



**ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES, TIRUPATI
(AUTONOMOUS)**
**Course structure for Four Year Regular B.Tech. Degree Program
AK-19 (Effective for the batches admitted from 2019-20)**
ELECTRICAL & ELECTRONICS ENGINEERING (EEE)

INDUCTION PROGRAM (3 weeks duration)

- ❖ Physical activity
- ❖ Creative Arts
- ❖ Universal Human Values
- ❖ Literary
- ❖ Proficiency Modules
- ❖ Lectures by Eminent People
- ❖ Visits to local Areas
- ❖ Familiarization to Dept./Branch & Innovations

I B. Tech - I 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	BS	19ABS9901	Algebra and Calculus	3	1	0	4	30	70	100
2	BS	19ABS9902	Applied Physics	3	0	0	3	30	70	100
3	ES	19AES0501	Problem Solving and Programming	3	1	0	4	30	70	100
4	HS	19AHS9901	Communicative English I	2	0	0	2	30	70	100
PRACTICAL										
5	LC	19ALC0201	Electrical and Electronics Engineering Workshop	0	0	2	1	30	70	100
6	BS	19ABS9907	Applied Physics Lab	0	0	3	1.5	30	70	100
7	ES	19AES0503	Problem Solving and Programming Lab	0	0	4	2	30	70	100
8	HS	19AHS9902	Communicative English I Lab	0	0	2	1	30	70	100
TOTAL							18.5	240	560	800

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	ES	19AES0101	Basics of Civil and Mechanical Engineering	3	0	0	3	30	70	100
2	BS	19ABS9906	Differential Equations and Vector Calculus	3	1	0	4	30	70	100
3	BS	19ABS9904	Chemistry	3	0	0	3	30	70	100
4	ES	19AES0502	Data Structures	3	0	0	3	30	70	100
PRACTICAL										
5	LC	19ALC0301	Engineering Workshop	0	0	2	1	30	70	100
6	ES	19AES0301	Engineering Graphics Lab	1	0	4	3	30	70	100
7	ES	19AES0102	Basics of Civil and Mechanical Engineering Lab	0	0	3	1.5	30	70	100
8	BS	19ABS9909	Chemistry Lab	0	0	3	1.5	30	70	100
9	ES	19AES0504	Data Structures Lab	0	0	3	1.5	30	70	100
TOTAL							21.5	270	630	900

II B. Tech – I Semester

S.No	Category	Course Code	Course Title	Hours per week			Credits	Scheme of Examination (Max. Marks)		
				L	T	P		CIE	SEE	Total
1	BS	19ABS9912	Transform Techniques and Complex Variables	3	0	0	3	30	70	100
2	HS	19AHS9903	Communicative English II	2	0	0	2	30	70	100
3	ES	19AES0505	Internet of Things (IoT)	2	0	0	2	30	70	100
4	PC	19APC0201	Electrical Circuit Analysis	3	0	0	3	30	70	100
5	PC	19APC0401	Electronic Devices and Circuits	3	0	0	3	30	70	100
6	PC	19APC0202	Engineering Electromagnetics	3	1	0	4	30	70	100
7	MC	19AMC9903	Environmental Studies	2	0	0	0	30	--	30
PRACTICAL										
8	HS	19AHS9904	Communicative English II Lab	0	0	2	1	30	70	100
9	ES	19AES0506	Internet of Things (IoT) Lab	0	0	2	1	30	70	100
10	PC	19APC0203	Electrical Circuit Analysis Lab	0	0	3	1.5	30	70	100
11	PC	19APC0404	Electronic Devices and Circuits Lab	0	0	2	1	30	70	100
TOTAL							21.5	330	700	1030

II 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
1	BS	19ABS9916	Numerical Methods and Probability	3	1	0	4	30	70	100
2	ES	19AES0509	Basics of Python Programming	2	0	0	2	30	70	100
3	ES	19AES0302	Design Thinking and Product Innovation	2	0	0	2	30	70	100
4	PC	19APC0204	Electrical Machines - I	3	1	0	4	30	70	100
5	PC	19APC0406	Analog Electronic Circuits	2	0	0	2	30	70	100
6	PC	19APC0408	Digital Electronic Circuits	2	0	0	2	30	70	100
7	MC	19AMC9901	Biology for Engineers	3	0	0	0	30	--	30
PRACTICAL										
8	PR	19APR0201	Socially Relevant Projects (15 hours / semester)	0	0	0	0.5	50	--	50
9	PC	19APC0205	Electrical Machines - I Lab	0	0	3	1.5	30	70	100
10	ES	19AES0510	Basics of Python Programming Lab	0	0	2	1	30	70	100
11	ES	19AES0303	Design Thinking and Product Innovation Lab	0	0	2	1	30	70	100
12	PC	19APC0409	Analog and Digital Electronic Circuits Lab	0	0	3	1.5	30	70	100
TOTAL							21.5	380	700	1080

