

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

Year: II

Semester: I

Branch of Study: EEE

Subject Code	Subject Name	L	T	P	Credits
19ABS9912	Transform Techniques and Complex Variables	3	0	0	3

**Course Outcomes:**

- CO: 1 Apply the Laplace transform for solving differential equations (continuous systems)  
 CO: 2 Find the Fourier series of periodic signals  
 CO: 3 Know and be able to apply integral expressions for the forwards and inverse Fourier transform to a range of non-periodic waveforms  
 CO: 4 Solve linear/nonlinear algebraic and transcendental equations using numerical methods  
 CO: 5 Solve ordinary differential equations by Euler's method, modified Euler's method, Runge Kutta method, Predictor Corrector method and Milne's method

**UNIT I****Laplace transforms:**

Definition of Laplace transform, existence conditions, properties of Laplace transforms, inverse Laplace transforms, transforms of derivatives, transforms of integrals, multiplication by  $t^n$ , division by  $t$ , convolution theorem, periodic functions, unit step function, unit impulse function, applications to ordinary differential equations. (Without proofs).

**UNIT II****Fourier series:**

Dirichlet's conditions, Fourier series, conditions for a Fourier expansion, functions of any period, odd and even functions - half range series.

**UNIT III****Fourier transforms:**

Fourier integrals, Fourier cosine and sine integrals, Fourier transform, sine and cosine transform, properties, convolution theorem.

**UNIT IV****Solution to algebraic equations:**

Solution of polynomial and transcendental equations: bisection method, Newton-Raphson method and Regula-Falsi method. finite differences, relation between operators, interpolation using Newton's forward and backward difference formulae. Interpolation with unequal intervals: Newton's divided difference and Lagrange's formulae.

**UNIT V****Numerical differentiation and integration:**

Numerical Differentiation, numerical integration- trapezoidal rule and Simpson's 1/3rd and 3/8 rules. Ordinary differential equations-Taylor's series, Euler and modified Euler's methods. Runge-Kutta method of fourth order for solving first and second order equations.

**Textbooks:**

1. B. S. Grewal, Higher Engineering Mathematics, 44/e, Khanna Publishers, 2017.
2. Erwin kreyszig, Advanced Engineering Mathematics, 9/e, John Wiley & Sons, 2006.

**References**

1. T.K.V.Iyengar, B.Krishna Gandhi and others, Engineering Mathematics-II, & Probability and Statistics, S.Chand Publishers
2. Veerarajan T., Engineering Mathematics, Tata McGraw-Hill, New Delhi, 2008.
3. Erwin kreyszig, Advanced Engineering Mathematics, 9/e, John Wiley & Sons, 2006.
4. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2010.

List of COs	PO no. and keyword	Competency	Performance Indicator
CO 1	PO1: Apply the knowledge of mathematics	1.1	1.1.2
CO 2	PO1: Apply the knowledge of mathematics	1.1	1.1.2
CO 3	PO 2: First principles of mathematics.	2.2	2.2.2
CO 4	PO1: Knowledge of mathematics	1.3	1.3.1
CO 5	PO1: Knowledge of mathematics	1.1	1.1.1

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

**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

**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**

**Reference Books**

1. Bailey, Stephen. *Academic writing: A handbook for international students*. Routledge, 2014.
2. Chase, Becky Tarver. *Pathways: Listening, Speaking and Critical Thinking*. HeinleyELT; 2<sup>nd</sup> 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](http://www.pointblank7.in)> News & Politics> Features dt. 15.05.2019
2. Learning English a Communication Approach by Orient Longman Pvt Ltd. Hyderabad, 2005.

**AK19 REGULATIONS**

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 multi disciplinary 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 clear instructions.	10.3	10.3.1 10.3.2

## ANNAMACHARYA INSTITUTE OF TECHNOLOGY &amp; SCIENCES:: TIRUPATI

(AUTONOMOUS)

Year: II

Semester : I

Branch of Study : ME

Subject Code	Subject Name	L	T	P	Credits
19AES0505	Internet of Things (IoT)	2	0	0	2

**Course Outcomes:**

- CO: 1 Interpret the vision of IoT from a global context  
 CO: 2 Determine the Market perspective of IoT  
 CO: 3 Compare and Contrast the use of Devices, Gateways and Data Management in IoT  
 CO: 4 Implement state of the art architecture in IoT  
 CO: 5 Illustrate the application of IoT in Industrial Automation and identify Real World Design Constraints

**UNIT I**

M2M to IoT-The Vision-Introduction, From M2M to IoT, M2M towards IoT-the global context, A usecase example, Differing Characteristics.

