with resistances only including dependent sources also.

UNIT – III: Steady State Analysis of A.C Circuits

Response to sinusoidal excitation - pure resistance, pure inductance, pure capacitance, impedance concept, phase angle, series R-L, R-C, R-L-C circuits problem solving. Complex impedance and phasor notation for R-L, R-C, R-L-C problem solving using mesh and nodal analysis, Star-Delta conversion, problem solving. (Text Books: 1, 2, Reference Books: 3)

UNIT IV: Coupled Circuits

Coupled Circuits: Self-inductance, Mutual inductance, Coefficient of coupling, analysis of coupled circuits, Natural current, Dot rule of coupled circuits, Conductively coupled equivalent circuits- problem solving.

Resonance: Introduction, Definition of Q, Series resonance, Bandwidth of series resonance, Parallel resonance, Condition for maximum impedance, current in anti-resonance, Bandwidth of parallel resonance, general case- resistance present in both branches, anti-resonance at all frequencies. (Text Books: 2, 3, Reference Books: 3)

UNIT V: Network Theorems

Thevinin's, Norton's, Milliman's, Reciprocity, Compensation, Substitution, Superposition, Max Power Transfer, Tellegens- problem solving using dependent sources also.

UNIT VI: Network Topology

Definitions of branch, node, tree, planar, non-planar graph, incidence matrix, basic tie set schedule, basic cut set schedule.

Text Books:

1. Network Analysis – ME Van Valkenburg, Prentice Hall of India, 3rd Edition, 2000.
2. Network Analysis by K.Satya Prasad and S Sivanagaraju, Cengage Learning
3. Electric Circuit Analysis by Hayt and Kimmarle, TMH

References Books:

1. Network lines and Fields by John. D. Ryder 2nd edition, Asia publishing house.
2. Basic Circuit Analysis by DR Cunninghan, Jaico Publishers.
3. Network Analysis and Filter Design by Chadha, Umesh Publications.

Course Outcomes: After completing this course, the students will be able to

- Articulate in working of various components of a circuit.
- Familiar with ac and dc circuits solving.
- Ready with the most important concepts like mesh and nodal analysis.
- Analyze various coupled circuits and resonance
- Solve the given circuit with various theorems and methods.
- Solve Circuits using Tree, Node, Branch, Cut set, Tie Set Methods.

Course Name	Artificial Intelligence Tools, Techniques and Applications				
Year/Semester	I B. Tech/II Sem	L	T	P	C
Regulation Year	2019-20	2	1	-	3

Course Objectives: To enable the students to

- Define AI and ML and understand their relationship with data
- Learn importing data and exploring using Python
- Understand different data wrangling techniques and their significance
- Understand different types of supervised learning and build various regression models
- Understand basic math fundamentals of this domain
- Understand performance metrics
- Understand classification as part of supervised learning and demonstrate and evaluate different classification techniques and models in Python
- Intuitively understand basic math fundamental behind each technique
- Explain the mechanism of unsupervised learning and practice various clustering techniques in Python.
- Understand Dimensionality reduction and its importance
- Comprehend text mining and its applications
- Understand basic working of recommender system
- know probabilistic learning models and their applications

UNIT 1: Introduction and Basic Tools in Python

Introduction to AI and Machine Learning. Emergence of AI. Relationship between AI, ML and Data Science. Types of Machine Learning with definitions and application areas. Data wrangling and manipulation using Numpy and Pandas in Python. Types of data. Data visualization using matplotlib and seaborn.

UNIT 2: Supervised learning - Regression

Introduction, KNN, Linear Regression, Least Squares, Mean Square Error. Plotting regression line and predicting with Scikit Learn. Gradient Descent. Stochastic Gradient Descent. Learning rate. Higher Order curves. Modifying code in scipy to switch to higher order polynomial fitting. Over fitting, Under fitting. Regularization. Measures of accuracy. Train-Test-Split. k-fold Cross Validation. Hyper parameter tuning.

UNIT 3: Supervised Learning - Classification

Definition of classification, use cases and algorithms using Scikit Learn, KNN, Logistic Regression, Decision Tree classifier, Support Vector Machines, Performance measures

UNIT 4: Unsupervised Learning

Definition, K-Means, Hierarchical clustering techniques. Dimensionality reduction using PCA. Feature Engineering – selection, factor analysis.Time series modeling (time series data types, stationarity and ARIMA modeling)

UNIT 5: Natural Language Processing / Text mining

Introduction, Applicaions. Chatbots, virtual agents (Alexa, Google Asisstant, Siri). Importance, Applications, NLP Subproblems. Components of Natural Language. Steps to get text data into workable format.Terms Frequency, Inverse Document Frequency, Bag of Words, ngram, one hot encoding. Notion of corpus. Intro to NLTK and use.

