

Annamacharya Institute of Technology and Sciences, Tirupati
Course structure for Four Year Regular B.Tech. Degree Program
(Effective for the batches admitted from 2019-20)

CIVIL ENGINEERING (CE)

I B. Tech – II Semester

S.No	Category	Course Code	Course Title	Hours per week			Credits	Scheme of Examination (Max. Marks)		
				L	T	P		CIE	SEE	Total
THEORY										
1	BSC	19ABS9906	Differential Equations and Vector Calculus	3	1	0	4	30	70	100
2	BSC	19ABS9905	Engineering Chemistry	3	0	0	3	30	70	100
3	ESC	19AES0202	Basics of Electrical and Electronics Engineering-I	3	0	0	3	30	70	100
4	ESC	19AES0502	Data Structures	3	0	0	3	30	70	100
PRACTICAL										
5	ESC	19AES0301	Engineering Graphics Lab	1	0	4	3	30	70	100
6	BSC	19ABS9910	Engineering Chemistry Lab	0	0	3	1.5	30	70	100
7	ESC	19AES0204	Basics of Electrical and Electronics Engineering -I Lab	0	0	3	1.5	30	70	100
8	ESC	19AES0504	Data Structures Lab	0	0	3	1.5	30	70	100
9	LC	19ALC0101	Civil Engineering Workshop	0	0	2	1	30	70	100
Total							21.5	270	630	900

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES: TIRUPATI

Year : I B.Tech

Semester: II Sem

Branch of Study: ME & CE

Subject Code 19ABS9906	Subject Name: Differential Equations and Vector Calculus	L 3	T 0	P 0	Credits: 3
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Course Outcomes:

1. Apply the mathematical concepts of ordinary differential equations of higher order.
2. solve the differential equations related to various engineering fields .
3. Identify solution methods for partial differential equations that model physical processes .
4. interpret the physical meaning of different operators such as gradient, curl and divergence .
5. estimate the work done against a field, circulation and flux using vector calculus .

UNIT I: Linear Differential Equations of Higher Order

Definitions, complete solution, operator D, rules for finding complimentary function, inverse operator, rules for finding particular integral, method of variation of parameters.

UNIT II: Equations Reducible to Linear Differential Equations and Applications

Cauchy's and Legendre's linear equations, simultaneous linear equations with constant coefficients, Applications: Mass spring system and L-C-R Circuit problems

UNIT III: Partial Differential Equations – First order

First order partial differential equations, solutions of first order linear and non-linear PDEs. Solutions to homogenous and non-homogenous higher order linear partial differential equations.

UNIT IV: Multivariable Calculus (Vector differentiation)

Scalar and vector point functions, vector operator del, del applies to scalar point functions- Gradient, del applied to vector point functions-Divergence and Curl, vector identities

UNIT V: Multivariable Calculus (Vector integration)

Line integral-circulation-work done, surface integral-flux, Green's theorem in the plane (without proof), Stoke's theorem (without proof), volume integral, Divergence theorem (without proof).

Text Books and Reference Books:

1. B. S. Grewal, Higher Engineering Mathematics, 44th Edition, Khanna publishers, 2017.
2. Erwin Kreyszig, Advanced Engineering Mathematics, 10th Edition, John Wiley & Sons, 2011.

References:

1. Dr.T.K.V.Iyengar, Engineering Mathematics-I,S.Chand publishers
2. R. K. Jain and S. R. K. Iyengar, Advanced Engineering Mathematics, 3/e, Alpha Science International Ltd., 2002
3. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics,Laxmi publication,2008

List of COs	PO no. and keyword	Competency	Performance Indicator
CO 1	PO1: Engineering Knowledge	1.1	1.1.1
CO 2	PO2: Problem Analysis	2.1	2.1.3
CO 3	PO1: Engineering Knowledge	1.1	1.1.1
CO 4	PO1: Engineering Knowledge	1.1	1.1.1
CO 5	PO2: Problem Analysis	2.1	2.1.3

Annamacharya Institute of Technology and Sciences::Tirupati

Year : I

Semester : II

Branch of Study : ME & CE

Subject Code:19ABS9905	Subject Name: Engineering chemistry	L T P 3 0 0	Credits:3
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Course Outcomes:

1. Differentiate between hard water and soft water. Understand the disadvantages of using hard water domestically and industrially. Select and apply suitable treatments domestically and industrially
2. Understand the electrochemical sources of energy
3. Demonstrate the corrosion prevention methods and factors affecting corrosion
4. explain the preparation, properties, and applications of thermoplastics & thermosettings, elastomers & conducting polymers.
5. Explain calorific values, octane number, refining of petroleum and cracking of oils
6. Explain the manufacturing of portland cement and concrete formation
7. Summarize the application of SEM, TEM and X-ray diffraction in surface characterization
8. Explain the principles of spectrometry, GC and HPLC in separation of gaseous and liquid mixtures

Unit 1: Water Technology

Introduction –Soft Water and hardness of water, Estimation of hardness by EDTA Method - Boiler troubles - scale and sludge, Industrial water treatment – specifications for drinking water, Bureau of Indian Standards(BIS) and World health organization(WHO) standards, zeolite and ion-exchange processes - desalination of brackish water, reverse osmosis (RO) and electro dialysis.