**UNIT II**

M2M to IoT - A Market Perspective- Introduction, Some Definitions, M2M Value Chains, IoT Value Chains, An emerging industrial structure for IoT, The international driven global value chain and global information monopolies. M2M to IoT-An Architectural Overview- Building an architecture, Main design principles and needed capabilities, An IoT architecture outline, standards considerations.

**UNIT III**

M2M and IoT Technology Fundamentals- Devices and gateways, Local and wide area networking, Data management, Business processes in IoT, Everything as a Service(XaaS), M2M and IoT Analytics, Knowledge Management.

**UNIT IV**

IoT Architecture-State of the Art - Introduction, State of the art.

**UNIT V**

IoT Reference Architecture- Introduction, Functional View, Information View, Deployment and Operational View, Other Relevant architectural views. Real-World Design Constraints-Introduction, Technical Design constraints-hardware is popular again, Data representation and visualization, Interaction and remote control. Industrial Automation- Service-oriented architecture-based device integration, SOCRADES: realizing the enterprise integrated Web of Things, IMC-AESOP: from the Web of Things to the Cloud of Things.

**Textbooks:**

1. Jan Holler, Vlasios Tsiatsis, Catherine Mulligan, Stefan Avesand, Stamatis Karnouskos, David Boyle, -From Machine-to-Machine to the Internet of Things: Introduction to a New Age of Intelligencell, 1<sup>st</sup> Edition, Academic Press, 2014.(ISBN-13:978-0124076846).

**References**

1. Vijay Madiseti and Arshdeep Bahga, -Internet of Things (A Hands-on-Approach)|, 1<sup>st</sup> Edition, VPT, 2014. (ISBN-13:978-8173719547)
2. Francis daCosta, -Rethinking the Internet of Things: A Scalable Approach to Connecting Everything|, 1<sup>st</sup> Edition, Apress Publications, 2013. (ISBN-13: 978-1430257400)P L Ballaney, Theory of Machines, Khanna Publishers.

**AK19 REGULATIONS**

List of COs	PO no. and keyword	Competency	Performance Indicator
CO 1	PO 5: Modern Tool Usage	5.1	5.1.1
CO 2	PO 5: Modern Tool Usage	5.2	5.2.1
CO 3	PO 4: Conduct investigations of complex Problems	4.3	4.3.1
CO 4	PO 3: Design/Development of Solutions	3.4	3.4.1
CO 5	PO 6: Engineer & Society	6.1	6.1.1



**Reference Books:**

1. Engineering Circuit Analysis, William Hayt and Jack E. Kemmerly, Mc Graw Hill Company, 6<sup>th</sup> edition.
2. Network Analysis 3<sup>rd</sup> Edition, M.E Van Valkenberg, PHI.

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-2-problem analysis	2.2	2.2.2 2.2.3
CO: 3	PO-4-conduct investigations of complex problems	4.1	4.1.1
CO: 4	PO-4- conduct investigations of complex problems	4.3	4.3.1
CO: 5	PO-1- engineering knowledge	1.4	1.4.1

(AUTONOMOUS)

Year: II

Semester: I

Branch of Study: EEE

Subject Code	Subject Name	L	T	P	Credits
19APC0401	Electronic Devices & Circuits	3	0	0	3

**Course Objectives:**

CO1: Ability to understand the operation of diodes and special electronic devices with V-I characteristics.

CO2: Ability to understand the operation of different rectifiers and filters.

CO3: Ability to understand the construction, operation of BJT, FET in different configurations

CO4: Ability to understand importance of biasing and design of DC biasing circuits.

CO5: Ability to understand small signal model and design of amplifiers with BJTs and FETs.

