

**ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES::TIRUPATI  
(Autonomous)**

**Year: II****Semester: IV****Branch: EEE**

<b>COURSE CODE</b>	<b>COURSE TITLE</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>CREDITS</b>
<b>20AES0509</b>	<b>BASICS OF PYTHON PROGRAMMING</b>	<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>

Course Outcomes (CO):

CO1: Apply the features of Python language in various real applications.

- Select appropriate data structure of Python for solving a problem.
- Design object oriented programs using Python for solving real-world problems.

CO2: Apply modularity to programs.

**UNIT –I**

9 Hrs

Introduction: What is a program, Running python, Arithmetic operators, Value and Types. Variables, Assignments and Statements: Assignment statements, Script mode, Order of operations, string operations, comments. Functions: Function calls, Math functions, Composition, Adding new Functions, Definitions and Uses, Flow of Execution, Parameters and Arguments, Variables and Parameters are local, Stack diagrams, Fruitful Functions and Void Functions, Why Functions.

**UNIT – II**

9 Hrs

Case study: The turtle module, Simple Repetition, Encapsulation, Generalization, Interface design, Refactoring, docstring. Conditionals and Recursion: floor division and modulus, Boolean expressions, Logical operators, Conditional execution, Alternative execution, Chained conditionals, Nested conditionals, Recursion, Infinite Recursion, Keyboard input. Fruitful Functions: Return values, Incremental development, Composition, Boolean functions, more recursion, Leap of Faith, Checking types

**UNIT – III**

8Hrs

Iteration: Reassignment, Updating variables, The while statement, Break, Square roots, Algorithms. Strings: A string is a sequence, len, Traversal with a for loop, String slices, Strings are immutable, Searching, Looping and Counting, String methods, The in operator, String comparison. Case Study: Reading word lists, Search, Looping with indices. Lists: List is a sequence, Lists are mutable, Traversing a list, List operations, List slices, List methods, Map filter and reduce, Deleting elements, Lists and Strings, Objects and values, Aliasing, List arguments.

**UNIT – IV**

8Hrs

Dictionaries: A dictionary is a mapping, Dictionary as a collection of counters, Looping and dictionaries, Reverse Lookup, Dictionaries and lists, Memos, Global Variables. Tuples: Tuples are immutable, Tuple Assignment, Tuple as Return values, Variable-length argument tuples, Lists and tuples, Dictionaries and tuples, Sequences of sequences. Files: Persistence, Reading and writing, Format operator, Filename and paths, Catching exceptions, Databases, Pickling, Pipes, Writing modules. Classes and Objects: Programmer-defined types, Attributes, Instances as Return values, Objects are mutable, Copying.

**UNIT – V**

10Hrs

Classes and Functions: Time, Pure functions, Modifiers, Prototyping versus Planning Classes and Methods: Object oriented features, Printing objects, The init method, The \_\_str\_\_ method, Operator overloading, Type-based Dispatch, Polymorphism, Interface and Implementation Inheritance: Card objects, Class attributes, Comparing cards, decks, Printing the Deck, Add Remove shuffle and sort, Inheritance, Class diagrams, Data encapsulation. The Goodies: Conditional expressions, List comprehensions, Generator expressions, any and all, Sets, Counters, defaultdict, Named tuples, Gathering keyword Args

**Textbooks:**

1. Allen B. Downey, “Think Python”, 2nd edition, SPD/O’Reilly, 2016.

**Reference Books:**

1. Martin C.Brown, “The Complete Reference: Python”, McGraw-Hill, 2018.
2. Kenneth A. Lambert, B.L. Juneja, “Fundamentals of Python”, CENGAGE, 2015.
3. R. Nageswara Rao, “Core Python Programming”, 2nd edition, Dreamtech Press, 2019

**ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES, TIRUPATI  
(AUTONOMOUS)**

Year: II

Semester: IV

Branch of Study: EEE

<b>COURSE CODE</b>	<b>COURSE TITLE</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>CREDITS</b>
<b>20APC0206</b>	<b>ELECTRICAL CIRCUITS-II</b>	<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>

**COURSE OUTCOMES**

1. Analyze two port networks
2. Determine the transient response of R-L, R-C, R-L-C circuits for D.C and A.C excitations
3. Apply Fourier transforms to electrical circuits excited by non-sinusoidal sources
4. Design different types of filters

**UNIT- I D.C TRANSIENT ANALYSIS**

Transient Response of R-L, R-C, R-L-C Series Circuits for D.C Excitation Initial Conditions- Solution Method Using Differential Equation and Laplace Transforms, Response of RL & R-C Networks to Pulse Excitation.

**UNIT- II A.C TRANSIENT ANALYSIS**

Transient Response of R-L, R-C, R-L-C Series Circuits for Sinusoidal Excitations-Initial Conditions-Solution Method Using Differential Equations and Laplace Transforms.