UNIT 6: Intro to Other Common Learning Methods and Applications

Intro to ANN and deep learning with applications, intro to ensemble learning with bagging and boosting, random forest and ada boost, time series modelling, Intro to probabilistic methods with terminology and applications. Naïve Bayes. Recommender systems, collaborative filtering, association Rule Mining, apriority algorithm.

Text Books:

1. Stuart J. Russell and Peter Norvig, Artificial Intelligence A Modern Approach
2. Tom Markiewicz & Josh Zheng, Getting started with Artificial Intelligence, Published by O'Reilly Media,2017
3. Stuart J. Russell and Peter Norvig, Artificial Intelligence A Modern Approach

References:

1. Build an AI Assistant with Wolfram Alpha and Wikipedia in Python. https://medium.com/@salisuwy/build-an-ai-assistant-with-wolfram-alpha-and-wikipedia-in-python-d9bc8ac838fe
2. Tom Markiewicz & Josh Zheng,Getting started with Artificial Intelligence, Published by O'Reilly Media,2017
3. Joseph Howse, Prateek Joshi, Michael Beyeler - Opencv_ Computer Vision Projects with Python-Packt Publishing (2016)
4. Tom Markiewicz & Josh Zheng,Getting started with Artificial Intelligence,Published by O'Reilly Media,2017
5. Curated Datasets on Kaggle https://www.kaggle.com/datasets

6. Aurélien Géron,Hands on Machine Learning with Scikit-Learn and TensorFlow [Concepts, Tools, and Techniques to Build Intelligent Systems], Published by O'Reilly Media,2017

Course Outcomes: After completing this course, the students will be able to

- Understand the importance of AI.
- Understand concepts of Machine Learning algorithms and their limitations.
- Develop Chatbots based on the requirements.
- Analyze complex problems involving image processing, such as quality control, visual surveillance, multimodal human-machine interfaces, and image compression.
- Understand the application of Reinforcement Learning
- Understand smart solutions for various domains

Course Name	Applied Chemistry Lab				
Year/Semester	I B. Tech/II Sem	L	T	P	C
Regulation Year	2019-20	-	-	3	1.5

List of Experiments:

1. Trial experiment - Determination of HCl using standard Na_2CO_3 solution.
2. Determination of alkalinity of a sample containing Na_2CO_3 and NaOH.
3. Determination of $KMnO_4$ using standard Oxalic acid solution.
4. Determination of Copper using standard $K_2Cr_2O_7$ solution.
5. Determination of temporary and permanent hardness of water using standard EDTA solution.
6. Determination of Vitamin – C
7. Determination of P^H of the given sample solution using P^H meter.
8. Conductometric titration between strong acid and strong base.
9. Potentiometric titration between strong acid and strong base.
10. Estimation of copper by Colorometry
11. Estimation of KCl by Ion exchange resin method.
12. Photo Chemical Reduction of Ferric Salt (Blue-Printing)
13. Adsorption of acetic acid on charcoal.
14. Determination of rate of corrosion.
15. Preparation of a polymer.

Reference Books:

1. A Textbook of Quantitative Analysis, Arthur J. Vogel.
2. Dr. Jyotsna Cherukuris (2012) Laboratory Manual of engineering chemistry-II, VGS
3. Techno Series
4. Chemistry Practical Manual, Lorven Publications
5. Practical Engineering Chemistry, K. Mukkanti (2009) B.S. Publication

. Course Name	AI Tools, Techniques and Applications Lab				
Year/Semester	**I B. Tech/II Sem**	**L**	**T**	**P**	**C**
Regulation Year	**2019-20**	**-**	**-**	**3**	**1.5**

List of Experiments:

1. Supervisely - Perform Data Labelling for various images using object recognition
2. Lobe.ai - Build custom models using the visual tool for Object recognition and sentiment analysis that can convert facial expressions into emoticons
3. Teachable Machine - In Browser Object Recognition through Brain.JS
4. Liv.ai - App for Speech recognition and Synthesis through APIs
5. Building a Chatbot using AWS Lex, Pandora bots
6. Configure an existing Neural Network by manipulating various parameters involved
7. Build a virtual assistant for Wikipedia using Wolfram Alpha and Python
8. Build a Convolutional Neural Network for Cat vs Dog Image Classification

