AMRITSAR GROUP OF COLLEGES

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

SYLLABUS

B. Tech. (CSE): 1st/2nd SEM

1st Semester	AGAM 21101: ENGINEERING MATHEMATICS -I			

			L	T	P
Internal Marks:	40		3	1	0
External Marks:	60				
Total Marks:	100		Credits		4

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

CO-1	Apply range of techniques to find solution of standard partial differential equations.
CO-2	Analyze how a function can be minimized or maximized.
CO-3	Understand the convergence and divergence of infinite series.
CO-4	Apply the engineering problem mathematically using theory of matrices.
CO-5	Analyze and designing complex systems that involve quantities with both magnitude and direction.
CO-6	Determine gradient vector fields and find potential functions.

Part	Content	CO
I	**Partial Differentiation:** Partial differentiation: Homogeneous functions and Euler's theorem, composite functions, Total derivative, Derivative of an implicit function, Change of variable, Jacobians.	CO-1
II	**Applications of Partial Differentiation:** Tangent and normal to a surface, Taylor's and Maclaurine's series for a function of two variables, Maxima and Minima of function of two variables	CO-2
	Sequence and Series: Convergence and divergence of series, Tests of convergence, Comparison test, Integral test, Ratio test, Rabee's test, Logarithmic test, Cauchy's root test and Gauss test. Convergence and absolute convergence of alternating series.	CO-3
III	**Matrices:** Inverse and rank of a matrix, System of linear equations, Symmetric, skew-symmetric and orthogonal matrices, Determinants, Eigenvalues and eigenvectors, Diagonalization of matrices, Cayley-Hamilton Theorem.	CO-4
IV	**Vector Calculus** Scalar and Vector fields, differentiation of vectors, velocity and acceleration, Vector differential operators, Del, Gradient, Divergence and Curl and their physical interpretations. Formulae involving Del applied to point functions and their products.	CO-5
	Applications of Vector Calculus: Line integral, Solenoidal Vector point function, irrotational vector, Conservative field (Irrotational field).	CO-6

References:
- Thomes, G.B, Finney, R.L. Calculus and Analytic Gemetry, Ninth Edition, Peason Education Mathematical Statistics: S.C.Gupta
- Kreyszig, E., Advanced Engineering Mathematics, Eighth edition, John wiley.
- Peter. V. O" Nil, Advanced Engineering Mathematics, Wordsworth Publishing Company
- Jain, R.K and Lyengar, S.R.K., Advanced Engineering Mathematics, Narosa Publishing Company
- Grewal, B.S., Higher Engineering Mathematics, Khanna Publishers, New Delhi
- Taneja, H.C., Engineering Mathematics, Volume-I & Volume-II, I.K. Publisher
- Babu Ram, Advance engineering Mathematics, Pearson Education.
- Bindra,. J.S., Applied Mathematics, Volume-I, Kataria Publications

1st Semester		AGHU 21101: ENGLISH-I			
			L	**T**	**P**
Internal Marks:	40		3	0	0
External Marks:	60				
Total Marks:	100		**Credits**		3

Course Outcomes: After studying the course, students will be able to:	
CO-1	Understand and build vocabulary for preparing the foundation to learn English Language.
CO-2	Generate a coherent argument in response to a situation or question.
CO-3	Understand the given text to enhance Reading Skills for the use of English in everyday life.
CO-4	Create understanding of the various grammatical components to master Communicative Skills in English.
CO-5	Create awareness of appropriate format and competence of explaining views in a rational manner.
CO-6	Understand the relation between language and literature for enhancing interest in literature.

Part	Content	CO
I	Vocabulary Reading -The Concept of word formation, Root words from foreign language and their use in English, Prefixes, Suffixes and Collocation	CO-1
II	Essay Writing	CO-2
	Comprehension	CO-3
III	Sentence Structure, Use of Phrases and clauses in sentences, Unity & Coherence in Writing, Parts of Speech, Gerund & Infinitive, Use of Tenses	CO-4
IV	Letter to Editor, Sales Letter,	CO-5
	The Road not taken by Robert Frost, The World is too much with us by William Wordsworth	CO-6

References:
• Practical English Usage. Michael Swan. OUP. 1995. Remedial English Grammar. F.T. Wood. Macmillan.2007
• On Writing Well. William Zinsser. Harper Resource Book. 2001
• Communication Skills. Sanjay Kumar and PushpLata. Oxford University Press. 2011.