**Unit 1: PN Junction Diode & Special Diode Characteristics**

Review of semiconductor Physics n and p-type semiconductors, Intrinsic & Extrinsic Semiconductors and their Fermi Levels, Open circuited p-n junction, Biased p-n junction, Current components in PN junction Diode, Diode Equation, V-I characteristics of p-n junction diode, Temperature dependence on V-I characteristics, Diode resistance, Diode capacitance.

Special Electronic Devices - Construction, Operation, V-I Characteristics of

Zener diode, Breakdown mechanisms, Zener diode applications, LED, LCD, Photo diode, Varactor diode, Tunnel diode, DIAC, TRIAC, SCR, UJT.

**Unit 2: Rectifiers & Filters**

Introduction to DC Power supply, Half Wave Rectifier, Full Wave Rectifier, Bridge Rectifier, derivations of rectifier parameters, Rectifier circuits-Operation, Input and Output waveforms, Filters, Capacitor filter, Inductor filter, L-section filter,  $\pi$ -section filter, Multiple L-section and Multiple  $\pi$  section filter, comparison of various filter circuits in terms of ripple factors.

**Unit 3: Transistor Characteristics**

**BJT:** Bi-polar Junction Transistor, Ebers-Moll model of a transistor, Transistor current components, Transistor as an amplifier, Transistor equation, Transistor configurations, Input-Output Characteristics of Transistor in Common Base, Common Emitter and Common Collector configurations, Punch through-Reach through, Photo transistor, Typical transistor junction voltage values.

**FET:** BJT Versus FET, Junction Field Effect Transistor JFET Types, Construction, Operation, parameters, Drain and Transfer characteristics, MOSFET Types - Enhancement and Depletion Types-Construction, Operation, Characteristics.

**Unit 4: Transistor Biasing & Thermal Stabilization**

Need for biasing, operating point, Load line analysis, BJT biasing-Methods, Basic stability Fixed bias, Collector to base bias, Self-bias, Stabilization against variations in  $V_{BE}$ ,  $I_C$ , and  $\beta$ , stability factors, (S, S', S<sub>l</sub>), Bias compensation, Thermal runaway, Thermal stability. FET Biasing- methods and stabilization.

**Unit 5: Small Signal Low Frequency Transistor Amplifier Models**

**BJT:** Two port network, Transistor hybrid model, determination of h-parameters, generalized analysis of transistor amplifier model using h-parameters, analysis of CB, CE and CC amplifiers using exact analysis, approximate hybrid model, analysis of CB, CE and CC amplifiers using approximate hybrid model, Comparison of transistor amplifiers.

**FET:** Generalized analysis of small signal model, analysis of CG, CS and CD amplifiers, comparison of FET amplifiers.

**Text Books and Reference Books:**

- 1) David A.Bell, -Electronic Devices and circuitsl,5<sup>th</sup> edition,Oxford university press 2015.
- 2) Thomas L.Floyd, -Electronic Devicesl, 9<sup>th</sup> edition, Pearson Education, 2013
- 3) Robert L.Boylestad and Louis Nashelsky, -Electronic Devices & circuit theoryl, Pearson Education, 11<sup>th</sup> Edition 2013.
- 4) Donald Neamen, -Electronic Circuits: Analysis and Designl, 3 rd edition, McGraw-Hill Education, 2011.
- 5) Muhammad Rashid, —Microelectronic Circuits: Analysis & Designl, 2<sup>nd</sup> edition, Cengage Learning,2010.

**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 AND SCIENCES, TIRUPATI**  
**(AUTONOMOUS)**  
**AK19 Regulations**

Year: II

Semester: I

Branch of Study: EEE

Course Code	Course Title	L	T	P	Credits
19APC0202	Engineering Electromagnetics	3	1	0	4

**COURSE OUTCOMES:**

CO1: Understand basic principles, concepts and fundamental laws of electromagnetic fields.

CO2: Translate from one coordinate system to another.

CO3: Describe electrostatics, magneto statics and time-varying fields

CO4: Analyze the interaction between electricity and magnetism.

CO5: Calculate the quantities associated with uniform plane wave motion in different media of Transmission.