Unit 2: Electrochemistry and Applications:

Electrodes – concepts, electrochemical cell, Nernst equation, cell potential calculations.

Primary cells – Fuel cells, hydrogen-oxygen, methanol fuel cells – working of the cells.

Secondary cells – lead acid, nickel-metal hydride and lithium ion batteries- working of the batteries including cell reactions.

Corrosion: Introduction to corrosion, electrochemical theory of corrosion, differential aeration cell corrosion, galvanic corrosion, metal oxide formation by dry electrochemical corrosion, Pilling Bedworth ratios and uses, environmental factors (pH, temperature, DO) affecting corrosion rate, Pourbaix diagrams for iron and aluminium, protection – corrosion inhibitors with specific examples, cathodic and anodic protection, electroplating and electro less plating (Nickel and Copper).

Unit 3: Polymers and Fuel Chemistry:

Introduction to polymers, functionality of monomers, chain growth and step growth polymerization, coordination polymerization, copolymerization (stereospecific polymerization) with specific examples and mechanisms of polymer formation.

Thermoplastics and Thermo-sets, Elastomers – applications with specific examples.

Conducting polymers – polyacetylene, polyaniline, polypyrroles – mechanism of conduction and applications.

Fuels – Types of fuels, calorific value, numerical problems based on calorific value; Analysis of coal, refining of petroleum, liquid fuels, fuels for IC engines, knocking and anti-knock agents, Octane and Cetane values, cracking of oils; alternative fuels- propane, methanol and ethanol, bio fuels.

Unit 4: Cement and Concrete Chemistry:

Introduction to building materials – Portland cement, constituents, manufacturing process-raw materials for manufacturing process, reactions below 1300 °C and reactions between 1300 and 1450 °C, reactions during cooling, grinding or storage, chemical equations, phases of cement clinker (alite, belite, aluminate and ferrite), reactivity of clinker phases, parameters to characterize the clinker formation: lime saturation factor (LSF), silica ratio (SR) and alumina ration (AR), chemistry of setting and hardening of cement (hydration, hydrolysis, equations), scheme of concrete formation, admixtures for concrete improvement – retarders, accelerators, air-entraining agents, grinding agents, super plasticizers, dispersants, etc.

Unit 5: Surface Chemistry and Applications:

Introduction to surface chemistry, colloids, nanometals and nanometal oxides, micelle formation, synthesis of colloids (any two methods with examples), chemical and electrochemical methods (not

more than two methods) of preparation of nanometals and metal oxides, stabilization of colloids and nanomaterials by stabilizing agents, characterization of surface by physicochemical methods (SEM, TEM, X-ray diffraction), solid-gas interface, solid-liquid interface, adsorption isotherm, BET equation (no derivation), calculation of specific surface area of solids, numerical problems, functionalization of surface of nanomaterials– applications of colloids and nanomaterials – catalysis, medicine, sensors, etc.

Text books:

1. Jain and Jain, Engineering Chemistry, 16/e, Dhanpat Rai, 2013.
2. Peter Atkins, Julio de Paula and James Keeler, Atkins' Physical Chemistry, 10/e, Oxford University Press, 2010.

Reference books:

1. H.F.W. Taylor, Cement Chemistry, 2/e, Thomas Telford Publications, 1997.
2. D.J. Shaw, Introduction to Colloids and Surface Chemistry, Butterworth-Heineman, 1992.
3. Skoog and West, Principles of Instrumental Analysis, 6/e, Thomson, 2007.

List of Cos	PO no. and keyword	Competency	Performance Indicator
CO 1	PO1:Engineering knowledge	1.2	1.2.1
CO 2	PO1:Engineering knowledge	1.4	1.4.1
CO 3	PO1:Engineering knowledge	1.2	1.2.1
CO 4	PO1:Engineering knowledge	1.2	1.2.1
CO 5	PO2: Problem Analysis	2.4	2.4.4
CO 6	PO1:Engineering knowledge	1.4	1.4.1
CO 7	PO2: Problem Analysis	2.4	2.4.4
CO 8	PO2: Problem Analysis	2.4	2.4.4

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES, TIRUPATI

Year: I

Semester: II

Branch of Study: CE,ME & CSE

Subject Code	Subject Name	L	T	P	Credits
19AES0202	Basics of Electrical & Electronics Engineering-I	3	0	0	3

Course Outcomes: Students should be able to

CO 1: Apply concepts of KVL/KCL in solving DC circuits

CO 2: Illustrate working principles of induction motor - DC Motor

CO 3: Identify type of electrical machine based on their operation

CO 4: Describe operation and characteristics of diodes and transistors.