III B. Tech – I Semester

S.No	Category	Course Code	Course Title	Hours per week			Credits	Scheme of Examination (Max. Marks)		
				L	T	P		CIE	SEE	Total
1	PC	19APC0206	Power Systems - I	3	0	0	3	30	70	100
2	PC	19APC0207	Electrical Machines - II	2	1	0	3	30	70	100
3	PC	19APC0208	Control Systems	2	1	0	3	30	70	100
4	PC	19APC0209	Power Electronics	3	0	0	3	30	70	100
5	PE	19APC0403	Signals and Systems	3	0	0	3	30	70	100
		19APC0425	Analog and Digital IC Applications							
		19APC0426	Linear System Analysis							
6	OE	19AHEMB01	Managerial Economics and Financial Analysis	3	0	0	3	30	70	100
		19APC0510	Computer Networks							
		19APC0412	Analog and Digital Communications							
7	MC	19AMC9902	Constitution of India	3	0	0	0	30	---	30
PRACTICAL										
8	PC	19APC0210	Electrical Machines - II Lab	0	0	2	1	30	70	100
9	PC	19APC0211	Control Systems Lab	0	0	2	1	30	70	100
10	PC	19APC0212	Power Electronics Lab	0	0	2	1	30	70	100
11	PR	19APR0202	Socially Relevant Projects (15 Hours /Sem)	0	0	0	0.5	50	---	50
TOTAL							21.5	350	630	980

III 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
1	PC	19APC0213	Power Systems - II	3	0	0	3	30	70	100
2	PC	19APC0214	Electrical Measurements and Instrumentation	3	0	0	3	30	70	100
3	PC	19APC0215	Power System Analysis	3	0	0	3	30	70	100
4	PC	19APC0216	Neural Networks and Fuzzy Logic	3	0	0	3	30	70	100
5	OE	19APC0417	Microprocessors and Microcontrollers	3	0	0	3	30	70	100
		19APE0306	Renewable energy technologies							
		19AOE0511	Business Data Analytics							
6	HE	19AHE9902	Principles of Effective Public Speaking	3	0	0	3	30	70	100
		19AHE9907	Optics							
		19AHE9909	Quantum Mechanics							
7	MC	19AMC9904	Professional Ethics and Human values	3	0	0	0	30	--	30
8	PC	19APC0217	Power Systems Lab	0	0	2	1	30	70	100
9	PC	19APC0420	Microprocessors and Microcontrollers Lab	0	0	2	1	30	70	100
10	PC	19APC0218	Electrical Measurements Lab	0	0	2	1	30	70	100
11	PR	19APR0203	Socially Relevant Projects (15 hours / semester)	0	0	0	0.5	50	--	50
12	PR	19APR0204	Industrial Training/ Internship/ Research Projects in National Laboratories/Academic Institutions	0	0	0	0	--	--	--
Total							21.5	350	630	980

IV B. Tech – I Semester

S.No	Category	Course Code	Course Title	Hours per week			Credits	Scheme of Examination (Max. Marks)		
				L	T	P		CIE	SEE	Total
1	PC	19APC0219	Switch Gear and Protection	3	0	0	3	30	70	100
2	PC	19APC0220	High Voltage Engineering	2	0	0	2	30	70	100
3	OE	19APE0411	Embedded Systems	3	0	0	3	30	70	100
		19APC0502	Data Base Management Systems							
		19APC0101	Mechanics of materials							
4	PE	19APE0201	Electrical Distribution Systems	3	0	0	3	30	70	100
		19APE0202	Power Semi-conductor Drives							
		19APE0203	Advanced Control Systems							
5	PE	19APE0204	Power System Operation and Control	3	0	0	3	30	70	100
		19APE0205	Flexible AC Transmission Systems							
		19APC0418	Digital Signal Processing							
6	HE	19AHE9901	Technical Writing	2	0	0	2	30	70	100
		19AHE9906	Effective technical Communication							
		19ASA0501	Soft skills							
PRACTICAL										
8	PC	19APC0221	Switchgear and Protection Lab	0	0	2	1	30	70	100
9	PR	19APR0205	Socially Relevant Projects (15 hours / semester)	0	0	0	0.5	50	--	50
10	PR	19APR0206	Industrial Training/Internship/Research Projects in National Laboratories/Academic Institutions	0	0	0	1.5	50	--	50
TOTAL							19	310	490	800