**UNIT-I****ELECTROSTATICS**

Electrostatic Fields - Coulomb's Law - Electric Field Intensity(EFI) due to Line, Surface and Volume charges- Work Done in Moving a Point Charge in Electrostatic Field-Electric Potential due to point charges, line charges and Volume Charges - Potential Gradient - Gauss's Law-Application of Gauss's Law-Maxwell's First Law – Numerical Problems.

Laplace's Equation and Poisson's Equations - Solution of Laplace's Equation in one Variable. Electric Dipole - Dipole Moment - Potential and EFI due to Electric Dipole - Torque on an Electric Dipole in an Electric Field – Numerical Problems.

**UNIT-II****CONDUCTORS AND DIELECTRICS**

Behavior of Conductors in an Electric Field-Conductors and Insulators – Electric Field Inside a Dielectric Material – Polarization – Dielectric Conductors and Dielectric Boundary Conditions – Capacitance-Capacitance of Parallel Plate, Spherical & Co-axial capacitors – Energy Stored and Energy Density in a Static Electric Field – Current Density – Conduction and Convection Current Densities – Ohm's Law in Point Form – Equation of Continuity – Numerical Problems.

**UNIT-III****MAGNETOSTATICS**

Static Magnetic Fields – Biot-Savart Law – Oersted's experiment – Magnetic Field Intensity(MFI) due to a Straight, Circular & Solenoid Current Carrying Wire – Maxwell's Second Equation. 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 – Maxwell's Third Equation – Numerical Problems.

Magnetic Force — Lorentz Force Equation – Force on Current Element in a Magnetic Field - Force on a Straight and Long Current Carrying Conductor in a Magnetic Field - Force Between two Straight and Parallel Current Carrying Conductors.

**UNIT-IV****MAGNETIC POTENTIAL**

Scalar Magnetic Potential and Vector Magnetic Potential and its Properties - Vector Magnetic Potential due to Simple Configuration – Vector Poisson's Equations. Magnetic Dipole and Dipole moment – A Differential Current Loop as a Magnetic Dipole – Torque on a Current Loop Placed in a Magnetic Field – Numerical Problems.

Self and Mutual Inductances – Neumann's Formulae – Determination of Self Inductance of a Solenoid and Toroid and Mutual Inductance Between a Straight, Long Wire and a Square Loop Wire in the Same Plane – Energy Stored and Intensity in a Magnetic Field – Numerical Problems.

**UNIT-V****TIME VARYING FIELDS**

Faraday's Law of Electromagnetic Induction – It's Integral and Point Forms – Maxwell's Fourth Equation. Statically and Dynamically Induced E.M.F's – Simple Problems – Modified Maxwell's Equations for Time Varying Fields – Displacement Current.

Wave Equations – Uniform Plane Wave Motion in Free Space, Conductors and Dielectrics – Velocity, Wave Length, Intrinsic Impedence and Skin Depth – Poynting Theorem – Poynting Vector and its Significance.

**Text Books :**

1. 'Principles of Electromagnetics', 6<sup>th</sup> Edition, Sadiku, Kulkarni, OXFORD University Press, 2015
2. 'Engineering Electromagnetics', William.H.Hayt, Mc.Graw Hill, 2010.

**Reference Books:**

1. 'Electromagnetics' 5<sup>th</sup> edition, J.D.Kraus,Mc.Graw – Hill Inc, 1999.
2. 'Field & Electromagnetic waves' – 2<sup>nd</sup> edition, David K. Cheng
3. 'Electromagnetics', Joseph Edminister, Tata Mc Graw Hill, 2006.

List of COs	PO no. and keyword	Competency Indicator	Performance Indicator
CO: 1	PO 1: Engineering knowledge	1.1,1.2,1.3	1.1.1,1.1.2,1.2.1
CO: 2	PO 2: Problem analysis	2.1,2.2	2.1.1, 2.2.3
CO: 3	PO 2: Problem analysis	2.1	2.1.1,2.1.2
CO: 4	PO4: Conduct investigations of complex problems	4.1	4.1.2
CO: 5	PO 2: Problem analysis	2.1	2.1.2

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

Semester: I

Branch of Study: EEE

Subject Code	Subject Name	L	T	P	Credits
19AMC9903	Environmental Studies	3	0	0	3

**Course Outcomes:**

CO: 1 Students get sufficient information that clarifies modern environmental concepts like equitable use of natural resources, more sustainable life styles etc.