**UNIT-III TWO PORT NETWORKS**

Two Port Networks Two port network parameters – Z, Y, ABCD and Hybrid parameters and their relations, Cascaded networks - Poles and zeros of network functions

**UNIT- IV FOURIER TRANSFORMS**

Fourier Theorem- Trigonometric Form and Exponential Form of Fourier Series – Conditions of Symmetry- Line Spectra and Phase Angle Spectra- Analysis of Electrical Circuits to Non Sinusoidal Periodic Waveforms. Fourier Integrals and Fourier Transforms – Properties of Fourier Transforms and Application to Electrical Circuits.

**UNIT V: FILTERS & CIRCUITS SIMULATION**

Filters – Low Pass – High Pass and Band Pass – RC, RL filters– derived filters and composite filters design – Attenuators – Principle of Equalizers – Series and Shunt Equalizers – L Type, T type and Bridged – T and Lattice Equalizers. Circuit Analysis – Description of Circuit elements, nodes and sources, Input and Output variables – Modeling of the above elements – Types of DC analysis.

**TEXT BOOKS:**

1. Electrical Circuit Theory and Technology 4th Edition, John Bird, Rpvtded / T&F, 2011.
2. Network Analysis 3rd Edition, M.E Van Valkenberg, PHI, .
3. Engineering Circuit Analysis by William Hayt and Jack E.Kemmerley, McGraw Hill Company, 6th edition.

**REFERENCE:**

1. Circuit Theory (Analysis & Synthesis) 6th Edition, A. Chakrabarti, Dhanpat Rai & Sons, 2008.
2. Electric Circuits by N.Sreenivasulu, REEM Publications
3. Fundamentals of Electrical Circuits by Charles K.Alexander and Mathew N.O.Sadiku, McGraw Hill Education (India)
4. Electric Circuits by David A. Bell, Oxford publications

CO No.	PO No. and keyword	Competency Indicator	Performance Indicator
CO1	PO1: Engineering knowledge	1.3	1.3.1
CO2	PO2: Problem analysis	2.4	2.4.1
	PO4: Conduct investigations of complex problems	4.3	4.3.1
CO3	PO1: Engineering knowledge	1.3	1.3.1
		1.4	1.4.1
CO4	PO4: Conduct investigations of complex problems	4.3	4.3.1

**ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES :: TIRUPATI  
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Year: II

Semester: IV

Branch: EEE

Course Code	Course Title	L	T	P	Credits
20APC0207	Electrical Machines-II	3	0	0	3

**COURSE OUTCOMES:**

CO1: Analyze the phasor diagrams of induction and synchronous machine, parallel operation of alternators, synchronization and load division of synchronous generators

CO2: Apply the concepts to determine V and inverted V curves and power circles of synchronous motor.

CO3: Understand construction, principle of working, equivalent circuit and analyze the testing of induction machine.

CO4: Analyze the various methods of starting and speed control of 3-phase induction motor.

CO5: Analyze the principle operations of single phase induction motors and special motors.

**UNIT-I : SYNCHRONOUS GENERATORS:**

Construction details, types of rotors, EMF Equation, harmonics, armature reaction, phasor diagram of non-salient pole synchronous generator, voltage regulation, direct load, EMF, MMF and ZPF methods, two reaction theory of salient pole machine, phasor diagram, slip test, synchronizing and parallel operation, synchronizing torque, change of excitation and mechanical input.

**UNIT-II: SYNCHRONOUS MOTOR**

Principle of operation – Torque equation – Operation on infinite bus bars – V and Inverted V curves – Power input and power developed equations – Starting methods – Current loci for constant power input, constant excitation and constant power developed-Hunting – damper windings- synchronous condenser.

**UNIT-III: THREE PHASE INDUCTION MOTOR**

Constructional details – Types of rotors – Production of rotating magnetic field –Principle of operation – Slip – Equivalent circuit – Torque-Slip characteristics – Condition for maximum torque – Losses and efficiency – Load test – No load and blocked rotor tests – Circle diagram – Separation of losses – Double cage induction motors –Induction generators – Synchronous induction motor.

**UNIT-IV : STARTING AND SPEED CONTROL OF 3- $\phi$  INDUCTION MOTOR**

Method for starting – Types of starters – DOL, Rotor resistance, Autotransformer and Star- delta starters – Speed control – Voltage control, Frequency control and pole changing – Cascaded connection-V/f control – Slip power recovery scheme-Braking of three phase induction motor: Plugging, dynamic braking and regenerative braking. cogging and crawling.

**UNIT-V:SINGLE PHASE AND SPECIAL MOTORS**

Single Phase Induction Motors - Constructional Features – Double Revolving Field Theory- Elementary Idea of Cross Field Theory – Split Phase Motors – Capacitor Start and Run Motors – Shaded Pole Motor. Principle and Performance of A.C Series Motor - Universal Motor – Single Phase Synchronous Motors – Reluctance Motor – Hysteresis Motor – Stepper Motor.

**TEXT BOOKS:**

1. Electrical Machinery, P.S. Bimbhra, Khanna Publishers, 7th Edition, 2011.
2. Electric Machinery Fundamentals, Stephen J Chapman, Mc Graw Hill Series in Electrical and Computer Engineering, 4th Edition, 2010, 10th Reprint 2015.
3. M G Say, The performance and Design of Alternating Current Machines, 3rd edition, CBS Publishers & Distributors, New Delhi, 2002.