CO 5: Make use of diodes and transistors in simple, typical circuit applications.

CO 6: Understand operation of basic op-amp circuits.

PART-A (Electrical Engineering)

UNIT-I: DC & AC Circuits:

Electrical circuit elements (R - L and C) - Kirchoff laws - Series and parallel connection of resistances with DC excitation. Superposition Theorem - Representation of sinusoidal waveforms - peak and rms values - phasor representation - real power - reactive power - apparent power - power factor - Analysis of single-phase ac circuits consisting of RL - RC - RLC series circuits.

UNIT-II: DC & AC Machines:

Principle and operation of DC Generator - EMF equations - OCC characteristics of DC generator – principle and operation of DC Motor – Performance Characteristics of DC Motor - Speed control of DC Motor – Principle and operation of Single Phase Transformer - OC and SC test on transformer - principle and operation of Induction Motor [Elementary treatment only]

UNIT-III: Basics of Power Systems:

Layout & operation of Hydro, Thermal, Nuclear Stations - Solar & wind generating stations – Typical AC Power Supply scheme – Elements of Transmission line – Types of Distribution systems: Primary & Secondary distribution systems.

Text Books:

1. D. P. Kothari and I. J. Nagrath - “Basic Electrical Engineering” - Tata McGraw Hill - 2010.
2. V.K. Mehta & Rohit Mehta, “Principles of Power System” – S.Chand – 2018.

References:

1. L. S. Bobrow - “Fundamentals of Electrical Engineering” - Oxford University Press - 2011.
2. E. Hughes - “Electrical and Electronics Technology” - Pearson - 2010.
3. C.L. Wadhwa – “Generation Distribution and Utilization of Electrical Energy”, 3rd Edition, New Age International Publications.

PART-B (Electronics Engineering)

UNIT-I: Analog Electronics

Overview of Semiconductors, PN junction diode, Zener diode, Applications of diode as switch and rectifier, Zener diode as regulator, special purpose diodes: schottky diode, tunnel diode, varactor diode, photodiode, phototransistor and LED.

BJT construction, operation, configuration and characteristics, JFET and MOSFET

construction, operation, characteristics (CS configuration), applications
 Operational Amplifiers: Introduction, block diagram, basic op-amp circuits: Inverting, Non Inverting, summer, subtractor, voltage follower.

UNIT II: Digital Electronics

Introduction, Switching and Logic Levels, Digital Waveform, characteristics of digital ICs, logic gates, number systems, combinational circuits - adders, multiplexers, decoders; introduction to sequential circuits, flip flops, shift register, binary counter

UNIT III: Communication Systems

Introduction, Elements of Communication Systems, EM spectrum, basics of electronic communication, Amplitude and Frequency modulation, Pulse modulation, Communication receivers, Examples of communication systems: Microwave & Satellite, Fibre optic, Television, mobile communication (block diagram approach).

Text Books:

1. D.P. Kothari, I.J.Nagrath, Basic Electronics, 2nd edition, McGraw Hill Education(India)Private Limited
2. S.K. Bhattacharya, Basic Electrical and Electronics Engineering, 2nd edition, Pearson India Private Limited.

References:

1. R. Muthu subramanian, S. Salivahanan, “Basic Electrical and Electronics Engineering”, Tata McGraw-Hill Education, Reprint 2012.
2. David Bell, Electronic Devices and Circuits: Oxford University Press, 5th edition. 2008.

Note: This table also should be in portrait only

CO	PO	CI	PI
CO1	PO1	1.3	1.3.1
	PO2	2.3	2.3.1
	PO3	3.3	3.3.1
CO2	PO1	1.3	1.3.1
	PO2	2.3	2.3.1
	PO3	3.3	3.3.1
CO3	PO1	1.3	1.3.1
	PO2	2.3	2.3.1
	PO3	3.3	3.3.1
CO4	PO1	1.3	1.3.1
	PO2	2.3	2.3.1
	PO3	3.3	3.3.1
CO5	PO1	1.3	1.3.1
	PO2	2.3	2.3.1
	PO3	3.3	3.3.1

CO6	PO1	1.3	1.3.1
	PO2	2.3	2.3.1
	PO3	3.3	3.3.1

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES, TIRUPATI

Year : I

Semester : II

Branch of Study : Common to All

19AES0502	Data Structures	L T P	Credits: 3
		3 1 0	

Course Outcomes:

1. Understand the importance of AI and concepts of Machine Learning algorithms and their limitations.
2. Develop Chatbots based on the requirements.
3. Analyse complex problems involving image processing, such as quality control, visual surveillance, multimodal human-machine interfaces, and image compression.