Course Name	Computer Programming Lab				
Year/Semester	I B. Tech/II Sem	L	T	P	C
Regulation Year	2019-20	-	-	2	1

List of Experiments:

Exercise - 1 Basic

a) What is an OS Command, Familiarization of Editors - vi, Emacs

b) Using commands like mkdir, ls, cp, mv, cat, pwd, and man

c) C Program to Perform Adding, Subtraction, Multiplication and Division of two numbers From Command line

Exercise - 2 Basic Math

a) Write a C Program to Simulate 3 Laws at Motion

b) Write a C Program to convert Celsius to Fahrenheit and vice versa

Exercise - 3 Control Flow - I

a)Write a C Program to Find Whether the Given Year is a Leap Year or not.

b)Write a C Program to Add Digits & Multiplication of a number

Exercise – 4 Control Flow - II

a)Write a C Program to Find Whether the Given Number is

i) Prime Number

ii) Armstrong Number

b) Write a C program to print Floyd Triangle

c) Write a C Program to print Pascal Triangle

Exercise – 5 Functions

a) Write a C Program demonstrating of parameter passing in Functions and returning values

b) Write a C Program illustrating Fibonacci, Factorial with Recursion without Recursion

Exercise – 6 Control Flow - III

a) Write a C Program to make a simple Calculator to Add, Subtract, Multiply or Divide Using switch...case

b) Write a C Program to convert decimal to binary and hex (using switch call function the function)

Exercise – 7 Functions - Continued

Write a C Program to compute the values ofsin x and cos x and e^x values using Series expansion. (Use factorial function)

Exercise – 8 Arrays

Demonstration of arrays

a) Search-Linear.

b) Sorting-Bubble, Selection.

c) Operations on Matrix.

Exercises - 9 Structures

a) Write a C Program to Store Information of a Movie Using Structure

b) Write a C Program to Store Information Using Structures with Dynamically Memory Allocation

c) Write a C Program to Add Two Complex Numbers by Passing Structure to a Function

Exercise - 10 Arrays and Pointers

a) Write a C Program to Access Elements of an Array Using Pointer

b) Write a C Program to find the sum of numbers with arrays and pointers.

Exercise – 11 Dynamic Memory Allocations

a) Write a C program to find sum of n elements entered by user. To perform this program, allocate memory dynamically using malloc () function.

b) Write a C program to find sum of n elements entered by user. To perform this program, allocate memory dynamically using calloc () function. Understand the difference between the above two programs

Exercise – 12 Strings

a) Implementation of string manipulation operations with library function.

i) Copy

ii) Concatenate

iii) Length

iv) Compare

b) Implementation of string manipulation operations without library function.

i) Copy

ii) Concatenate

iii) Length

iv) Compare

Exercise -13 Files

a) Write a C programming code to open a file and to print it contents on screen.

b) Write a C program to copy files

Exercise - 14 Files Continued

a) Write a C program merges two files and stores their contents in another file.

b) Write a C program to delete a file.

Note:

a) All the Programs must be executed in the Linux Environment. (Mandatory)

b) The Lab record must be a print of the LATEX (.tex) Format.

Course Name	Engineering Workshop & IT Workshop				
Year/Semester	I B. Tech/II Sem	L	T	P	C
Regulation Year	2019-20	-	-	3	1.5

List of Experiments:

1. System Assembling, Disassembling and identification of Parts / Peripherals
2. **Operating System Installation**-Install Operating Systems like Windows, Linux along with necessary Device Drivers.
3. **MS-Office / Open Office**

   a. **Word** - Formatting, Page Borders, Reviewing, Equations, symbols.

   b. **Spread Sheet** - organize data, usage of formula, graphs, and charts.

   c. **Power point** - features of power point, guidelines for preparing an effective presentation.

   d. **Access**- creation of database, validate data.
4. **Network Configuration & Software Installation**-Configuring TCP/IP, proxy and firewall settings. Installing application software, system software & tools.
5. **Internet and World Wide Web**-Search Engines, Types of search engines, netiquette, cyber hygiene.
6. Trouble Shooting-Hardware trouble shooting, Software trouble shooting.
7. **MATLAB-** basic commands, subroutines, graph plotting.
8. **LATEX**-basic formatting, handling equations and images.