IV 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
1	MOOCS	19AOE0515	The joy of computing using Python (MOOCS-NPTEL)	3	0	0	3	-	-	100
		19AOE0516	Principles of Management (MOOCS-NPTEL)							
		19AOE0517	Introduction to Industry 4.0 and Industrial internet of things (MOOCS-NPTEL)							
2	MOOCS	19APE0206	Design of photovoltaic systems (MOOCS-NPTEL)	3	0	0	3	-	-	100
		19APE0207	Solar Energy Engineering and Technology (MOOCS-NPTEL)							
		19APE0208	Physics of Renewable Energy Systems (MOOCS-NPTEL)							
PRACTICAL										
3	PR	19APR0207	Technical Paper Presentation/Seminar	0	0	0	0	50	0	50
4	PR	19APR0208	Project	3	0	0	9	60	140	200
TOTAL							15	110	140	450
Grand Total of all semesters							160	2340	4480	7020

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

Year: I

Semester: I

Branch of Study: Common to All

COURSE CODE	COURSE TITLE	L	T	P	CREDITS
19ABS9901	Algebra and Calculus	3	1	0	4

Course Outcomes:

1. Develop the use of matrix algebra techniques that is needed by engineers for practical applications.
2. Utilize mean value theorems to real life problems.
3. Familiarize with functions of several variables which is useful in optimization.
4. Students will also learn important tools of calculus in higher dimensions. Students will become familiar with 2- dimensional coordinate systems
5. Students will become familiar with 3- dimensional coordinate systems and also learn the utilization of special functions

Unit I : Matrix Operations and Solving Systems of Linear Equations 12

hrs Rank of a matrix by echelon form, solving system of homogeneous and non-homogeneous equations linear equations. Eigen values and Eigen vectors and their properties, Cayley- Hamilton theorem (without proof), finding inverse and power of a matrix by Cayley- Hamilton theorem,

Unit II : Quadratic Forms and Mean Value Theorems 9

hrs Diagonalisation of a matrix, quadratic forms and nature of the quadratic forms, reduction of quadratic form to canonical forms by orthogonal transformation. Rolle's Theorem, Lagrange's mean value theorem, Cauchy's mean value theorem, Taylor's and Maclaurin's theorems with remainders (without proof);

Unit III: Multivariable calculus 9 hrs

Partial derivatives, total derivatives, chain rule, change of variables, Jacobians, maxima and minima of functions of two variables, method of Lagrange multipliers.

Unit IV: Multiple Integrals 10hrs

Double integrals, change of order of integration, double integration in polar coordinates, change of Variables in double integration (Cartesian to polar), areas enclosed by plane curves. Evaluation of triple integrals.

Unit V: Special Functions 10 hrs

Beta and Gamma functions and their properties, relation between beta and gamma functions, Bessel functions, Bessel's equation, Recurrence formulae or $J_n(x)$, Generating function- Orthogonality of Bessels functions.

Textbooks:

1. B. S. Grewal, Higher Engineering Mathematics, 44/e, Khanna Publishers, 2017.
2. Erwin Kreyszig, Advanced Engineering Mathematics, 10/e, John Wiley & Sons, 2011.

References:

1. Dr.T.K.V Iyengar, B.Krishna Gandhi, S. Ranganatham and M.V.S.S.N Prasad, Mathematics – 1, S.Chand publications.
2. R. K. Jain and S. R. K. Iyengar, Advanced Engineering Mathematics, 3/e, Alpha Science International Ltd., 2002.
3. B.V.Ramana, Higher Engineering Mathematics, Mc Graw Hill Education.
4. N.Bali, M.Goyal, C.Watkins, Advanced Engineering Mathematics, Infinity Science Press.