CO: 2 Students realize the need to change their approach, so as to perceive our own environmental issues correctly, using practical approach based on observation and self-learning.

CO: 3 Students become conversant with the fact that there is a need to create a concern for our environment that will trigger pro-environmental action; including simple activities we can do in our daily life to protect it.

CO: 4 Interpretation of different types of environmental pollution problems and designing of new solid waste management techniques usage

CO: 5 To get knowledge on various environmental acts and to engage all the students life - long learning of rain water harvesting

**UNIT I**

**Multidisciplinary Nature of Environmental Studies:** Introduction – Multidisciplinary Nature of Environmental Studies – Definition, Scope and Importance – Need for Public Awareness.

**Natural Resources:** Renewable and non-renewable energy resources – Natural resources and associated problems.

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

**Water resources:** Use and over utilization of surface and sub-surface – Floods, drought, conflicts over water, dams – benefits and problems.

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

**Food resources:** World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticides problems, water logging, salinity, case studies.

**Energy resources:** Renewable and non-renewable energy resources

**UNIT II**

**Ecosystems:** Concept of an ecosystem. – Structure and functions of anecosystem – Producers, consumers and decomposers – Energy flow in the ecosystem – Ecological succession – Food chains, food webs and ecological pyramids – Introduction, types, characteristic features, structure and function of the following ecosystem: Forest ecosystem, Grassland ecosystem, Desert ecosystem and Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries).

**Biodiversity And Its Conservation :** Introduction- Definition:genetic, species and ecosystem diversity – Value of biodiversity: consumptive use, Productive use, social, ethical, aesthetic and option values – Biodiversity at global, National and local levels – India as a mega-diversity nation – Hot-spots of biodiversity – Threats to biodiversity: habitat loss, poaching of wildlife, man – wildlife conflicts – Conservation of biodiversity: In-situ and Ex- situ conservation of biodiversity

**UNIT III**

**Environmental Pollution:** Definition, Causes, effects and its controlmeasures of : Air Pollution, Water pollution, Soil pollution, Marine pollution, Noise pollution, Thermal pollution and Nuclear hazards.

**Solid Waste Management:** Causes, effects and control measures of urban and industrial wastes – Role of an individual in prevention of pollution – Pollution case studies – Disaster management: floods, earthquake, cyclone, Tsunami and landslides.

#### UNIT IV

**Social Issues and the Environment:** From Unsustainable to Sustainable development – Urban problems related to energy – Water conservation, rain water harvesting and watershed management – Resettlement and rehabilitation of people – Case studies – Environmental ethics: Issues and possible solutions – Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case Studies–Wasteland reclamation. – Consumerism and waste products. – Environment Protection Act. – Air (Prevention and Control of Pollution) Act. – Water (Prevention and control of Pollution) Act – Wildlife Protection Act – Forest Conservation Act – Public awareness.

#### UNIT V

**Human Population and the Environment:** Population growth, variation among nations. Population explosion – Family Welfare Programmed. – Environment and human health – Human Rights – Value Education – HIV/AIDS – Women and Child Welfare – Role of information Technology in Environment and human health – Case studies.

#### Text Books:

1. Text book of Environmental Studies for Undergraduate Courses by Erach Bharucha for University Grants Commission, Universities Press.
2. Environmental Studies by Kaushik, New Age Publishers.
3. Environmental Studies by Sri Krishna Hitech publishing Pvt. Ltd.

#### Reference Books:

1. Environmental studies by R.Rajagopalan, Oxford University Press.
2. Comprehensive Environmental studies by J.P.Sharma, Laxmi publications.
3. Introduction to Environmental engineering and science by Gilbert M. Masters and Wendell P. Ela - Printice hall of India Private limited.
4. Environmental studies by A. Ravi Krishnan, G. Sujatha Sri Krishna Hitech publications.