1st Semester		AGHU 21103: ENGLISH-I LAB			
			L	**T**	**P**
Internal Marks:	**30**		**0**	**0**	**2**
External Marks:	**20**				
Total Marks:	**50**		**Credits**		**1**

Course Outcomes: After studying the course, students will be able to:	
CO-1	Develop the skills of writing and expressing his ideas about introduction
CO-2	Present before others/audience to highlight special traits/qualities/weaknesses etc
CO-3	Think cognitively extensively about a situation and put the ideas on paper in writing
CO-4	Speak instantaneously on any topic/situation which will enhance his confidence to speak fluently
CO-5	Imagine a situation and develop conversation in writing in association with another student
CO-6	Master the skill to converse in telecommunication mode in day-to-day life as well organizational setup

Part	Content	CO
I	Self-Introduction Written Document	CO-1
	Introduction of the Lab Activities. Description and Performance of the First Activity: Professional Self Introduction for 2 minutes	CO-2
	Extempore Written Document	CO-3
	Activity: Extempore Description & Performance	CO-4
	Telephonic Conversation Written Document	CO-5
	Activity: Telephonic Conversation Description, Understanding and Individual performance	CO-6

References:
• The Audio CD accompanying S.P. Dhanavel's Book (Part 1 & 2)
• English Lab Software by Bureau for Health and Education Status Upliftment

1st/2nd Semester	AGCH 21101: ENGINEERING CHEMISTRY			

			L	**T**	**P**
Internal Marks:	**40**		**3**	**1**	**0**
External Marks:	**60**				
Total Marks:	**100**		**Credits**		**4**

Course Outcomes: After studying the course, students will be able to:	
CO-1	Understand periodic properties and arrangement of elements in periodic table according to electronic configuration.
CO-2	Differentiate between different types of polymers and to understand their properties and their applications.
CO-3	Evaluate hardness present in water and to solve the problems related to municipal water.
CO-4	Study different types of corrosion, its consequences and the methods to minimize corrosion.
CO-5	Recognize different properties and physical separation methods of petrochemicals, applicability of engineering and nanomaterials in our day to day life .
CO-6	Evaluate fundamentals of electrochemistry, electrodes and cell.

Part	Content	CO
I	Periodic Properties (Properties, Configuration and arrangement of elements in periodic table)	CO-1
	Polymers (Types, Applications, Numerical related to molecular mass)	CO-2
II	Water and its treatment (Types of hardness, Problems related to water and their prevention method)	CO-3
	Corrosion (Types, Effects and Prevention methods.)	CO-4
III	Engineering materials and nanomaterials	CO-5
IV	Electrochemistry (types of cells, Nernst equation, Application	CO-6

References:
• Engg. Chemistry by Jain & Jain.
• Engg. Chemistry by RS Grewal.
• Engg. Chemistry by B. Sivasankar, Mc Geaw Hill.
• C.P. Poole, Jr, F.J Owens, Introduction to nanotechnology, Wiley Interscience.2003.

1st/2nd Semester		AGES 21101: ENVIRONMENTAL STUDIES			
Internal Marks:	40		**L**	**T**	**P**
External Marks:	60		2	0	0
Total Marks:	100		**Credits**		2

Course Outcomes: After studying the course, students will be able to:
CO-1	Attribute the knowledge of multidisciplinary nature of environmental studies.
CO-2	Identify the role of natural resource on the basis of their utilization and recognize overexploitation of natural resources.
CO-3	Evaluate the interlink between biotic and abiotic components of ecosystem.
CO-4	Differentiate the terms of biodiversity and understanding the role of biodiversity in society.
CO-5	Apply the knowledge to understand the problems and remedies of environmental sciences.
CO-6	Relate the importance of environment sciences for sustainable development of the society.

Part	Content	CO
I	Multidisciplinary nature of environmental sciences.	CO-1
	Natural Resources (Types, Uses and overexploitation)	CO-2
II	Ecosystem (Introduction, Types, Flow of Energy and nutrition in ecosystem and Ecological Pyramids)	CO-3
	Biodiversity (Levels, Threats, Values and Conservation)	CO-4
III	Environmental Pollution (Types, Causes and Control measures)	CO-5
	Social Issues and the Environment	
IV	Human Population and Environment and Field Work	CO-6

References:
• Environmental Sciences, Tata McGraw Hill Pub., Banny Joseph
• Textbook of Environmental Studies for UG courses by Erach Bharucha.
• Environmental Studies by Anubha Kaushik and CP Kaushik (New Age Pub.)