4. Understand the application of Reinforcement Learning
5. Understand smart solutions for various domains

Unit I: Introduction to Artificial Intelligence

Basics of AI. Applications of AI. Advanced search, Constraint satisfaction problems, Knowledge representation & reasoning, Non-standard logics, Uncertain and probabilistic reasoning Conceptual introduction to **Machine Learning**: Introduction to Neural Networks, Supervised, Unsupervised, and Semi-Supervised Learning, Deep Learning, Reinforcement Learning, Linear Regression. Conceptual introduction to **Natural Language Processing**: Natural language Understanding, Sentiment Analysis, Segmentation and recognition. Conceptual introduction to **Speech Recognition & Synthesis**: Speech Fundamentals, Speech Analysis, Speech Modeling, Speech Recognition, Speech Synthesis, Text-to-Speech Conceptual introduction to **Image Processing & Computer Vision**: Introduction to Image processing, Image Noise, Removal of Noise from Images, Color Enhancement, Segmentation, Edge Detection, Optical Character Recognition, Feature Detection & Recognition

Unit II: BOT Technologies and Virtual Assistants:

Chatbots: Introduction to a Chatbot, Architecture of a Chatbot. NLP in the cloud, NL Interface, How to Build a Chatbot, Transformative user experience of chatbots, Designing elements of a chatbot, Best practices for chatbot development. NLP components. NLP wrapper to chatbots. Audiobots and Musicbots.

Virtual Assistants: Architecture of a Virtual Assistant.

Unit III: Image Processing & Computer Vision :

Image - Definition and Tagging. Classification of images. Tagging. Image formation, Deep Learning algorithms for Object detection & Recognition. Face recognition, Instance recognition, Feature detection and matching, Segmentation, Recognition Databases and test sets Applications -- Feature extraction, Shape identification. Face detection,.

Applications: Automation, Agriculture[Crop and Soil Monitoring, Grading farm produce, Predictive Analytics], Retail and Retail Security[Amazon Go], Autonomous vehicles,

Unit IV: Reinforcement Learning

Introduction to Reinforcement Learning, Game Playing [Deep Blue in Chess, IBM Watson in Jeopardy, Google's DeepMind in AlphaGo], Agents and Environment, Action-Value Function, Deep Reinforced Learning

Applications : Robotics, Gaming, Diagnostic systems, Virtual Assistants

Unit V: Smart Applications

Smart Manufacturing, Smart Agriculture, Smart Healthcare, Smart Education, Smart Grids, Smart Transportation and Autonomous Vehicles, Smart Homes, Smart Cities.

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Textbooks:

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

Reference Books:

1. 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
2. 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>
3. Tom Markiewicz & Josh Zheng, Getting started with Artificial Intelligence, Published by O'Reilly Media, 2017

Map POs with CIs and PIs:

Course Outcome	PO no and Keyword	Competency Indicator	Performance Indicator
CO1	PO1:Apply	1.1	1.1.1
		1.4	1.1.2
			1.1.4
CO2	PO1:Apply	1.1	1.1.1
		1.4	1.1.2
			1.1.4
CO3	PO2:Formulate	2.1	2.1.1
			2.1.2
			2.1.3
CO4	PO4:Research-based Knowledge	4.1	4.1.1
			4.1.2
			4.1.3
CO5	PO5:Create & Apply	5.1	5.1.1
		5.3	5.1.2
			5.3.1
			5.3.2

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES:: TIRUPATI

Year: I

Semester: II

Branch of Study: Common to all Braches

Subject Code	Subject Name	L	T	P	Credits
19AES0301	Engineering Graphics and Design	1	0	3	2.5

Course Outcomes:

Students should be able to

1. Select Appropriate Data Structure for solving a real world problem (L4)
2. Select appropriate file organization technique depending on the processing to be done (L4)
3. Construct Indexes for Databases (L6)
4. Analyse the Algorithms (L4)
5. Develop Algorithm for Sorting large files of data (L3)

Unit-1:Introduction

Algorithm Specification, Performance analysis, Performance Measurement. Arrays: Arrays, Dynamically Allocated Arrays. Structures and Unions. Sorting: Motivation, Quick sort, How fast can we sort, Merge sort, Heap sort

Unit – 2: Stack, Queue and Linked lists

Stacks, Stacks using Dynamic Arrays, Queues, Circular Queues Using Dynamic Arrays, Evaluation of Expressions, Multiple Stacks and Queues. Linked lists: Singly Linked Lists and Chains, Representing Chains in C, Linked Stacks and Queues, Additional List Operations, Doubly Linked Lists.

Unit – 3 :Trees

Introduction, Binary Trees, Binary Tree Traversals, Additional Binary Tree Operations, Binary Search Trees, Counting Binary Trees, Optimal Binary search Trees, AVL Trees. B-Trees: BTrees, B + Trees.