**REFERENCE BOOKS:**

1. Electric Machines 4th edition, D.P.Kothari and I.J. Nagrath, Mc Graw Hill Education (India) Pvt. Ltd., 4th Edition, 2010, 16th Reprint 2015.
2. Electric Machinery, A.E.Fitzgerald, C.Kingsley and S. Umans, Mc Graw Hill Education (India) Pvt. Ltd., 6th Edition, 2005.
3. Electrical Machines, S K Bhattacharya, Mc Graw Hill Education (India) Pvt. Ltd., 4th Edition, 2014, 3rd Reprint 2015.

**WEB REFERENCES:**

1. <https://www.electrical4u.com>
2. <https://www.freevidelectures.com>

**E-TEXT BOOKS:**

1. <https://www.freeengineeringbooks.com>
2. <https://www.pdfdrive.com/textbook-of-electrical-technology-ac-and-dc-machines-d184089760.html>

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CO1	PO1: Engineering knowledge	1.3	1.3.1
CO2	PO1: Engineering knowledge	1.3	1.3.1
CO3	PO2: Problem analysis	2.4	2.4.1
	PO4: Conduct investigations of complex problems	4.3	4.3.1
CO4	PO1: Engineering knowledge	1.3	1.3.1
		1.4	1.4.1
CO5	PO4: Conduct investigations of complex problems	4.3	4.3.1

**ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES, TIRUPATI  
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Year: II

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Branch of Study: EEE

COURSE CODE	COURSE TITLE	L	T	P	CREDITS
20APC0208	ENGINEERING ELECTROMAGNETICS	3	0	0	3

**Course Outcomes:**

1. Analyze the different aspects related to Static Electric Fields equations.
2. Understand the concept of Conductors, Dipole, Dielectric & Capacitance.
3. Learns the fundamental laws related to Magneto statics.
4. Understand the concepts of Magnetic forces and Magnetic potential.
5. Learns the fundamentals of Time Varying Fields.

**UNIT – I****Electrostatics:**

Electrostatic Fields -Coulomb's Law – Electric Field Intensity (EFI) – EFI due to a line and a surface charge –Electric flux density – Gauss's law – Application of Gauss's Law –Work done in moving a point charge in an electric field – Electric Potential – Potential gradient – Energy density in electric field - Related Problems. Maxwell's First Law – Numerical Problems-

**UNIT – II****Conductors, Dipole, Dielectric & Capacitance:**

Laplace's and Poisson's equations – electric dipole – Conduction current and current density – Ohm's law in point form – Conductors and Insulators - Electric field inside a dielectric material – Polarization – Dielectric – Conductor and Dielectric – Dielectric boundary conditions - Capacitance – Capacitance of parallel plate , co-axial and spherical capacitors with composite dielectrics - Related Problems.

**UNIT – III****Magneto Statics:**

Biot-Savart's law – Magnetic field intensity (MFI) – MFI due to a straight current carrying filament – MFI due to circular, square and solenoid current – Carrying wire – Relation between magnetic flux, magnetic flux density and MFI – Maxwell's second Equation,  $\text{div}(\mathbf{B})=0$ . Ampere's circuital law and its applications viz. MFI due to an infinite sheet of current and a long current carrying filament – Point form of Ampere's circuital law - Related Problems.

**UNIT – IV****Magnetic Forces:**

Forces due to magnetic field – force on a charged particle – force on a current element – force between two current element – magnetic torque and moment – Magnetic Dipole - Related Problems.

**Magnetic Potential:**

Scalar magnetic potential and vector magnetic potential – classification of magnetic materials – Self and Mutual inductances – Self inductances of a coaxial cable, solenoid, toroid and two wire transmission line – Mutual inductance between a two co-axial solenoids and two coils wound on the same magnetic circuit – Energy stored in a magnetic field - Related Problems.

**UNIT – V**

**Time Varying Fields**

Faraday’s law in integral form and in differential form –Maxwell’s fourth equation. Statically and Dynamically Induced E.M.F’S-simple problems–Modification of Maxwell’s equations for time varying fields – Displacement current- Poynting Theorem and Poynting vector - Related Problems.

**TEXT BOOKS:**

1. Elements of Electromagnetics – by Matthew N O Sadiku, Oxford University Press, 3<sup>rd</sup> Edition 2004 .
2. Engineering Electromagnetic – by W H hayt and J A Buck, TATA Mc-graw-hill Education – 7<sup>th</sup> Edition 2006.