1st/2nd Semester	AGCS 21101: PROGRAMMING FOR PROBLEM SOLVING

			L	T	P
Internal Marks:	40		3	0	0
External Marks:	60		3	0	0
Total Marks:	100		Credits		3

Course Outcomes: After studying the course, students will be able to:	
CO-1	Demonstrate the basic building blocks of general-purpose digital computer system like hardware/software, memory and peripheral devices and the program development life cycle using various tools like flowcharts algorithms and pseudo-code.
CO-2	Familiarize and classify character set, data types, operators, expressions and control statements of a programming language.
CO-3	Understand the concept arrays and strings.
CO-4	Apply the concept of modular programming and code reusability using functions.
CO-5	Understand the concept of structures, unions and pointers.
CO-6	Implement the concept of file handling for developing real world applications.

Part	Content	CO
I	**Introduction to Computers:** Features, advantages and applications of computer, generations of computer, Components of a computer system along with block diagram of a computer, processor, memory, peripheral devices, operating system, its types and functions, translator, interpreters and compilers. **Idea of Algorithm:** Steps to solve logical and numerical problems, representation of algorithm, flowchart/pseudo code with examples.	CO-1
II	**Introduction to Programming:** From algorithms to programs, source code, variables and memory locations, syntax and logical errors in compilation, object and executable code, data types in C, operators: unary and binary, categories of operators, Arithmetic, relational, logical, conditional, increment/decrement, arithmetic expressions and precedence of operators, Storage Classes in C, Data input/output using scanf() and printf() functions along with their different formats, getchar() and putchar() functions along with their variations. **Control Statements:** If, If else, if else if, nested if statements, switch case statement. Iteration and loops using while, do-while and for loops, nested loops, continue statement, break statement and go to statement.	CO-2
	Arrays: Arrays (1-D, 2-D) declaration, initialization, accessing elements, searching and sorting of elements, matrix addition, multiplication, transpose. **Strings:** String handling functions such as strupr(), strlwr(), strcat(), strrev(), strlen(), strcpy().	CO-3
	Functions: Function prototyping, function definition, function advantages, parameter passing in functions, call by value and call by reference, passing arrays to functions, passing strings to functions, recursion.	CO-4
III	**Structures:** Defining structures, initializing a structure, structure assignment, array of structures, nesting of structures. **Unions:** Defining a union, structures Vs Unions. **Pointers:** Idea of pointers, defining pointers, pointer arithmetic, void pointer, pointer with arrays, pointer with strings, pointer with structures, array of pointers, malloc(), calloc(), realloc() and free().	CO-5
IV	**File handling:** Text file and binary file, file opening modes, writing in a file, reading from a file, copying a file to another file, errors in file handling.	CO-6

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References:

- Byron Gottfried, Schaum's Outline of Programming with C, McGraw-Hill
- E. Balaguruswamy, Programming in ANSIC, Tata McGraw-Hill Suggested

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1st/2nd Semester		AGCH 21102: ENGINEERING CHEMISTRY LAB			
			L	**T**	**P**
Internal Marks:	40		**0**	**0**	**2**
External Marks:	60				
Total Marks:	100		**Credits**		**1**

Course Outcomes: After studying the course, students will be able to:	
CO-1	Synthesize thermosetting polymers and analyse the properties.
CO-2	Evaluate the hardness of water using complex metric titration.
CO-3	Understand different separation techniques such as chromatography.
CO-4	Measure physical properties such as surface tension and viscosity of fluid.
CO-5	Apply the concept of conductivity.
CO-6	Create a mini project related to the course AGCH-21101.

Part	Content	CO
A	Synthesis of polymers	CO-1
	Determination of hardness of water	CO-2
	Separation of components using chromatography	CO-3
	Measurement of Surface Tension and Viscosity of fluid.	CO-4
	Determination of strength of an acid using Conductivity meter.	CO-5
B	Mini Project related to course AGCH-21101	CO-6

References:
• Engineering chemistry Practical by Nagendar Mani Khadka.
• Laboratory Manual Engg Chemistry, Anupama Rajput

1st/2nd Semester	AGCS-21102: PROGRAMMING FOR PROBLEM SOLVING LAB			
		L	**T**	**P**
Internal Marks: 30		**0**	**0**	**4**
External Marks: 20				
Total Marks: 50		**Credits**		**2**

Course Outcomes: After studying the course, students will be able to:	
CO-1	Demonstrate building block of computers, installation of C compiler and proper usage of IDE for debugging and execution.
CO-2	Understand and implement basic concepts of C Programming and various control structures.
CO-3	Perform linear array, matrices and strings in C programming.
CO-4	Apply the concept of modular programming and code reusability using functions.
CO-5	Understand and implement the concepts of structures, union, pointers.
CO-6	Apply skill of identifying appropriate programming constructs for problem solving using file handling.