Unit – 4 : Graphs and Hashing

The Graph Abstract Data Type, Elementary Graph Operations, Minimum Cost Spanning Trees, Shortest Paths and Transitive Closure Hashing: Introduction to Hash Table, Static Hashing, Dynamic Hashing.

Unit – 5: Files and Advanced sorting

File Organization: Sequential File Organization, Direct File Organization, Indexed Sequential File Organization. Advanced sorting: Sorting on Several keys, List and Table sorts, Summary of Internal sorting, External sorting.

Text Books:

1. Ellis Horowitz, Sartaj Sahni and Susan Anderson Freed “Fundamentals of Data Structures in C”, 2nd Edition, University Press, 2007.
2. Alan L. Tharp, “File Organization and Processing”, Wiley and Sons, 1988.

Reference Books:

1. D. Samanta, “Classic Data Structures”, 2nd Edition, Prentice-Hall of India, Pvt. Ltd., India,2012.
2. Peter Bras, “Advanced Data Structures”, Cambridge University Press, 2016
3. Richard F.Gilberg, Behrouz A.Forouzan, “Data Structures A Pseudo code Approach with C”, Second Edition, Cengage Learning 2005.

List of COs	PO no. and keyword	Competency Indicator	Performance Indicator
CO: 1	PO 1: Engineering knowledge	1.3	1.3.1
CO: 2	PO 3: Design/Development of Solutions	3.2	3.2.1
CO: 3	PO 1: Engineering knowledge	1.3	1.3.1
CO: 4	PO 3: Design/Development of Solutions	3.2	3.2.2
CO: 5	PO 5: Problem analysis	5.1	5.1.1

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES:: TIRUPATI**Year I****Semester II****Branch of Study: ME & CE**

Subject Code 19ABS9910	Subject Name ENGINEERING CHEMISTRY LAB	L T P 0 0 3	Credits:1.5
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Course Outcomes:

1. Determine the cell constant and conductance of solutions
2. Prepare advanced polymer materials
- 3 Determine the physical properties like surface tension, adsorption and viscosity
4. Estimate the Iron and Calcium in cement
5. Calculate the hardness of water

List of Experiments:

1. Determination of Hardness of a groundwater sample.
2. pH metric titration of (i) strong acid vs. strong base, (ii) weak acid vs. strong base
3. Determination of cell constant and conductance of solutions
4. Potentiometry - determination of redox potentials and emfs
5. Determination of Strength of an acid in Pb-Acid battery
6. Preparation of a polymer
7. Determination of viscosity of polymer solution using survismeter
8. Determination of percentage of Iron in Cement sample by colorimetry
9. Estimation of Calcium in port land Cement
10. Preparation of nanomaterials
11. Adsorption of acetic acid by charcoal
12. Determination of percentage Moisture content in a coal sample

List of COs	PO no. and keyword	Competency	Performance Indicator
CO 1	PO 4: Conduct Investigations of complex problems	4.3	4.3.3
CO 2	PO 4: Conduct Investigations of complex problems	4.3	4.3.1
CO 3	PO 4: Conduct Investigations of complex problems	4.3	4.3.1
CO 4	PO 4: Conduct Investigations of complex problems	4.3	4.3.2
CO 5	PO 4: Conduct Investigations of complex problems	4.3	4.3.2

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES: TIRUPATI

Year: I

Semester: II

Branch of Study: CE,ME &CSE

Subject Code	Subject Name	L	T	P	Credits
19AES0204	Basics of Electrical & Electronics Engineering Lab – I	0	0	3	1.5

Course Objectives: Students should be able to

CO1: Verify Kirchoff's Laws & Superposition theorem for dc supply

CO2: Analyze the performance of AC and DC Machines by testing.

CO3: Study I – V Characteristics of PV Cell & Perform speed control of dc shunt motor

CO4: Ability to operate diodes for finding V-I Characteristics.

CO5: Ability to construct and operate rectifiers without & with filters

CO6: Ability to construct and operate BJT & FET Characteristics.

List of Experiments:

PART-A

1. Verification of Kirchhoff laws.
2. Verification of Superposition Theorem.
3. Open circuit characteristics of a DC Shunt Generator.
4. Speed control of DC Shunt Motor.
5. OC & SC test of 1 – Phase Transformer.
6. Brake test on 3 - Phase Induction Motor.
7. Brake test on DC Shunt Motor

PART-B

1. PN Junction Diode Characteristics.
2. Zener Diode Characteristics.
3. Rectifiers (With and Without Filter).
4. BJT Characteristics (CB Configuration).
5. BJT Characteristics (CE Configuration).
6. FET Characteristics (CS Configuration).