**REFERENCE BOOKS:**

- 1 Engineering Electromagnetics – by Nathan Ida, Springer (India) Pvt. Ltd., New Delhi, 2nd Edition 2005
- 2 Introduction to Electro Dynamics - by D.J. Griffiths, PHI.
- 3 Electromagnetics – Theory and problems by Joseph A. Edminister, 2<sup>nd</sup> edition.,1993, Schaum’s outline series, Mc-Graw Hill

CO No.	PO No. and keyword	Competency Indicator	Performance Indicator
CO1	PO1: Engineering knowledge	1.3	1.3.1
CO2	PO1: Engineering knowledge	1.3	1.3.1
CO3	PO2: Problem analysis	2.4	2.4.1
CO4	PO1: Engineering knowledge	1.3	1.3.1
		1.4	1.4.1
CO5	PO1: Engineering knowledge	1.4	1.4.1



**ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES, TIRUPATI  
(AUTONOMOUS)**

**Year: II Semester: IV Branch of Study: Common to all**

<b>Course Code</b>	<b>MANAGERIALECONOMICSANDFINANCI</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>20AHSMB01</b>	<b>AL ANALYSIS</b>	<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>
<b>Course Outcomes (CO):</b>					
CO1: Understand the fundamentals of Economics and Managerial economics viz., Demand, Production, cost, revenue and markets.					
CO2: Apply the Concept of Production cost and revenues for effective Business decision					
CO3: Analyze how to invest their capital and maximize returns.					
CO4: Evaluate the capital budgeting techniques.					
CO5: Define the concepts related to financial accounting and management and able to develop the Accounting statements and evaluate the financial performance of business entity.					
<b>UNIT- I</b>	<b>Managerial Economics</b>				
Introduction – meaning, nature, significance, functions, and advantages, ME and its role in other fields. Demand - Concept, Function, Law of Demand-Demand Elasticity-Types– Measurement Demand Forecasting-Factors governing forecasting, Methods.					
<b>UNIT-II</b>	<b>Production and Cost Analysis</b>				
Introduction – Nature, meaning, significance, functions and advantages. Production Function– Least-cost combination– Short run and Long run Production Function- Isoquants and Isocosts, MRTS -Cobb-Douglas Production Function-Laws of Returns-Internal and External Economies of scale. Cost & Break-Even Analysis-Cost concepts and Cost Behavior-Break-Even Analysis (BEA)-Determination of Break-Even Point (Simple Problems)-Managerial significance and limitations of Break-Even Analysis.					
<b>UNIT-III</b>	<b>Business Organizations and Markets</b>				
Introduction–Nature, meaning, significance, functions and advantages. Forms of Business Organizations- Sole Proprietary - Partnership - Joint Stock Companies - Public Sector Enterprises. Types of Markets - Perfect and Imperfect Competition - Features of Perfect Competition Monopoly-MonopolisticCompetition–Oligopoly-Price-OutputDetermination-Pricing Methods and Strategies.					
<b>UNIT-IV</b>	<b>Capital Budgeting</b>				
Introduction to Capital, Sources of Capital. Short-term and Long-term Capital: Working capital, types, Estimating Working capital requirements. Capital Budgeting – Features, Proposals, Time value of money. Methods and Evaluation of Projects – Pay Back Method, Accounting Rate of Return (ARR), Net Present Value (NPV), and Internal Rate Return (IRR)Method (simple problems).					
<b>UNIT-V</b>	<b>Financial Accounting and Analysis</b>				
Introduction – Nature, meaning, significance, functions and advantages. Concepts and Conventions-Double-Entry Book Keeping, Journal, Ledger, Trial Balance-Final Accounts (Trading Account, Profit and Loss Account and Balance Sheet with simple adjustments). <b>Financial Analysis</b> - Analysis and Interpretation of Liquidity Ratios, Activity Ratios and Capital structure Ratios and Profitability.					
<b>Textbooks:</b>					
1. Varshney&Maheswari:ManagerialEconomics,SultanChand,2013.					
2. Aryasri:BusinessEconomicsandFinancialAnalysis,4/e,MGH,2019.					

**Reference Books:**

1. Ahuja HI Managerial economics Schand, 3/e, 2013
2. S.A. Siddiqui and A.S. Siddiqui: Managerial Economics and Financial Analysis, New Age International, 2013.
3. Joseph G. Nellis and David Parker: Principles of Business Economics, Pearson, 2/e, New Delhi.
4. Dom nick Salvatore: Managerial Economics in a Global Economy, Cengage, 2013.

**Online Learning Resources:**

<https://www.slideshare.net/123ps/managerial-economics-ppt>  
<https://www.slideshare.net/rossanz/production-and-cost-45827016>  
<https://www.slideshare.net/darkyla/business-organizations-19917607>  
<https://www.slideshare.net/balarajbl/market-and-classification-of-market>  
<https://www.slideshare.net/ruchi101/capital-budgeting-ppt-59565396>  
<https://www.slideshare.net/ashu1983/financial-accounting>.

**ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES: TIRUPATI  
(AUTONOMOUS)  
AK20 Regulations**

II B.Tech

SEMESTER: IV

Branch: Common to all

COURSE CODE	COURSE TITLE	L	T	P	CREDITS
20AHS9905	Universal Human Values	3	0	0	3

**Course Objectives**

1. Development of a holistic perspective based on self-exploration about themselves (human being), family, society and nature/existence.
2. Understanding (or developing clarity) of the harmony in the human being, family, society and Nature /existence
3. Strengthening of self-reflection.
4. Development of commitment and courage to act.