Part	Experiment	CO
A	**Fundamentals of computer system, C compiler and IDE:** Basic building block of computer system, installation of C compiler, familiarization with programming environment, basic structure of C program, compiling and executing a C program.	CO-1
	Basic concepts of C programming and Control Statements: Simple computational problems using arithmetic expressions. Problems involving conditional statements (If, If-else, If-else-if ladder, nested if, Switch case) iterative statements (while, do while and for loops) and branching/jumping statements (break, continue, go to), storage classes.	CO-2
	Arrays & Strings: 1D Arrays: Creation, initialization, accessing, searching, sorting. 2D arrays: Creation, initialization, accessing, matrix problems. Strings: Creation, accessing and implementation of all string operations.	CO-3
	Modular Programming using Functions: Functions (including built in libraries), parameter passing in functions, call by value, call by reference, passing arrays to functions, passing strings to functions, recursion.	CO-4
	Structures, Unions, Pointers: Defining structures, initializing a structure, structure assignment array of structures, nested structures, defining union, implementing union. Defining pointers, pointer arithmetic, void pointer, pointer with arrays, pointer with strings, pointer with structures, array of Pointers	CO-5
B	To make a mini project through file handling by implementing various file operations: Insert, Delete, Update, Display and Search modules should be covered by each project.	CO-6

1st/2nd Semester		AGPH 21101: ENGINEERING PHYSICS			
Internal Marks:	**40**		**L**	**T**	**P**
External Marks:	**60**		**4**	**1**	
Total Marks:	**100**		**Credits**		**4**

Course Outcomes: After studying the course, students will be able to:	
CO-1	Understand new concepts of physics like laser emission, holography etc which will help the students in engineering and technological applications.
CO-2	Generate logical thinking and ability to solve numerical problems which will lead to improve the problem solving ability in students.
CO-3	Understand need of quantum mechanics and it applications in every branch of engineering.
CO-4	Analyse and classify different types of electronic materials such as Magnetic materials, Nanomaterials, Metamaterials, Superconductors, etc and concept of superconductivity.
CO-5	Understand about the concept of heat, different modes of transfers of heat and thermal expansion of materials which is required for every branch of engineering in upcoming semesters
CO-6	Classify branches of physics like Electromagnetics, modern physics which will surely help the students in engineering and technology in future.

Part	**Content**	**CO**
I	Lasers, Population Inversion, Properties of Laser Light, Stimulated and Spontaneous Emission, Einstein A and B Coefficients, Pumping, Types of LASER-Ruby Laser, He-Ne Laser, and Applications of LASERS, Introduction to Holography, Difference between Holography and Photography.	CO-1
	Laws of Reflection and Refraction, TIR, Essential conditions of TIR, Applications of TIR, Optical Fibre, Acceptance Angle, Numerical Aperture, Propagation of waves, Attenuation of Optical fibre Signals, Applications of Optical Fibres , Numericals related to heat and temperature.	CO-2
II	Introduction to Classical Mechanics and Quantum Mechanics, Need of Quantum Mechanics, Uncertainty Principle, Wave-particle duality, Matter Waves, Black Body Radiation, Concept of Wave function, Application of Quantum Mechanics, Davisson Germer Experiment.	CO-3
III	Basic Idea of Dia, Para and Ferromagnetic material, Soft and Hard Magnetic Materials, Magnetostriction, Magnetic Anisotropy, Hysteresis curve. Introduction to semiconductors, Dielectrics, Metamaterials, Superconductors and Nanomaterials; types and their Applications, Superconductivity, Meissner Effect, Type I and Type II superconductors, Properties of superconductors, Isotope Effect, Cooper Pair, BCS Theory(Qualitative Idea), London Equations (No derivations).	CO-4
IV	Concept of Heat and Temperature, Units, Difference between Heat and Temperature, Different scales of temperature and their conversions, Expansion of Solids, Linear Expansion, Superficial Expansion and Volume Expansion, Relation between α, β and γ , Coefficient of Thermal Conductivity, Transfer of Heat, Modes of Transfer of Heat (Conduction, Convection and Radiation)	CO-5
	Introduction and properties of EM Waves, Divergence, Gradient and Curl, Applications of EM Waves, Displacement Current, Continuity Equation, Maxwell's Equations in Differential form	CO-6

References:
• Physics for Scientists & Engineers (Vol. I & II), Serway & Jewett, 9th Edition. Cengage Learning.