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	PO2 : Analyze complex engineering Problems	2.1	2.1.3
CO5	PO2 : Analyze complex engineering problems	2.1	2.1.3

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

Year: I

Semester: I

Branch of Study: EEE

COURSE CODE	COURSE TITLE	L	T	P	CREDITS
19ABS9902	Applied Physics	3	0	0	3

Course Outcomes

1. Analyze the wave properties of light and the interaction of energy with the matter.
2. Apply electromagnetic wave propagation in different guided media.
3. Asses the electromagnetic wave propagation and its power in different media
4. Analyze the conductivity of semiconductors.
5. Interpret the difference between normal conductor and superconductor and apply the nanomaterials for engineering applications.

Unit I : Optics and EM Theory**10 Hrs**

Interference of light -principle of superposition-Conditions for sustained, Interference- Interference in thin films (reflected light) - Newton's Rings -Determination of Wavelength, Diffraction-Fraunhofer diffraction- Single slit and double slit- Diffraction Grating, Divergence and Curl of Electric and Magnetic Fields - Gauss' theorem for divergence and Stokes' theorem for curl - Maxwell's, Equations (Quantitative)-Electromagnetic wave - propagation in non-conducting medium - Poynting's Theorem.

Unit II : Lasers and Fiber Optics**10 Hrs**

Lasers – Introduction – Characteristics – Spontaneous and Stimulated Emission – Einstein Coefficients – Population Inversion – Excitation Mechanism and Optical Resonator - He-Ne Laser -Nd:YAG Laser – Semiconductor Diode Laser – Applications of Lasers and Holography.

Introduction to Optical Fibers – Total Internal Reflection – Critical angle of propagation – Acceptance angle – Numerical Aperture – Classification of fibers based on Refractive index profile – Propagation of electromagnetic wave through optical fiber – modes – importance of V-number-Attenuation, Block Diagram of Fiber optic Communication – Industrial Applications –Fiber optic Sensors.

Unit III : Dielectric and Magnetic Materials**8 Hrs**

Introduction—Dielectric polarization-Dielectric polarizability, Susceptibility and Dielectric constant-Types of polarizations : Electronic and Ionic,(Quantitative), Orientation Polarizations (Qualitative) - Frequency dependence of polarization-Lorentz (internal) field-Claussius-Mosotti equation-Applications of Dielectrics: Ferroelectricity.

Introduction-Magnetic dipole moment - Magnetization-Magnetic susceptibility and permeability-Origin of permanent magnetic moment – Classification of Magnetic materials - Weiss theory of ferromagnetism (qualitative) – Hysteresis– soft and hard magnetic materials – Magnetic memory device applications.

Unit IV: Semiconductors**8 Hrs**

Origin of Energy bands (Qualitative)-Intrinsic and Extrinsic semiconductors –Direct and indirect band gap semiconductors- Density of charge carriers – Fermi energy--Dependence of Fermi energy on carrier concentration and temperature – Electrical conductivity – Drift and Diffusion currents – Continuity equation - Hall effect -Applications of Hall effect and Semiconductors.

Unit V: Superconductors and Nanomaterials**10Hrs**

Superconductors-Properties-Meissner's effect-BCS Theory(Qualitative) - Josephson effect (AC&DC)-Types of Superconductors-Applications of superconductors.

Nanomaterials–Significance of nanoscale–: Physical, Mechanical, Magnetic, Optical properties of nanomaterials –Synthesis of nanomaterials:Top-down-Ball Milling, Bottom-up-Chemical vapour deposition–Characterization of nanomaterials : X-Ray Diffraction (XRD), Scanning Electron Microscope (SEM)-Applications of Nanomaterials.

Textbooks:

1. M. N. Avadhanulu, P. G. Kshirsagar & TVS Arun Murthy|| A Text book of Engineering Physics||-S. Chand Publications, 11th Edition 2019.
2. B.K.Pandey and S.Chaturvedi, Engineering Physics, Cengage Learning, 2012.

References:

1. K Thyagarajan –Engineering Physics||,-Mc Graw Hill Publishing Company Ltd, 2016
2. Shatendra Sharma, Jyotsna Sharma, — Engineering Physics||, Pearson Education, 2018
3. David J.Griffiths,—Introduction to Electrodynamics||-4/e, Pearson Education, 2014
4. T Pradeep, –A Text book of NanoScience and NanoTechnology||-Tata Mc Graw Hill 2013.