List of COs	PO no. and keyword	Competency Indicator	Performance Indicator
CO: 1	PO1:Apply the knowledge of Basic science	1.2	1.2.1
CO: 2	PO1:Apply the knowledge of Basic science	1.2	1.2.1
CO: 3	PO1:Apply the knowledge of Basic science	1.2	1.2.1
CO: 4	PO1:Apply the knowledge of Basic science	1.2	1.2.1
CO: 5	PO1:Apply the knowledge of Basic science	1.2	1.2.1

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

**Year: II****Semester: I****Branch of Study: EEE**

<b>Subject Code</b>	<b>Subject Name</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>Credits</b>
<b>19AHS9904</b>	<b>Communicative English II Lab</b>	<b>0</b>	<b>0</b>	<b>2</b>	<b>1</b>

Course Outcomes:

- CO: 1 Prioritize information from reading texts after selecting relevant and useful points.  
 CO: 2 Make formal structured presentations on academic topics using PPT slides with relevant graphical elements.  
 CO: 3 Participate in Group discussions using appropriate conventions and language strategies.  
 CO: 4 Paraphrase short academic text using suitable strategies and conventions.  
 CO: 5 Collaborate with a partner to make presentations and Project

**UNIT I**

Oral Presentation: Reading for presenting – strategies to select, compile and synthesize information for presentation; reading to recognize academic style. Listening for presentation strategies and answering questions- Formal presentations using PPT slides without graphic elements

**UNIT II**

Power point Presentation/Poster Presentation: Understand formal and informal styles; recognize the difference between facts and opinions. Following an argument/ logical flow of thought; answering questions, formal presentations using PPT slides with graphic elements.

**UNIT III**

Group discussion on general topics; agreeing and disagreeing, using claims and examples/ evidences for presenting views, opinions and position. Identifying claims, evidences, views, opinions and stance/ position. Identifying views and opinions expressed by different speakers while listening to discussions.

**UNIT IV**

Reading for inferential comprehension. Group discussion; reaching consensus in group work(academic context). Understanding inferences; processing of information using specific context clues from the text.

**UNIT V**

Formal team presentations on academic/ general topics using PPT slides-identifying sections in project reports; understanding the purpose of each section; significance of references.

**Reference Books:**

1. Effective Technical Communication, Rizvi, Tata McGraw-Hill Education 2007.
2. A Practical Course in Effective English Speaking skills, J.K.Gangal, PHI Learning PvtLtd, 2012.
3. A Course in Communication Skills, P.Kiranmai Dutt, Geetha Rajeevan, C.L.N.Prakash, 2008.
4. Technical Communication, Meenakshi Raman, Oxford University Press.
5. Professional Communication Skills, Er.A.K.Jain, Pravin S.R.Bhatia, Dr.A.M.Sheikh, S.Chand & Company Ltd, 2001.

**AK19 REGULATIONS**

List of COs	PO no. and keyword	Competency Indicator	Performance Indicator
CO: 1	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
CO: 2	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 .
CO: 3	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
CO: 4	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
CO: 5	PO10 Able to comprehend and write effective reports and design documentation.	10.3	10.3.1 10.3.2

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

Year: II

Semester: I

Branch of Study: EEE

Subject Code	Subject Name	L	T	P	Credits
19AES0506	Internet of Things Lab (IoT Lab)	0	0	2	1

**Lab Experiments:**

1. Select any one development board (Eg., Arduino or Raspberry Pi) and control LED using the board.
2. Using the same board as in (1), read data from a sensor. Experiment with both analog and digital sensors.
3. Control any two actuators connected to the development board using Bluetooth.
4. Read data from sensor and send it to a requesting client.(using socket communication)  
Note: The client and server should be connected to same local area network.
5. Create any cloud platform account, explore IoT services and register a thing on the platform.
6. Push sensor data to cloud.
7. Control an actuator through cloud.
8. Access the data pushed from sensor to cloud and apply any data analytics or visualization services.
9. Create a mobile app to control an actuator.
10. Identify a problem in your local area or college which can be solved by integrating the things you learned so far and create a prototype to solve it (MiniProject).

**Text Book:**

1. Adrian McEwen, Hakim Cassimally - Designing the Internet of Things, Wiley Publications, 2012

**Reference Books:**

1. Arshdeep Bahga, Vijay Madisetti - Internet of Things: A Hands-On Approach, Universities Press, 2014.
2. The Internet of Things, Enabling technologies and use cases – Pethuru Raj, Anupama C. Raman, CRC Press.