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- Engineering Physics, Malik; HK, Singh; AK, Tata McGraw Hill,
- Concepts of Modern Physics, Beiser; A., Mahajan; S., Choudhary; SR, Tata McGraw Hill.
- Physics; A calculus based approach (Vol. I & II) Serway; RA & Jewitt; JW, Cengage Learning.Materials Science & Engineering, Callister; WD, John Wiley & Sons.
- Introduction to Electrodynamics, Griffiths; DJ, Prentice Hall.
- D.A Neaman, "Semiconductor Physics and devices", Times Mirror High Education Group, Chicago. 1997
- Laser Theory & Applications, Thygrajan; K, Ghatak; AK, Mc Millan India Ltd.
- Engineering Mechanics, 2nd ed. — MK Harbola
- Principles of Mechanics — JL Synge & BA Griffith.
- Mechanics by D S Mathur, S Chand Publishing,1981
- Halliday and Resnick, Physics W. Saslow, Electricity, magnetism and light

1st/2nd Semester	AGEE 21101: BASIC ELECTRICAL AND ELECTRONICS ENGINEERING

			L	T	P
Internal Marks:	40		3	1	0
External Marks:	60				
Total Marks:	100		Credits		4

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

CO-1	Verify the basic laws in DC circuits and understand the concepts related to solar energy.
CO-2	Understand the concept of AC circuits with R, L, C and their combinations.
CO-3	Understand the concept of balanced 3-phase system and magnetic circuits.
CO-4	Understand the concept of single-phase conventional transformer and autotransformer
CO-5	Verify the working of DC and AC Motors and generators.
CO-6	To understand the applications of various electronic devices like diodes, transistors, rectifiers, logic gates and transducers.

Part	Content	CO
I	Direct Current (DC) Circuits Circuit elements, Ohm's Law, Kirchoff's Laws, Star-Delta Conversion, Superposition and Thevenin Theorem. Introduction to Solar Energy: Operating principle of solar cells, photovoltaic effect, environmental impacts and practical applications.	CO-1
II	Alternating Current (AC) Circuits, Representation of sinusoidal waveforms, Peak and RMS values, Analysis of single phase AC Circuits consisting of R, L, C, RL, RC and RLC, Introduction to balanced three phase system and its different types of connections. Magnetic Circuits. Comparison between magnetic and electric circuits, Faraday's law of Electromagnetic Induction, Self and Mutual Induction.	CO-2 & CO-3
III	Static Machines, Single Phase Transformer: Working principle, Construction (Core and Shell type), Efficiency, Autotransformer: Construction, Comparison with single phase transformer and industrial applications. Rotating Electrical Machines, D.C. machines (motor and generator), Three phase Induction motor, Single phase Induction motor: construction, working principle and industrial applications.	CO-4 & CO-5
IV	Transducers and Semiconductor Devices, Introduction, classification of transducers, LVDT: working principle, construction and industrial applications. Application of diodes as rectifiers, Application of transistor as amplifier, Introduction to logic gates and its truth table.	CO-6

References:

- Basic Electrical and Electronics and Computer Engineering by R Muthusubramanian, S Salivahanan,K A Muraleedharan, Tata McgrawHill
- A Textbook of Electrical Techology by B.L Theraja. & A.K Theraja, S Chand publishers.
- Electrical Technology, Edward Hughes, Addisin Wesley Longman Limited.
- A Course in electrical and electronic Measurements & Instumentation by A.K Sawhney, Dhanpat Rai & Co.
- Basic Electrical and Electronics Engineering by S.K. Sahdev, Uneek Publishers.

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1st/2nd Semester	AGHV 21101: HUMAN VALUES AND PROFESSIONAL ETHICS			

			L	T	P
Internal Marks:	**40**		**3**	**0**	**0**
External Marks:	**60**				
Total Marks:	**100**		**Credits**		**3**

Course Outcomes: After studying the course, students will be able to:	
CO-1	Understand Need and Process of Value Education.
CO-2	Identify and Analyse Basic Human Aspirations.
CO-3	Analyse the Needs and Activities of Self and Body.
CO-4	Identify and Understand the Comprehensive Human Goal.
CO-5	Understand Existence as Co-existence at all levels
CO-6	Visualize futuristic goals for Holistic Development.