**UNIT – 1: Course Introduction - Need, Basic Guidelines, Content and Process for Value Education**

- Purpose and motivation for the course, recapitulation from Universal Human Values-I
- Self-Exploration–what is it? - Its content and process; ‘Natural Acceptance’ and Experiential Validation- as the process for self-exploration
- Continuous Happiness and Prosperity- A look at basic Human Aspirations
- Right understanding, Relationship and Physical Facility- the basic requirements for fulfillment of aspirations of every human being with their correct priority
- Understanding Happiness and Prosperity correctly- A critical appraisal of the current scenario
- Method to fulfill the above human aspirations: understanding and living in harmony at various levels.

**Include practice sessions to discuss natural acceptance in human being as the innate acceptance for living with responsibility (living in relationship, harmony and co-existence) rather than as arbitrariness in choice based on liking-disliking.**

**UNIT II: Understanding Harmony in the Human Being - Harmony in Myself!**

- Understanding human being as a co-existence of the sentient ‘I’ and the material ‘Body’
- Understanding the needs of Self (‘I’) and ‘Body’ - happiness and physical facility
- Understanding the Body as an instrument of ‘I’ (I being the doer, seer and enjoyer)
- Understanding the characteristics and activities of ‘I’ and harmony in ‘I’
- Understanding the harmony of I with the Body: Sanyam and Health; correct appraisal of Physical needs, meaning of Prosperity in detail
- Programs to ensure Sanyam and Health.

**Include practice sessions to discuss the role others have played in making material goods available to me. Identifying from one's own life. Differentiate between prosperity and accumulation. Discuss program for ensuring health vs dealing with disease.**

**UNIT III: Understanding Harmony in the Family and Society- Harmony in Human-Human Relationship.**

- Understanding values in human-human relationship; meaning of Justice (nine universal values in relationships) and program for its fulfillment to ensure mutual happiness; Trust and Respect as the foundational values of relationship
- Understanding the meaning of Trust; Difference between intention and competence
- Understanding the meaning of Respect, Difference between respect and differentiation; the other salient values in relationship
- Understanding the harmony in the society (society being an extension of family): Resolution, Prosperity, fearlessness (trust) and co-existence as comprehensive Human Goals
- Visualizing a universal harmonious order in society- Undivided Society, Universal Order- from family to world family

**Include practice sessions to reflect on relationships in family, hostel and institute as extended family, real life examples, teacher-student relationship, goal of education etc. Gratitude as a universal value in relationships. Discuss with scenarios. Elicit examples from students' lives**

**UNIT IV: Understanding Harmony in the Nature and Existence - Whole existence as Coexistence**

- Understanding the harmony in the Nature
- Interconnectedness and mutual fulfillment among the four orders of nature recyclability and self-regulation in nature
- Understanding Existence as Co-existence of mutually interacting units in all- pervasive space
- Holistic perception of harmony at all levels of existence. Include practice sessions to discuss human being as cause of imbalance in nature (film "Home" can be used), pollution, depletion of resources and role of technology etc.

**Include practice sessions to discuss human being as cause of imbalance in nature (film "Home" can be used), pollution, depletion of resources and role of technology etc.**

**UNIT- V: Implications of the above Holistic Understanding of Harmony on Professional Ethics.**

- Natural acceptance of human values
- Definitiveness of Ethical Human Conduct
- Basis for Humanistic Education, Humanistic Constitution and Humanistic Universal Order

- Competence in professional ethics: a. Ability to utilize the professional competence for augmenting universal human order b. Ability to identify the scope and characteristics of people friendly and eco-friendly production systems, c. Ability to identify and develop appropriate technologies and management patterns for above production systems.
- Case studies of typical holistic technologies, management models and production systems
- Strategy for transition from the present state to Universal Human Order: a. At the level of individual: as socially and ecologically responsible engineers, technologists and managers b. At the level of society: as mutually enriching institutions and organizations
- Sum up.

**Include practice Exercises and Case Studies will be taken up in Practice (tutorial) Sessions eg. To discuss the conduct as an engineer or scientist etc.**

**Course Outcomes:**

On completion of this course, the students will be able to

1. Students are expected to become more aware of themselves, and their surroundings (family, society, nature)
2. They would become more responsible in life, and in handling problems with sustainable solutions, while keeping human relationships and human nature in mind.
3. They would have better critical ability.
4. They would also become sensitive to their commitment towards what they have understood (human values, human relationship and human society).
5. It is hoped that they would be able to apply what they have learnt to their own self in different day-to-day settings in real life, at least a beginning would be made in this direction.