## Reference sites:

<https://www.arduino.cc/>, <https://www.raspberrypi.org/>

Course outcomes: At the end of the course, students will be able to

- Choose the sensors and actuators for an IoT application.
- Select protocols for a specific IoT application.
- Utilize the cloud platform and APIs for IoT application.
- Experiment with embedded boards for creating IoT prototypes.

Design a solution for a given IoT application

List of Cos	PO no. and keyword	Competency	Performance Indicator
CO 1	PO 5: Modern Tool Usage	5.1	5.1.1
CO 2	PO 5: Modern Tool Usage	5.2	5.2.1
CO 3	PO 4: Conduct investigations of complex Problem	4.3	4.3.1
CO 4	PO 3: Design/Development of Solutions	3.4	3.4.1
CO 5	PO 6: Engineer & Society	6.1	6.1.1

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

Year: II

Semester: I

Branch of Study: EEE

Course Code	Course Title	L	T	P	Credits
19APC0203	Electrical Circuit Analysis Lab	0	0	3	1.5

**COURSE OUTCOMES:**

CO1: Analyze complex DC and AC linear circuits

CO2: Apply concepts of electrical circuits across engineering

CO3: Evaluate response in a given network by using theorems

**From the following experiments students may select any 10 experiments:**

1. Verification Of Ohms Law
2. Verification Of KCL And KVL
3. Verification Of Nodal And Mesh Analysis
4. Verification Of Superposition Theorem
5. Verification Of Reciprocity Theorem & Milliman's Theorem
6. Verification Of Maximum Power Transfer Theorem
7. Verification Of Thevenin's Theorem & Norton 'S Theorem
8. Verification Of Compensation Theorem
9. Verification Of Series & Parallel Resonance
10. Determination Of Self, Mutual Inductance And Coefficient Of Coupling
11. Z and Y Parameters
12. Transmission and Hybrid Parameters

**Text books:**

1. Alexander and Sadiku's fifth edition —fundamentals of electric circuits|| Indian edition,2013
2. Circuits & Networks by A. Sudhakar and Shyammohan S Palli, Tata McGraw- Hill

**References:**

1. Engineering Circuit Analysis, William Hayt and Jack E. Kemmerly, Mc Graw Hill Company, 6<sup>th</sup> edition.
2. Network Analysis 3<sup>rd</sup> Edition, M.E Van Valkenberg, PHI.

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-2-problem analysis	2.2	2.2.2 &2.2.3
CO 3	PO-4-conduct investigations of complex problems	4.1	4.1.1

## ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES, TIRUPATI

(AUTONOMOUS)

Year: II

Semester: I

Branch of Study: EEE

Subject Code	Subject Name	L	T	P	Credits
19APC0404	Electronic Devices & Circuits Lab	0	0	2	1

**Course Objectives:**

CO1: Ability to test and operate diodes and special electronic devices.

CO2: Ability to construct and operate rectifiers without and with filters

CO3: Ability to construct and operate BJT, FET in different configurations

CO4: Ability to design DC biasing circuits for Transistors

CO5: Ability to design amplifiers using BJTs and FETs.

**List of Experiments:**

1. PN Junction Diode Characteristics
2. Zener Diode Characteristics and Zener Diode as Voltage Regulator.
3. Rectifiers (With and Without Filter).
4. BJT Characteristics (CB Configuration).
5. BJT Characteristics (CE Configuration).
6. FET Characteristics (CS Configuration).
7. SCR Characteristics
8. Transistor Biasing
9. BJT-CE Amplifier
10. Emitter Follower-CC Amplifier
11. FET-CS Amplifier
12. UJT Characteristics

**Equipment required for Laboratory**

1. Regulated Power supplies
2. Analog/Digital Storage Oscilloscopes
3. Analog/Digital Function Generators
4. Digital Multimeters
5. Decade Resistance Boxes/Rheostats
6. Decade Capacitance Boxes
7. Ammeters (Analog or Digital)
8. Voltmeters (Analog or Digital)
9. Active & Passive Electronic Components
10. Bread Boards
11. Connecting Wires
12. CRO Probes etc.

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