Table: Course Outcomes (CO), Programme Outcomes (PO), Competency Indicator (CI) and Performance Indicator (PI) Mapping

CO	PO	CI	PI
CO1	PO1	1.3	1.3.1
	PO2	2.3	2.3.1
	PO3	3.3	3.3.1
CO2	PO1	1.3	1.3.1
	PO2	2.3	2.3.1
	PO3	3.3	3.3.1
CO3	PO1	1.3	1.3.1
	PO2	2.3	2.3.1
	PO3	3.3	3.3.1
CO4	PO1	1.3	1.3.1
	PO2	2.3	2.3.1
	PO3	3.3	3.3.1
CO5	PO1	1.3	1.3.1
	PO2	2.3	2.3.1
	PO3	3.3	3.3.1

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES: TIRUPATI

Year I

Semester II

Branch of Study: Common to All

19AES0504	Data Structures Lab	L T P 2 1 0	Credits: 3
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Course Outcomes:

6. Understand the importance of AI and concepts of Machine Learning algorithms and their limitations.
7. Develop Chatbots based on the requirements.
8. Analyse complex problems involving image processing, such as quality control, visual surveillance, multimodal human-machine interfaces, and image compression.

Experiments:

1. Supervisely - Perform Data Labelling for various images using object recognition

Experiment Outcomes:

- Understand supervised learning for various datasets of images using Pattern Recognition.

2. Lobe.ai - Build custom models using the visual tool for Object recognition and sentiment analysis that can convert facial expressions into emoticons

Experiment Outcomes:

- Manage image databases using detection tools for classification.
- Build different applications using Image Processing & Computer Vision.

3. Teachable Machine - In Browser Object Recognition through Brain.JS

Experiment Outcomes:

- Understand Image Recognition through Brain.JS

4. Liv.ai - App for Speech recognition and Synthesis through APIs

Experiment Outcomes:

- Summarize applications of Speech Recognition and Synthesis.

5. Building a Chatbot using AWS Lex, Pandora bots

Experiment Outcomes:

- Develop bots, chatbots, audiobots, music bots

6. Configure an existing Neural Network by manipulating various parameters involved

Experiment Outcomes:

- Understand different Neural Networks by various parameters.

7. Build a virtual assistant for Wikipedia using Wolfram Alpha and Python

Experiment Outcomes:

- Build an AI Assistant with Wolfram Alpha and Wikipedia in Python

8. Build a Convolutional Neural Network for Cat vs Dog Image Classification

Experiment Outcomes:

- Build CNN for different images Classification

References :

Pytorch:

<https://pytorch.org/>
<https://github.com/pytorch>

Keras:

<https://keras.io/>
<https://github.com/keras-team>

Theano:

<http://deeplearning.net/software/theano/>
<https://github.com/Theano/Theano>

Cafee2:

<https://caffe2.ai/>
<https://github.com/caffe2>

Deeplearning4j:

<https://deeplearning4j.org/>

Scikit-learn:<https://scikit-learn.org/stable/>

<https://github.com/scikit-learn/scikit-learn>

Deep Learning.Ai:

<https://www.deeplearning.ai/>

OpenCv:

<https://opencv.org/>
<https://github.com/qqwweee/keras-yolo3>

YOLO:

<https://www.pyimagesearch.com/2018/11/12/yolo-object-detection-with-opencv/>

nVIDIA: CUDA

<https://developer.nvidia.com/cuda-math-library>

Map POs with CIs and PIs:

Course Outcome	PO no and Keyword	Competency Indicator	Performance Indicator
CO1	PO1:Apply	1.1	1.1.1
		1.4	1.1.2
			1.1.4
	PO3:Design/Develop	3.1	3.1.1
			3.1.2
		3.1.3	
		3.1.4	
		3.1.5	
	PO3:Design/Develop	3.4	3.4.1

CO2			3.4.2
			3.4.3
CO2	PO5:Create & Apply	5.1	5.1.1
		5.3	5.1.2
			5.3.1
			5.3.2
CO3	PO4:Research-based Knowledge	4.1	4.1.1
			4.1.2
			4.1.3

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES: TIRUPATI

Year: I

Semester: II

Branch of Study: CE

Subject Code	Subject Name	L	T	P	Credits
19ALC0101	Civil Engineering Workshop	0	0	3	1.5

Course outcomes:

CO1: Able to determine Setting out of a building

CO2: Understand the concept of Construct a wall of height 50 cm

CO3: Determine the Computation of Centre of gravity and Moment of inertia

CO4: Determine the Plastering and Finishing of wall

CO5: Examine the Casting and testing of Fly ash Blocks

LABORATORY EXPERIMENTS

- 1) Setting out of a building: The student should set out a building (single room only) as per the given building plan using tape only.
- 2) Construct a wall of height 50 cm and wall thickness 1½ bricks using English bond (No mortar required) - corner portion – length of side walls 60 cm.
- 3) Computation of Centre of gravity and Moment of inertia of a given rolled steel section by actual measurements.
- 4) Installation of plumbing and fixtures like Tap, T-Joint, Elbow, Bend, Threading etc;
- 5) Plastering and Finishing of wall
- 6) Application of wall putty and painting a wall
- 7) Preparation of cement Fly ash Blocks and testing for compressive strength