**TEXT BOOKS**

1. R R Gaur, R Asthana, G P Bagaria, “A Foundation Course in Human Values and Professional Ethics”, 2nd Revised Edition, Excel Books, New Delhi, 2019. ISBN 978-93-87034-47-1
2. R R Gaur, R Asthana, G P Bagaria, “Teachers’ Manual for A Foundation Course in Human Values and Professional Ethics”, 2nd Revised Edition, Excel Books, New Delhi, 2019. ISBN 978-93-87034-53-2

**REFERENCE BOOKS**

1. Jeevan Vidya: EkParichaya, A Nagaraj, Jeevan Vidya Prakashan, Amar kantak, 1999.
2. A. N. Tripathi, “Human Values”, New Age Intl. Publishers, New Delhi, 2004.
3. The Story of Stuff (Book).
4. Mohandas Karamchand Gandhi “The Story of My Experiments with Truth”
5. E. F Schumacher. “Small is Beautiful”
6. Slow is Beautiful –Cecile Andrews
7. J C Kumarappa “Economy of Permanence”
8. Pandit Sunderlal “Bharat Mein Angreji Raj”
9. Dharampal, “Rediscovering India”
10. Mohandas K. Gandhi, “Hind Swaraj or Indian Home Rule”
11. India Wins Freedom - Maulana Abdul Kalam Azad
12. Vivekananda - Romain Rolland(English)
13. Gandhi - Romain Rolland (English)

**AK20 REGULATIONS**

<b>List of COs</b>	<b>PO no. and keyword</b>	<b>Competency Indicator</b>	<b>Performance Indicator</b>
CO 1	<b>PO 7: Environment and sustainability :</b> Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and the need for sustainable development	7.1	7.1.2
CO 2	<b>PO 7: Environment and sustainability :</b> Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and the need for sustainable development	7.1	7.1.2
CO 3	<b>PO 8: Ethics:</b> Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice	8.1 8.2	8.1.1 8.2.2
CO 4	<b>PO 8: Ethics:</b> Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice	8.1 8.2	8.1.1 8.2.2
CO5	<b>PO 8: Ethics:</b> Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice	8.1 8.2	8.1.1 8.2.2

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES, TIRUPATI  
(AUTONOMOUS)

II B.Tech

SEMESTER: IV

Branch Common to all

Course Code	Basics of Python Programming Lab		L	T	P	C
20AES0510			0	0	3	1.5
Pre-requisite	Nil	Semester	I-II and II-I			
<b>Course Objectives:</b>						
<ul style="list-style-type: none"> <li>• To train the students in solving computational problems</li> <li>• To elucidate solving mathematical problems using Python programming language</li> <li>• To understand the fundamentals of Python programming concepts and -its applications.</li> <li>• To understand the object-oriented concepts using Python in problem solving.</li> </ul>						
<b>Course Outcomes (CO):</b>						
<ul style="list-style-type: none"> <li>• Write, Test and Debug Python Programs</li> <li>• Implement Conditionals and Loops for Python Programs</li> <li>• Use functions and represent Compound data using Lists, Tuples and Dictionaries</li> <li>• Read and write data from &amp; to files in Python and develop Application using Pygame</li> </ul>						
<b>List of Experiments:</b>						
<p>1. Install Python Interpreter and use it to perform different Mathematical Computations. Try to do all the operations present in a Scientific Calculator</p> <p>2. Write a function that draws a grid like the following:</p> <pre> +-----+-----+   +-----+-----+   +-----+-----+</pre> <p>3. Write a function that draws a Pyramid with # symbols</p> <pre> # ### #### ##### Up to 15 hashes at the bottom</pre> <p>4. Using turtles concept draw a wheel of your choice</p> <p>5. Write a program that draws Archimedean Spiral</p>						

6. The letters of the alphabet can be constructed from a moderate number of basic elements, like vertical and horizontal lines and a few curves. Design an alphabet that can be drawn with a minimal number of basic elements and then write functions that draw the letters. The alphabet can belong to any Natural language excluding English. You should consider at least Ten letters of the alphabet.

7. The time module provides a function, also named time that returns the current Greenwich Mean Time in “the epoch”, which is an arbitrary time used as a reference point. On UNIX systems, the epoch is 1 January 1970.

```
>>> import time
```

```
>>> time.time()
```

```
1437746094.5735958
```

Write a script that reads the current time and converts it to a time of day in hours, minutes, and seconds, plus the number of days since the epoch.

8. Given  $n+r+1 \leq 2r$ .  $n$  is the input and  $r$  is to be determined. Write a program which computes minimum value of  $r$  that satisfies the above.

9. Write a program that evaluates Ackermann function

10. The mathematician Srinivasa Ramanujan found an infinite series that can be used to generate a numerical approximation of  $1/\pi$ : Write a function called estimate\_pi that uses this formula to compute and return an estimate of  $\pi$ .

$$\frac{1}{\pi} = \frac{2\sqrt{2}}{9801} \sum_{k=0}^{\infty} \frac{(4k)!(1103 + 26390k)}{(k!)^4 396^{4k}}$$

It should use a while loop to compute terms of the summation until the last term is smaller than  $1e^{-15}$  (which is Python notation for  $10^{-15}$ ). You can check the result by comparing it to math.pi.

11. Choose any five built-in string functions of C language. Implement them on your own in Python. You should not use string related Python built-in functions.

12. Given a text of characters, Write a program which counts number of vowels, consonants and special characters.

13. Given a word which is a string of characters. Given an integer say ‘n’, Rotate each character by ‘n’ positions and print it. Note that ‘n’ can be positive or negative.