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

AK19 REGULATIONS

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES, TIRUPATI
(AUTONOMOUS)

Year: I

Semester: I

Branch of Study: EEE

COURSE CODE	COURSE TITLE	L	T	P	CREDITS
19AES0501	Problem Solving and Programming	3	1	0	4

Course Objectives:

1. Introduce the internal parts of a computer, and peripherals.
2. Introduce the Concept of Algorithm and use it to solve computational problems
3. Identify the computational and non-computational problems
4. Teach the syntax and semantics of a C Programming language
5. Demonstrate the use of Control structures of C Programming language
6. Illustrate the methodology for solving Computational problems

Unit 1:

Computer Fundamentals: What is a Computer, Evolution of Computers, Generations of Computers, Classification of Computers, Anatomy of a Computer, Memory revisited, Introduction to Operating systems, Operational overview of a CPU.

Introduction to Programming, Algorithms and Flowcharts: Programs and Programming, Programming languages, Compiler, Interpreter, Loader, Linker, Program execution, Fourth generation languages, Fifth generation languages, Classification of Programming languages, Structured programming concept, Algorithms, Pseudo-code, Flowcharts, Strategy for designing algorithms, Tracing an algorithm to depict logic, Specification for converting algorithms into programs.

Unit 2:

Introduction to computer problem solving: Introduction, the problem-solving aspect, top-down design, implementation of algorithms, the efficiency of algorithms, the analysis of algorithms.

Fundamental algorithms: Exchanging the values of two variables, counting, summation of a set of numbers, factorial computation, sine function computation, generation of the Fibonacci sequence, reversing the digits of an integer.

Unit 3:

Types, Operators, and Expressions: Variable names, data types and sizes, constants, declarations, arithmetic operators, relational and logical operators, type conversions, increment and decrement operators, bitwise operators, assignment operators and expressions, conditional expressions precedence and order of evaluation.

Input and output: standard input and output, formatted output-Printf, formatted input-Scanf.

Control Flow: Statements and blocks, if-else, else-if, switch, Loops-while and for, Loops- Do-while, break and continue, Goto and labels.

Functions and Program Structure: Basics of functions, functions returning non-integers, external variables, scope variables, header variables, register variables, block structure, initialization, recursion, the C processor.

Unit 4:

Factoring methods: Finding the square root of a number, the smallest divisor of a number, the greatest common divisor of two integers, generating prime numbers.

Pointers and arrays: Pointers and addresses, pointers and function arguments, pointers and arrays, address arithmetic, character pointers and functions, pointer array; pointers to pointers, multi-dimensional arrays, initialization of arrays, pointer vs. multi-dimensional arrays, command line arguments, pointers to functions, complicated declarations.

Array Techniques: Array order reversal, finding the maximum number in a set, removal of duplicates from an order array, finding the kth smallest element

Unit 5:

Sorting and Searching: Sorting by selection, sorting by exchange, sorting by insertion, sorting by partitioning, binary search.

Structures: Basics of structures, structures and functions, arrays of structures, pointers to structures, self-referential structures, table lookup, typedef, unions, bit-fields.

Some other Features: Variable-length argument lists, formatted input-Scanf, file access, Error handling-stderr and exit, Line Input and Output, Miscellaneous Functions.

Text Books:

1. Pradip Dey, and Manas Ghosh, -Programming in C, 2018, Oxford University Press.
2. R.G. Dromey, -How to Solve it by Computer. 2014, Pearson.
3. Brian W. Kernighan, and Dennis M. Ritchie, -The C Programming Language, 2nd Edition, Pearson.

Reference Books:

1. RS Bichkar -Programming with C, 2012, Universities Press.
2. Pelin Aksoy, and Laura Denardis, -Information Technology in Theory, 2017, Cengage Learning.
3. Byron Gottfried and Jitender Kumar Chhabra, -Programming with C, 4th Edition, 2019, McGraw Hill Education.

Course Outcomes:

1. Construct his own computer using parts.
2. Recognize the importance of programming language independent constructs
3. Solve computational problems
4. Select the features of C language appropriate for solving a problem
5. Design computer programs for real world problems
6. Organize the data which is more appropriated for solving a problem

List of COs	PO no. and keyword	Competency Indicator	Performance Indicator
CO1	PO1: Engineering Knowledge	1.3	1.3.1
CO2	PO2: Problem analysis	2.1	2.1.1
CO3	PO2: Problem analysis	2..2	2.2.2
CO4	PO2: Problem analysis	2.1	2.1.1
CO5	PO2: Problem analysis	2.3	2.3.1
CO6	PO2: Problem analysis	2.2	2.2.3