List of COs	PO no. and keyword	Competency Indicator	Performance Indicator
CO1	PO1: Engineering knowledge	1.3	1.3.1
		1.4	1.4.1
	PO2: Problem analysis	2.2	2.2.1
		2.3	2.3.1
CO2	PO1: Engineering knowledge	1.3	1.3.1
		1.4	1.4.1
	PO2: Problem analysis	2.2	2.2.1
		2.3	2.3.1
CO3	PO1: Engineering knowledge	1.3	1.3.1
		1.4	1.4.1
	PO2: Problem analysis	2.2	2.2.1
		2.3	2.3.1

CO4	PO1: Engineering knowledge	1.3	1.3.1
		1.4	1.4.1
	PO2: Problem analysis	2.2	2.2.1
		2.3	2.3.1
CO5	PO1: Engineering knowledge	1.3	1.3.1
		1.4	1.4.1
	PO2: Problem analysis	2.2	2.2.1
		2.3	2.3.1

**ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES :: TIRUPATI
AUTONOMOUS
AK 19 Regulations**

**Year : II B.Tech
ME**

Semester: I

Branch of Study: CE and

SubjectCode:19ABS9913	Subject Name: Probability & Statistics, PDE, Complex Variables	L T P 3 0 0	Credits 3
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Course Outcomes:

- 1) Apply discrete and continuous probability distributions
- 2) Design the components of a classical hypothesis test
- 3) Infer the statistical inferential methods based on small and large sampling tests
- 4) Find the general solution of the PDEs bearing applications
- 5) Differentiation and integration of complex functions used in engineering problems To equip the students to solve application problems in their disciplines.

Unit I: Probability

probability axioms, addition law and multiplicative law of probability, conditional probability, Baye's theorem, random variables (discrete and continuous), probability distribution: Binomial - Poisson approximation to the binomial distribution and normal distribution-their properties.

Unit II: Testing of Hypothesis

Formulation of null hypothesis, critical regions, level of significance. Large sample tests: test for single proportion, difference of proportions, test for single mean and difference of means.

Unit III: Small Sample Tests

Student t-distribution (single mean, two means and paired t-test), Testing of equality of variances (F-test), χ^2 - test for goodness of fit.

Unit IV: Applications of Partial Differential Equations

Method of separation of variables, solution of 1D-wave, 1D-heat and 2D-Laplace's equation in Cartesian coordinates.

Unit V: Complex Variables

Differentiation, Cauchy-Riemann equations, analytic functions, harmonic functions, finding harmonic conjugate. Complex integration, Cauchy theorem (without proof), Cauchy integral formula (without proof), Taylor's series, zeros of analytic functions, singularities, Laurent's series, residues, Cauchy residue theorem (without proof).

Text Books:

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 43/e, 2010.
2. Erwin kreyszig, Advanced Engineering Mathematics, 9/e, John Wiley & Sons, 2006.

References:

1. S.Chand ,Engineering Mathematics-II,III &IV by Dr.T.K.V.Iyengar, Dr.B.Krishna Gandhi, S.Ranganatham, Dr.M.V.S.S.N.Prasad
2. W. E. Boyce and R. C. DiPrima, Elementary Differential Equations and Boundary Value Problems, 9/e, Wiley India, 2009.
3. E. A. Coddington, An Introduction to Ordinary Differential Equations, Prentice Hall India,1995.
4. J. W. Brown and R. V. Churchill, Complex Variables and Applications, 7/e, Mc-Graw Hill, 2004.
5. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, 2008.

List of COs	PO no. and keyword	Competency Indicator	Performance Indicator
CO1	PO1: Apply the knowledge of mathematics	1.1	1.1.1
CO2	PO1: Apply the knowledge of mathematics	1.1	1.1.1
CO3	PO1: Apply the knowledge of mathematics	1.1	1.1.1
CO4	PO 2: First principles of mathematics.	2.1	2.1.3
CO5	PO 2: First principles of mathematics	2.4	2.4.1

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES:: TIRUPATI

(AUTONOMOUS)

AK 19 Regulations

B. Tech II Year

Semester : I

Branch : Common to all

Subject Code: 19AHS9903	Subject Name: Communicative English II	L T P 2 0 0	Credits:2
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Course Outcomes

At the end of the course, the learners will be able to

1. Prioritize information from reading texts after selecting relevant and useful points
2. Paraphrase short academic texts using suitable strategies and conventions
3. Make formal structured presentations on academic topics using PPT slides with relevant graphical elements
4. Participate in group discussions using appropriate conventions and language strategies
5. Prepare a CV with a cover letter to seek internship/ job
6. Collaborate with a partner to make presentations and Project Reports

Syllabus

Unit 1

(10 hrs)

Listening : Listening for presentation strategies and answering questions on the speaker, audience, and key points.