14. Given rows of text, write it in the form of columns.

15. Given a page of text. Count the number of occurrences of each letter (Assume case insensitivity and don’t consider special characters). Draw a histogram to represent the same

16. Write program which performs the following operations on list’s. Don’t use built-in functions

a) Updating elements of a list

b) Concatenation of list’s

c) Check for member in the list

d) Insert into the list

e) Sum the elements of the list

f) Push and pop element of list

g) Sorting of list

h) Finding biggest and smallest elements in the list



- i) Finding common elements in the list
17. Write a program to count the number of vowels in a word.
  18. Write a program that reads a file, breaks each line into words, strips whitespace and punctuation from the words, and converts them to lowercase.
  19. Go to Project Gutenberg (<http://gutenberg.org>) and download your favorite out-of-copyright book in plain text format. Read the book you downloaded, skip over the header information at the beginning of the file, and process the rest of the words as before. Then modify the program to count the total number of words in the book, and the number of times each word is used. Print the number of different words used in the book. Compare different books by different authors, written in different eras.
  20. Go to Project Gutenberg (<http://gutenberg.org>) and download your favorite out-of-copyright book in plain text format. Write a program that allows you to replace words, insert words and delete words from the file.
  21. Consider all the files on your PC. Write a program which checks for duplicate files in your PC and displays their location. Hint: If two files have the same checksum, they probably have the same contents.
  22. Consider turtle object. Write functions to draw triangle, rectangle, polygon, circle and sphere. Use object oriented approach.
  23. Write a program illustrating the object oriented features supported by Python.
  24. Design a Python script using the Turtle graphics library to construct a turtle bar chart representing the grades obtained by N students read from a file categorizing them into distinction, first class, second class, third class and failed.
  25. Design a Python script to determine the difference in date for given two dates in YYYY:MM:DD format( $0 \leq YYYY \leq 9999$ ,  $1 \leq MM \leq 12$ ,  $1 \leq DD \leq 31$ ) following the leap year rules.
  26. Design a Python Script to determine the time difference between two given times in HH:MM:SS format. ( $0 \leq HH \leq 23$ ,  $0 \leq MM \leq 59$ ,  $0 \leq SS \leq 59$ )

References:

- Allen B. Downey , “ Think Python: How to Think Like a Computer Scientist”, Second Edition, Updated for Python 3, Shroff/O’Reilly Publishers, 2016.
- Shroff “Learning Python: Powerful Object-Oriented Programming; Fifth edition, 2013.
- David M.Baezly “Python Essential Reference”. Addison-Wesley Professional; Fourth edition, 2009.
- David M. Baezly “Python Cookbook” O’Reilly Media; Third edition (June 1, 2013).

Online Learning Resources/Virtual Labs:

<http://www.edx.org>

**ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES,  
TIRUPATI (AUTONOMOUS)**

Year:II

Semester:IV

Branch of Study: EEE

COURSE CODE	COURSE TITLE	L	T	P	CREDITS
20APC0209	ELECTRICAL CIRCUITS-II LAB	0	0	3	1.5

**COURSE OUTCOMES:**

1. Able to understand simulation programs for DC circuit analysis using PSPICE.
2. Understand and compare basic electric circuit theorems with actual working circuits.
3. Design and understand RLC series and parallel circuits and its resonance condition.
4. Able to measure power in three phase circuits in day to day life.
5. Characterize and model the network in terms of all network parameters.

**List of Experiments**

1. Simulation of DC Circuits
2. DC Transient Response
3. Mesh Analysis in p-spice
4. Nodal Analysis in p-spice
5. Measure and calculate RC time constant for a given RC circuit.
6. Measure and calculate RL time constant for a given RL circuit.
7. Frequency response of RLC Series Circuits
8. Analysis of RL and RC Series circuits for DC Excitation
9. Analysis of RL and RC Series circuits for AC Excitation
10. Verification of the maximum power dissipation (plot the power dissipated versus the load).
11. Measure and calculate Z, Y parameters of two-port network.
12. Measure and calculate ABCD & h parameters of two-port network.

**REFERENCES:**

1. Simulation of Power Electronics Circuit, M B Patil, V Ramanarayan and V T Ranganat, Alpha Science International Ltd., 2009.
2. Public Domain Simulator: [http:// www.ee.iitb.ac.in/~sequel](http://www.ee.iitb.ac.in/~sequel)
3. PSPICE A/D user's manual – Microsim, USA.
4. PSPICE reference guide – Microsim, USA.

CO No.	PO No. and keyword	Competency Indicator	Performance Indicator
CO1	PO1: Engineering knowledge	1.3	1.3.1
CO2	PO1: Engineering knowledge	1.3	1.3.1
CO3	PO2: Problem analysis	2.4	2.4.1
	PO4: Conduct investigations of complex problems	4.3	4.3.1
CO4	PO1: Engineering knowledge	1.3	1.3.1
		1.4	1.4.1
CO5	PO4: Conduct investigations of complex problems	4.3	4.3.1

**ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::TIRUPATI  
(AUTONOMOUS)**

Year: II

Semester: IV

Branch: EEE

Course Code	Course Title	L	T	P	Credits
20APC0210	Electrical Machines-II Lab	0	0	3	1.5

**Course Outcomes:**

1. Analyze and apply load test, no-load and blocked-rotor tests for construction of circle diagram and equivalent circuit determination in a single-phase induction motor.
2. Predetermine regulation of a three-phase alternator by synchronous impedance & m.m.f methods.
3. Predetermine the regulation of Alternator by Zero Power Factor method  $X_d$  and  $X_q$  determination of salient pole synchronous machine.
4. Evaluate and analyze V and inverted V curves of 3 phase synchronous motor.