Text Books:

1. Computer Hardware, Installation, Interfacing, Troubleshooting and Maintenance, K.L. James, Eastern Economy Edition.
2. Microsoft Office 2007: Introductory Concepts and Techniques, Windows XP Edition ByGary B. Shelly, Misty E. Vermaat and Thomas J. Cashman (2007, Paperback).
3. LATEX- User's Guide and Reference manual, Leslie Lamport, Pearson, LPE, 2/e.
4. Getting Started with MATLAB: A Quick Introduction for Scientists and ngineers, Rudraprathap, Oxford University Press, 2002.
5. Scott Mueller's Upgrading and Repairing PCs, 18/e, Scott. Mueller, QUE, Pearson, 2008
6. The Complete Computer upgrade and repair book, 3/e, Cheryl A Schmidt, Dreamtech.
7. Comdex Information Technology course tool kit Vikas Gupta, WILEY Dreamtech.

Course Name	Environmental Science				
Year/Semester	I B. Tech/II Sem	L	T	P	C
Regulation Year	2019-20	3	-	-	-

Course Objectives: To enable the students to

- Make the students to get awareness on environment, to understand the importance of protecting natural resources, ecosystems for future generations and pollution causes due to the day to day activities of human life to save earth from the inventions by the engineers.

UNIT – I: Multidisciplinary nature of Environmental Science and Ecosystems.

Definition, Scope and Importance and sustainability – Need for public awareness- Human population and Environment. Ecosystems: Concept of an ecosystem. - Structure and function of an ecosystem. – Types of ecosystems- Forest, Grassland, Desert and Aquatic ecosystems- Food chains, food webs and ecological pyramids.

UNIT – II: Natural Resources

Forest resources: Use and over – exploitation, deforestation – Timber extraction – Mining, dams and other effects on forest and tribal people.

Water resources: Conflicts over water, dams – benefits and problems

Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources.

Energy resources: Growing energy needs- renewable and non-renewable energy sources.

Food resources – World food problems

Land resources- Wasteland reclamation.

Role of an individual in conservation of natural resources.

UNIT – III: Biodiversity and its conservation

Definition: Genetic, species and ecosystem diversity- classification - Value of biodiversity: consumptive use, productive use, and social - Biodiversity at national and local levels. Hot-spots of biodiversity - Threats to biodiversity - Endangered and endemic species of India - conservation of biodiversity.

UNIT – IV: Environmental Pollution

Definition, Cause, effects and control measures of Air pollution, Water pollution, Soil pollution, Noise pollution, Nuclear hazards. Role of an individual in prevention of pollution. - Pollution case studies. Solid Waste Management: Sources, effects and control measures of

urban and industrial solid wastes. Biomedical and e - waste management. Global Environmental Challenges: Global warming and climate change, acid rains, ozone layer depletion.

UNIT – V: Social Issues and the Environment

Urban problems related to energy -Water conservation, rain water harvesting-Resettlement and rehabilitation of people. Environmental Protection Act –Air Act. –Water Act - Wildlife Protection Act -Forest Conservation Act- Public awareness. International protocols: Stockholm and Rio Summit, Kyoto protocol and Montreal protocol.

UNIT – VI: Environmental Management

Impact Assessment and its significance - various stages of EIA- Environmental audit, Ecotourism. The student Visit of an Industry / Ecosystem.

Text Books:

1. A Textbook of Environmental Studies, Shaashi Chawla, TMH, New Delhi.
2. Textbook of Environmental Studies for Undergraduate Courses by Erach Bharucha for University Grants Commission.
3. Environmental Studies, R. Rajagopalan, 2nd Edition, 2011, Oxford University Press.

Reference Books:

1. Environmental Studies, K. V. S. G. Murali Krishna, VGS Publishers, Vijayawad
2. Text Book of Environmental Studies, Deeshita Dave & P. Udaya Bhaskar, Cengage Learning.
3. Text book of Environmental Science and Technology – Dr. M. Anji Reddy , BS Publications
4. Environment Studies, Anubha Kaushik, C P Kaushik, New Age International Publishers, 2014
5. Environmental Studies, P. N. Palanisamy, P. Manikandan, A. Geetha, and K. Manjula Rani; Pearson Education, Chennai

Course Outcomes: After completing this course, the students will be able to

- Articulate the basic structure, functions, and processes of key social systems affecting the environment.
- Explain how Natural resources should be used.
- Identify the threats to biodiversity.
- Understand Causes, effects and control measures of environmental pollution.
- Gain knowledge about watershed management and environmental ethics.

- Gain a rigorous foundation in various scientific disciplines as they apply to environmental science, such as ecology, evolutionary biology, hydrology, and human behaviour.