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Year: I

Semester: I

Branch of Study: EEE

COURSE CODE	COURSE TITLE	L	T	P	CREDITS
19AHS9901	Communicative English - I	2	0	0	2

Course Outcomes:

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

1. Identify the context, topic, and pieces of specific information from social or transactional dialogues spoken by native speakers of English
2. Formulate sentences using proper grammatical structures and correct word forms
3. Speak clearly on a specific topic using suitable discourse markers in informal discussions
4. Write summaries based on global comprehension of reading/listening texts
5. Produce a coherent paragraph interpreting a figure/graph/chart/table
6. Take notes while listening to a talk/lecture to answer questions

Unit 1 :**10 Hours (4L+6P)**

Listening: Identifying the topic, the context and specific pieces of information by listening to short audio texts and answering a series of questions. **Speaking:** Asking and answering general questions on familiar topics such as home, family, work, studies and interests; introducing one self and others. **Reading:** Skimming to get the main idea of a text; scanning to look for specific pieces of information.

Reading for Writing: Beginnings and endings of paragraphs - introducing the topic, summarizing the main idea and/or providing a transition to the next paragraph.

Grammar and Vocabulary: Content words and function words; word forms: verbs, nouns, adjectives and adverbs; nouns: countable and uncountable; singular and plural; basic sentence structures; simple question form - wh-questions; word order in sentences.

Unit 2:**10 Hours (4L+6P)**

Listening: Answering a series of questions about main idea and supporting ideas after listening to audio texts. **Speaking:** Discussion in pairs/ small groups on specific topics followed by short structured talks. **Reading:** Identifying sequence of ideas; recognizing verbal techniques that help to link the ideas in a paragraph together. **Writing:** Paragraph writing (specific topics) using suitable cohesive devices; mechanics of writing - punctuation, capital letters. **Grammar and Vocabulary:** Cohesive devices -linkers, sign posts and transition signals; use of articles and zero article; prepositions.

Unit 3:**10 Hours (4L+6P)**

Listening: Listening for global comprehension and summarizing what is listened to. **Speaking:** Discussing specific topics in pairs or small groups and reporting what is discussed. **Reading:** Reading a text in detail by making basic inferences - recognizing and interpreting specific context clues; strategies to use text clues for comprehension. **Writing:** Summarizing - identifying main idea/s and rephrasing what is read; avoiding redundancies and repetitions. **Grammar and Vocabulary:** Verbs -tenses; subject-verb agreement; direct and indirect speech, reporting verbs for academic purposes.

Unit 4:**8 Hours (2L+6P)**

Listening: Making predictions while listening to conversations/ transactional dialogues without video; listening with video. **Speaking:** Role plays for practice of conversational English in academic contexts (formal and informal) - asking for and giving information/directions. **Reading:** Studying the use of graphic elements in texts to convey information, reveal trends / patterns / relationships, communicate processes or display

complicated data. **Writing:** Information transfer; describe, compare, contrast, identify significance / trends based on information provided in figures/charts/graphs/tables.

Grammar and Vocabulary: Quantifying expressions - adjectives and adverbs; comparing and contrasting; degrees of comparison; use of antonyms.

Unit 5:

8 Hours (2L+6P)

Listening: Identifying key terms, understanding concepts and answering a series of relevant questions that test comprehension. **Speaking:** Formal oral presentations on topics from academic contexts without the use of PPT slides. **Reading:** Reading for comprehension.

Writing: Writing structured essays on specific topics using suitable claims and evidences.

Grammar and Vocabulary: Editing short texts – identifying and correcting common errors in grammar and usage (articles, prepositions, tenses, subject- verb agreement) Suggested books:

Text Book: English all round: Communication Skills for Under graduation Learners Vol. I, Orient BlackSwan Publishers, First Edition 2019.

Reference Books

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

Chase, Becky Tarver. *Pathways: Listening, Speaking and Critical Thinking*.

Heinley, ELT;

2nd Edition, 2018.

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

3. 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

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

Year: I

Semester: I

Branch of Study: EEE

COURSE CODE	COURSE TITLE	L	T	P	CREDITS
19ALC0201	Electrical and Electronics Engineering Workshop	0	0	2	1

COURSE OUTCOMES:

CO1: Demonstrate knowledge on different tools, abbreviations and symbols used in Electrical Engineering.

CO2: Measure different electrical quantities using measuring instruments.

CO3: Demonstrate how to trouble shoot the electrical equipment's (like fan, grinder, motor, etc.)