**List of Experiments:****All the following ten experiments are required to be conducted:**

1. No-load & Blocked-rotor tests on 3- $\phi$  Induction motor.
2. Brake Test on Three Phase Induction Motor.
3. Speed control of three phase induction motor.
4. Separation of no-load losses of three phase induction motor.
5. Determination of Equivalent circuit of a single phase induction motor.
6. Load test on single phase induction motor.
7. Predetermination of Regulation of a three phase alternator by synchronous impedance & m.m.f methods.
8. Predetermination of Regulation of three-phase alternator by Z.P.F. method.
9. Determination of  $X_d$  and  $X_q$  of a salient pole synchronous machine by slip test.
10. V and inverted V curves of a 3-phase synchronous motor.

**References:**

1. D. P.Kothari and B. S. Umre, "Laboratory Manual for Electrical Machines" I.K International Publishing House Pvt. Ltd, 2017.
2. D.R. Kohli and S.K. Jain, "A Laboratory Course in Electrical Machines" NEM Chand & Bros.

**Online Learning Resources/Virtual Labs:**

<http://vem-iitg.vlabs.ac.in/>

[http://em-coep.vlabs.ac.in/List%20of%20experiments.html?domain=Electrical Engineering](http://em-coep.vlabs.ac.in/List%20of%20experiments.html?domain=Electrical%20Engineering)

[http://vlabs.iitb.ac.in/vlabs-dev/vlab\\_bootcamp/bootcamp/Sadhya/experimentlist.html](http://vlabs.iitb.ac.in/vlabs-dev/vlab_bootcamp/bootcamp/Sadhya/experimentlist.html).

CO No.	PO No. and keyword	Competency Indicator	Performance Indicator
CO1	PO1: Engineering knowledge	1.3	1.3.1
CO2	PO1: Engineering knowledge	1.3	1.3.1
CO3	PO2: Problem analysis	2.4	2.4.1
	PO4: Conduct investigations of complex problems	4.3	4.3.1
CO4	PO4: Conduct investigations of complex problems	4.3	4.3.1

**ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES, TIRUPATI  
(AUTONOMOUS)  
DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING  
SKILL ORIENTED COURSE**

Year: II

Semester: IV

Branch of Study: EEE

COURSE CODE	COURSE TITLE	L	P	CREDITS
20ASC0201	SIMULATION OF CIRCUITS USING PSPICE	1	02	2

**COURSE OBJECTIVES:**

- Learn the about the abilities, features and programming basics of PSPICE.
- Understand the various elements, syntax and execution procedures for simulation of AC and DC circuits using PSPICE.
- Acquire knowledge on creating a PSPICE circuit design for analog circuits.
- Conduct simulation of DC and AC circuits and obtain data of simulation for nodal analysis of AC and DC analog circuits.
- Acquire required knowledge for conduct of frequency response of circuits and model the network in terms of all network parameters.

**List of Experiments**

- Introduction to the use of P-Spice.
- Procedure to use of P-Spice.
- Design a circuit for 3-node system using following data.  
Voltage=20V, R1= 3Ω & R2= 2Ω
- Design an RC circuit with a suitable switch for DC transient analysis.  
Voltage=20V, R=10 Ω, C=0.1F
- Perform the nodal analysis for a 4-node circuit.  
Voltage=10V, R1=10 Ω, R2=5 Ω, R3= 3 Ω, R4=10 Ω
- Perform the frequency response of an RC network. V<sub>rms</sub>=100V, R=10Ω, C=50μF
- Perform the analysis of an RL series circuit for DC Excitation.  
Voltage= 20V, R= 500Ω, L=2mH

**REFERENCES:**

- Simulation of Power Electronics Circuit, M B Patil, V Ramanarayan and V T Ranganat, Alpha Science International Ltd., 2009.
- Public Domain Simulator: [http:// www.ee.iitb.ac.in/~sequel](http://www.ee.iitb.ac.in/~sequel)
- PSPICE A/D user's manual – Microsim, USA.
- PSPICE reference guide – Microsim, USA.

**COURSE OUTCOMES:**

- Able to understand features and programming basics of PSPICE.
- Understand the procedures for simulation of AC and DC circuits using PSPICE.
- Design and understand nodal and frequency response analysis of circuits.

CO No.	PO No. and keyword	Competency Indicator	Performance Indicator
CO1	PO5: Modern tool usage	5.1	5.1.1
CO2	PO5: Modern tool usage	5.1	5.1.1
CO3	PO5: Modern tool usage	5.2	5.2.1