Part	Content	CO
I	Introduction to Value Education, Self-Exploration as the Process of Value Education	CO-1
	Basic Human Aspirations and the Program to fulfil Basic Human Aspirations	CO-2
II	Understanding the Human Being as Co-existence of Self (I') and Body	CO-3
III	Harmony in the Family, Extending relationship from Family to society.	CO-4
	Harmony in Nature and the Holistic perception of Harmony in Existence	CO-5
IV	Implications of Holistic Understanding for mutually enriching and sustainable systems	CO-6

References:

- A Foundation Course in Human Values and Professional Ethics by R R Gaur, R Sangal & G P Bagaria
- Ethics and Human Values by S. Abdul Sattar.
- Human Values by Dr. Kshitiz Jain.

1st/2nd Semester	AGPH-21102: ENGINEERING PHYSICS LABORATORY			
		L	**T**	**P**
Internal Marks: 30		0	0	2
External Marks: 20		0	0	2
Total Marks: 50		**Credits**		1

Part	Course Outcomes: After studying the course, students will be able to:	CO
A	Study the properties of variety of electrical and optical systems.	CO-1
	Understand principle, concept, working and application of new technology and comparison of results with theoretical calculations.	CO-2
	Understand measurement technology, usage of new instruments and real time applications in engineering studies.	CO-3
	Design new instruments with practical knowledge.	CO-4
	Develop experimentation skills and understand importance of measurement practices in Science & Technology.	CO-5
B	To make a mini project that demonstrate a concept, based on the content of AGPH-21101 (Engineering Physics)	CO-6

Exp. No.	Aim of Experiment	CO
I	To analyse the suitability of Zener diode as voltage regulator	CO-1
II	To study the laser beam characteristics like wave length using diffraction grating aperture.	
III	To find out the frequency of AC mains using electric-vibrator.	CO-2
IV	To determine the time period of simple pendulum for different length and acceleration due to gravity.	
V	To determine the band gap of a semiconductor material.	
VI	Use of multimeter for measuring (a) resistance (b) ac and dc voltages (c) dc current (d) capacitance (e) checking electrical fuses.	CO-3
VII	To determine the grain size of a material using optical microscope	
VIII	To find divergence of given laser beam.	CO-4
IX	To measure the length and diameter using Vernier calliper, screw gauge and travelling Microscope, use of plumb line and spirit level.	CO-5

(SOME SAMPLE PROJECTS RELATED TO ENGINEERING PHYSICS FOR REFERENCE)
- ✓ Designing and developing demo models of series and parallel circuits.
- ✓ Design and develop demo model for exploring concepts in current and voltage with a Vande-Graff Generator.
- ✓ Design and develop demo model of Homemade generators and emergency lamps.
- ✓ Design and develop demo model of Mini Maglev train.
- ✓ Design and develop demo model of electromagnetic motor.
- ✓ Design and develop demo model to check speed of sound at Room Temperature.
- ✓ Design and develop working model of elevator using Magnetic levitation.
- ✓ Design and develop a portable mobile charger.
- ✓ Design and develop working model of laser security system
- ✓ Design and develop working model for studying phenomenon of electromagnetic induction.
- ✓ Design and develop working model of Electromagnetic suction

References:
- Practical Physics, C.L. Arora, S. Chand & Company Ltd. - Practical Physics, R.S. Sirohi, Wiley Eastern.

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- Advanced Practical Physics for students, B.L. Flint and H.T. Worsnop, 1971, Asia Publishing House.
- Practical Physics, G.L.Squires, Cambridge University Press, Cambridge, 1985
- https://vlab.amrita.edu/index.php?sub=1
- http://www.vlab.co.in
- physicsandbox.com/projects/double_pendulum.com
- 1000sciencefairprojects.com
- Seminarsonly.com/engineering-projects/physics
- https://learning-center.homesciencetools.com/article/electromagnetism-science-project/

1st/2nd Semester	AGEE 21102: BASIC ELECTRICAL ENGINEERING AND ELECTRONICS LAB			

Internal Marks:	30		L	T	P
External Marks:	20		0	0	2
Total Marks:	50		Credits		1

Course Outcomes: After studying the course, students will be able to:	
CO-1	Learn to measure the electrical quantities with different measuring devices like multimeter, voltmeter, ammeter, etc. and understand the concept of solar panel
CO-2	Explain the concept of circuit laws and apply them to laboratory measurements.
CO-3	Be able to understand the connections of single phase and three phase transformers.
CO-4	Acknowledge the principles of operation and the main features of rotating electric machines and their applications.
CO-5	Prepare projects related to basic electrical circuits
CO-6	Prepare projects related to basic electronic circuits