Speaking: Formal presentations using PPT slides without graphic elements.

Reading: Reading for presenting – strategies to select, compile and synthesize information for presentation; reading to recognize academic style.

Writing: Paraphrasing; using quotations in writing; using academic style - avoiding colloquial words and phrases.

Grammar and Vocabulary: Formal/academic words and phrases.

Unit 2

(10 hrs)

Listening: Following an argument/ logical flow of thought; answering questions on key concepts after listening to extended passages of spoken academic discourse.

Speaking: Formal presentations using PPT slides with graphic elements.

Reading: Understand formal and informal styles; recognize the difference between facts and opinions.

Writing: Formal letter writing and e-mail writing (enquiry, complaints, seeking permission, seeking internship); structure, conventions and etiquette.

Grammar and Vocabulary: Phrasal prepositions; phrasal verbs.

Unit 3

10(hrs)

Listening: Identifying views and opinions expressed by different speakers while listening to discussions.

Speaking: Group discussion on general topics; agreeing and disagreeing, using claims and examples/ evidences for presenting views, opinions and position.

Reading: Identifying claims, evidences, views, opinions and stance/ position.

Writing: Writing structured persuasive/argumentative essays on topics of general interest using suitable claims, examples and evidences.

Grammar and Vocabulary: Language for different functions such as stating a point, expressing opinion, agreeing/disagreeing, adding information to what someone has stated, and asking for clarification.

Unit 4:

(8 hrs)

Listening: Understanding inferences; processing of information using specific context clues from the text.

Speaking: Group discussion; reaching consensus in group work (academic context).

Reading: Reading for inferential comprehension.

Writing: Applying for internship/ job - Writing one's CV/Resume and cover letter.

Grammar and Vocabulary: Active and passive voice – use of passive verbs in academic writing.

Unit 5:

(8hrs)

Listening: Understanding inferences - processing of explicit information presented in the text and implicit information inferable from the text or from previous/background knowledge.

Speaking: Formal team presentations on academic/ general topics using PPT slides.

Reading for Writing: Structure and contents of a Project Report; identifying sections in project reports; understanding the purpose of each section; significance of references.

Grammar and Vocabulary: Reinforcing learning; editing short texts; correcting common errors in grammar and usage.

***Course Materials would be compiled and provided to learners and teachers**
ReferenceBooks

1. Bailey, Stephen. Academic writing: A handbook for international students .Routledge,2014.

2. Chase, Becky Tarver. Pathways: Listening, Speaking and Critical Thinking. Heinley ELT; 2nd Edition,2018.

3. Skillful Level 2 Reading & Writing Student's Book Pack (B1) Macmillan Educational.

4. Hewings, Martin. Cambridge Academic English (B2).CUP, 2012.Sample Web Resources
Grammar/Listening/Writing 1-language.com <http://www.5minuteenglish.com/>
<https://www.englishpractice.com/>

Grammar/Vocabulary

English Language Learning Online, <http://www.bbc.co.uk/learningenglish/>,

<http://www.better-english.com/>, <http://www.nonstopenglish.com/>,

<https://www.vocabulary.com/>, BBC Vocabulary Games, Free Rice Vocabulary Game

Reading

<https://www.usingenglish.com/comprehension/>, <https://www.englishclub.com/reading/short->

[stories.htm](#), <https://www.english-online.at/>

Listening

<https://learningenglish.voanews.com/z/3613>, <http://www.englishmedialab.com/listening.html>

Speaking

<https://www.talkenglish.com/>, BBC Learning English – Pronunciation tips, Merriam-Webster – Perfect pronunciation Exercises

All Skills

<https://www.englishclub.com/>, <http://www.world-english.org/>, <http://learnenglish.britishcouncil.org/>, Online Dictionaries, Cambridge dictionary online, MacMillan dictionary, Oxford learner's dictionaries

References:

1. www.pointblank7.in> News & Politics> Features dt. 15.05.2019

2. Learning English a Communication Approach by Orient Longman Pvt Ltd. Hyderabad , 2005.

List of COs	PO no. and keyword	Competency Indicator:	Performance Indicator:
CO1.	PO10-Able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.	10.1	10.1.1 10.1.2
CO2	PO10-Able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.	10.3	10.3.1 10.3.2
CO3.	PO10-Able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.	10.2	10.2.2
CO4.	PO9-Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.	9.2	9.2.1 9.2.2 9.2.3
CO5.	PO10-Able to comprehend and write effective reports and design documentation.	10.3	10.3.1 10.3.2
CO6.	PO10-Able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive	10.3	10.3.1

	clear instructions.		10.3.2
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