CO4: Perform Wiring and Earthing for residential houses.

From the following experiments students may select any 10 experiments:

1. Study of Introduction to Electrical tools, symbols and abbreviations
2. Study of types of sizes of wires and making -T| joint and straight joint for wires
3. Measurements of Electrical quantities (like Voltage, Current, Power, Power factor in RLC circuits)
4. Study of measurements of Energy (using Single phase and Three phase Energy meter) by connecting different loads
5. Study of earthing and measurement of earth resistance
6. Study and performance of residential wiring (using Energy meter, Fuses, Switches, Indicator, Lamps, etc.)
7. Study of Fluorescent lamp wiring
8. Study of various electrical gadgets (CFL and LED)
9. Study of PV Cell
10. Study of Induction motor and Transformer
11. Assembly of choke or small transformer
12. Study of trouble shooting of electrical equipments (fan, iron box, mixer-grinder, etc.)
13. Introduction to basics of Electronic components: Solder practice, Multi meter, Power supply
14. Measurement of wire guages using guage meter
15. Identification of color code, resistors, ICs, Transistors, capacitors, diodes, SCRs, IGBTs etc.

References:

1. Lab manual of Electrical Engineering by TTTI, Chennai.

CO No.	PO No. and keyword	Competency Indicator	Performance Indicator
CO1	PO1:Engineering knowledge	1.1	1.3.1
		1.4	1.4.1
	PO3: Design/Development of solutions	3.2	3.2.1
CO2	PO1: Engineering knowledge	1.4	1.4.1
	PO4: Conduct investigations of complex problems	4.1	4.1.2
			4.1.3
CO3	PO1: Engineering knowledge	1.3	1.3.1
	PO4: Conduct investigations of complex problems	4.3	4.3.1
CO4	PO5: Modern tool usage	5.1	5.1.1
		5.2	5.2.1

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Year: I

Semester : I

Branch of Study : EEE

COURSE CODE	COURSE TITLE	L	T	P	CREDITS
19ABS9907	Applied Physics Lab	0	0	3	1.5

Course Outcomes

1. Analyze the wave properties of light and the interaction of energy with the matter.
2. Apply electromagnetic wave propagation in different guided media.
3. Asses the electromagnetic wave propagation and its power in different media
4. Analyze the conductivity of semiconductors.
5. Interpret the difference between normal conductor and superconductor and apply the nanomaterials for engineering applications.

List of Experiments

1. Determination of the thickness of the wire using wedge shape method.
2. Determination of the radius of curvature of the lens by Newton's ring method
3. Determination of wavelength by plane diffraction grating method
4. Dispersive power of a diffraction grating
5. Study of the Magnetic field along the axis of a circular coil carrying current.
6. Study the variation of B versus H of the magnetic material (B-H curve)
7. Determination of the numerical aperture of a given optical fiber and angle of acceptance.
8. Determination of Hall voltage and Hall coefficient of a given semiconductor using Hall effect.
9. Determination of the energy gap of a semiconductor
10. Determination of crystallite size using X-Ray diffraction spectra.
11. Determination of Wavelength of LASER using diffraction grating.
12. Determination of particle size using LASER.
13. Determination of the resistivity of semiconductor by Four probe method.
14. Determination of dielectric constant by charging and discharging method.
15. Study the temperature dependence of resistance of a thermister.

References:

1. S. Balasubramanian, M.N.Srinivasan, –A Text book of Practical Physics–S Chand Publishers, 2017.
2. <http://vlab.amrita.edu/index.php-VirtualLabs, Amrita> University.

List of COs	PO no. and keyword	Competency Indicator	Performance Indicator
CO: 1	PO 4: Analysis and interpretation of data	4.3	4.3.3
CO: 2	PO 4: Analysis and interpretation of data	4.3	4.3.1
CO: 3	PO 4: Analysis and interpretation of data	4.3	4.3.1
CO: 4	PO 4: Analysis and interpretation of data	4.3	4.3.2
CO: 5	PO 4: Analysis and interpretation of data	4.3	4.3.2

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COURSE CODE	COURSE TITLE	L	T	P	CREDITS
19AES0503	Problem Solving and Programming Lab	0	0	4	2

Course outcomes:

1. Construct a Computer given its parts (L6)
2. Select the right control structure for solving the problem (L6)
3. Analyze different sorting algorithms (L4)
4. Design solutions for computational problems (L6)
5. Develop C programs which utilize the memory efficiently using programming constructs like pointers.