Part	Content	CO
I	- To test the various components using Multimeter. - To verify Ohm's Law and its limitations. - To verify Kirchoff's Laws. - To study the voltage and current from solar panel output.	CO-1
II	- To find voltage-current relationship in a R-L series circuit and to determine the power factor of the circuit. - To start and reverse the direction of rotation of a 3-phase Induction motor. - To verify the working of LVDT	CO-2 & CO-3
III	- To obtain the characteristics of a P-N junction diode. - To verify the various waveforms for rectifier circuits. - To verify the truth table of logic gates.	CO-4
IV	- Design and develop the demo model for dancing LED lights. - Design and develop the demo model to check the continuity of supply. - Design and develop the demo model for water irrigation system using solar panel. - Design and develop the demo model for home lightning system using solar panel. - Design and develop the demo model for mobile charger using solar panel. - Design and develop the demo model for clap switch. - Electric model for equivalent circuit of rectifier using discrete components. - Any other project of their choice.	CO-5 & CO-6

References:
- S.K. Bhattacharya and R.K. Rastogi, Experiments in Electrical Engineering, New Age International Publisher Ltd., New Delhi.   - D.R. Kohli and S.K. Jain, Experiments in Electrical Machines.

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1st/2nd Semester	AGMP 21101: MANUFACTURING PRACTICE			

			L	T	P
Internal Marks:	40		3	1	0
External Marks:	60				
Total Marks:	100		Credits		4

Course Outcomes: After studying the course, students will be able to:	
CO-1	Identify the basics of tools and equipment used in Foundry Shop and welding shop. Also understand the various processes of Foundry shop and welding shop.
CO-2	Identify the basics of tools and equipment's used in Smithy shop and fitting shop. Also understand the basic processes of Smithy shop and Fitting shop.
CO-3	To make an ability to understand the various tools and processes performed in Machine Shop.
CO-4	To make an ability to understand the various tools used in Electrical and Electronic shop. Also make an ability to understand the exercises used in preparing PCB.
CO-5	Identify the basics of tools and equipment's used in Sheet Metal shop. Also familiarize with the production of models in Sheet Metal shop.
CO-6	Identify the basics of tools and equipment's used in carpentry shop. Also familiarize with the production of simple models in carpentry shop.

Part	Content	CO
I	**Foundry Shop:** Introduction to molding materials; moulds; use of cores; melting furnaces; tools and equipment used in foundry shops; firing of a cupola furnace; exercises involving preparation of small sand molds and castings. **Welding Shop:** Introduction to different welding methods; welding equipment; electrodes; welding joints; welding defects; exercises involving use of gas/electric arc welding.	CO-1
II	**Forging Practice:** Introduction to forging tools; equipments and operations; forgability of metals; exercises on simple smithy; forging exercises. **Fitting Shop**: Introduction of fitting practice and tools used in fitting shop; exercise involving marking, cutting, fitting practice (Right Angles), male- Female mating parts practice, trapping practice.	CO-2
	Machine Shop: Machines, Grinders etc; cutting tools and operations; exercises involving awareness.	CO-3
III	**Electrical and Electronics Shop:** Introduction to electrical wiring; preparation of PCBs involving soldering applied to electrical and electronic applications; exercises preparation of PCBs involving soldering applied to electrical and electronic applications.	CO-4
IV	**Sheet Metal:** Shop development of surfaces of various objects; sheet metal forming and joining operations, joints, soldering and brazing; exercises involving use of sheet metal forming operations for small joints.	CO-5
	Carpentry and Pattern Making: Various types of timber and practice boards, defects in timber, seasoning of wood; tools, wood operation and various joints; exercises involving use of important carpentry tools to practice various operations and making joints.	CO-6

References:
• P. N. Rao, Manufacturing Technology, Foundry, Forming and Welding, Mc Graw Hill
• Richard L Little, Welding and Welding Technology, McGraw Hill
• Amitabha Ghosh, Manufacturing Science, East-West Press Pvt Ltd

Syllabus For B.Tech. CSE 2021 onwards

2nd Semester	AGAM 21102: ENGINEERING MATHEMATICS II			

			L	T	P
Internal Marks:	40		3	1	0
External Marks:	60		3	1	0
Total Marks:	100		Credits		4

Course Outcomes: After studying the course, students will be able to:	
CO-1	Calculate the area of the region and the average value of a function of two variables over a rectangular region.
CO-2	Find the relation between line, surface and volume integral.
CO-3	Identify the type of a given differential equation and select and apply the analytical technique for finding the solution.
CO-4	Be familiar with the modelling assumptions and derivations that lead to PDEs
CO-5	Describe the need for extending the set of real numbers to the set of complex numbers.
CO-6	Understand the significance of differentiability for complex functions.