Laboratory Experiments #

1. Assemble and disassemble parts of a Computer
2. Design a C program which reverses the number
3. Design a C program which finds the second maximum number among the given list of numbers.
4. Construct a program which finds the kth smallest number among the given list of numbers.
5. Design an algorithm and implement using C language the following exchanges $a \leftarrow b \leftarrow c \leftarrow d \leftarrow a$
6. Develop a C Program which counts the number of positive and negative numbers separately and also compute the sum of them.
7. Implement the C program which computes the sum of the first n terms of the series $\text{Sum} = 1 - 3 + 5 - 7 + 9$
8. Design a C program which determines the numbers whose factorial values are between 5000 and 32565.
9. Design an algorithm and implement using a C program which finds the sum of the infinite series $1 - x^2/2! + x^4/4! - x^6/6! + \dots$
10. Design a C program to print the sequence of numbers in which each number is the sum of the three most recent predecessors. Assume first three numbers as 0, 1, and 1.
11. Implement a C program which converts a hexadecimal, octal and binary number to decimal number and vice versa.
12. Develop an algorithm which computes the all the factors between 1 and 100 for a given number and implement it using C.
13. Construct an algorithm which computes the sum of the factorials of numbers between m and n.
14. Design a C program which reverses the elements of the array.
15. Given a list of n numbers, Design an algorithm which prints the number of stars equivalent to the value of the number. The stars for each number should be printed horizontally.
16. Implement the sorting algorithms a. Insertion sort b. Exchange sort c. Selection sort d. Partitioning sort.
17. Illustrate the use of auto, static, register and external variables.
18. Design algorithm and implement the operations creation, insertion, deletion, traversing on a singly linked list.

19. Develop a C program which takes two numbers as command line arguments and finds all the common factors of those two numbers.
20. Design a C program which sorts the strings using array of pointers.

Instructors may add some experiments to the above list. Moreover, 50% of the experiments are to be changed every academic year. Instructors can choose the experiments, provided those experiments are not repetitions.

References:

1. B. Govindarajulu, -IBM PC and Clones Hardware Trouble shooting and Maintenancel, Tata McGraw-Hill, 2nd edition, 2002.
2. R.G. Dromey, -How to Solve it by Computerl. 2014, Pearson.

List of COs	PO no. and keyword	Competency Indicator	Performance Indicator
CO1	PO2: Problem analysis	2.1	2.1.1
CO2	PO2: Problem analysis	2.2	2.2.2
CO3	PO2: Problem analysis	2.1	2.1.1
CO4	PO2: Problem analysis	2.3	2.3.1
CO5	PO2: Problem analysis	2.2	2.2.3

AK19 REGULATIONS

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES, TIRUPATI
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Year: I

Semester : I

Branch of Study : EEE

COURSE CODE	COURSE TITLE	L	T	P	CREDITS
19AHS9902	Communicative English - I Lab	0	0	2	1

Course Outcomes

1. Remember and understand the different aspects of the English language proficiency with emphasis on LSRW skills
2. Apply communication skills through various language learning activities
3. Analyze the English speech sounds, stress, rhythm, intonation and syllable division for better listening and speaking comprehension.
4. Evaluate and exhibit acceptable etiquette essential in social and professional settings.
5. Create awareness on mother tongue influence and neutralize it in order to improve fluency in spoken English.

Unit 1

1. Phonetics for listening comprehension of various accents
2. Reading comprehension
3. Describing objects/places/persons

Unit 2

1. JAM
2. Small talks on general topics
3. Debates

Unit 3

1. Situational dialogues – Greeting and Introduction
2. Summarizing and Note making
3. Vocabulary Building

Unit4

1. Asking for Information and Giving Directions
2. Information Transfer
3. Non-verbal Communication – Dumb Charade

Unit 5

1. Oral Presentations
2. Précis Writing and Paraphrasing
3. Reading Comprehension and spotting errors

Software Source:

K-Van Solutions Software

Reference:

Teaching English - British Council

AK19 REGULATIONS

List of COs	PO No. and keyword	Competency Indicator: Description	Performance Indicator: Description
CO1	PO10: Able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.	10.2	10.1.1
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
CO3	PO10: Able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.	10.2	10.2.1
CO4	PO 9: Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.	9.2	9.2.1
CO5	PO10: Able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.	10.2	10.2.1