Part	Content	CO
I	**Multiple Integration:** Multiple Integration, Double integrals (Cartesian), change the order of integration in double integrals, Change of variables (Cartesian to polar),	CO-1
	Applications of Multiple Integration: Area and Volume. Triple integrals (Cartesian), scalar surface integrals, vector surface integrals, Theorems of Green, Gauss and Stokes.	CO-2
II	**Ordinary Differential Equations**: Exact differential equation, reducible to exact form by integrating factors, Equations of the first order and higher degree, Clairaut's equation, Leibniz's linear and Bernoulli's equation.	CO-3
III	**Linear Ordinary Differential Equations**: Solution of linear Ordinary Differential Equations of second and higher order, methods of finding complementary functions and particular integrals, Special methods for finding particular integrals, Method of variation of parameters, Operator method, Cauchy's homogeneous and Legendre's linear equation.	CO-4
IV	**Complex Numbers and elementary functions of complex variable:** De-Moivre's theorem and its applications, Real and Imaginary parts of exponential, logarithmic functions of complex variables, Summation of trigonometric series. (C+iS method).	CO-5
	Complex Variable: Differentiation, Cauchy-Riemann equations, analytic functions, harmonic functions, finding harmonic conjugate, elementary analytic functions, Conformal mappings.	CO-6

References:
- Thomes, G.B, Finney, R.L. Calculus and Analytic Gemetry, Ninth Edition, Peason Education Mathematical Statistics: S.C.Gupta
- Kreyszig, E., Advanced Engineering Mathematics, Eighth edition, John wiley.
- Peter. V. O" Nil, Advanced Engineering Mathematics, Wordsworth Publishing Company
- Jain, R.K and Lyengar, S.R.K., Advanced Engineering Mathematics, Narosa Publishing Company
- Grewal, B.S., Higher Engineering Mathematics, Khanna Publishers, New Delhi
- Taneja, H.C., Engineering Mathematics, Volume-I & Volume-II, I.K. Publisher
- Babu Ram, Advance engineering Mathematics, Pearson Education.
- Bindra,. J.S., Applied Mathematics, Volume-I, Kataria Publications

2nd Semester	AGHU 21102: ENGLISH-II			
		L	**T**	**P**
Internal Marks: 40		3	0	0
External Marks: 60				
Total Marks: 100		**Credits**		**3**

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

CO-1	Generate their communicative skills for their forthcoming professional needs.
CO-2	Organize accurately, clearly, deeply and present well the matter/ logic/ facts/ opinion in a concrete and interesting manner.
CO-3	Understand the need to use English in their everyday life.
CO-4	Understand the language through grammatical components of English.
CO-5	Construct appropriate format and generate the capacity of explaining the views in a rational manner.
CO-6	Understand the relation between language and literature through textual reading and to enhance the reader's interest in Literature.

Part	Content	CO
I	Vocabulary Reading -The Concept of word formation, Root words from foreign language and their use in English, Synonyms & Antonyms, Homonyms, Homophones & Homographs	CO-1
II	Article Writing	CO-2
	Comprehension & Precis Writing	CO-3
III	Common Errors in English, Active & Passive Voice, Direct & Indirect Speech	CO-4
	Office Correspondence Writing (Official Letters)	CO-5
IV	The School for Sympathy by E V Lucas, The Beauty and the Beast by R K Narayan	CO-6

References:

- Practical English Usage. Michael Swan. OUP. 1995.
- Remedial English Grammar. F.T. Wood. Macmillan.2007
- On Writing Well. William Zinsser. Harper Resource Book. 2001
- Communication Skills. Sanjay Kumar and PushpLata. Oxford University Press. 2011.

Syllabus For B.Tech. CSE 2021 onwards

2nd Semester		AGHU 21104: ENGLISH-II LAB			
			L	**T**	**P**
Internal Marks:	30		0	0	2
External Marks:	20				
Total Marks:	50		**Credits**		1

Course Outcomes: After studying the course, students will be able to:	
CO-1	The students will learn about their strengths, weaknesses, threats and work enthusiastically to transfer weaknesses into strengths and threats into opportunities.
CO-2	They will be able to produce on their own clear and coherent texts.
CO-3	Students will be able to gain greater proficiency in English language and its technical aspects for its effective use in personal and professional life.
CO-4	Students will acquire basic proficiency in arranging the thoughts in written form and create hold on the language.
CO-5	The students will achieve greater refinement of techniques to present himself / herself before audience in an effective way.
CO-6	Students will be able to increase the memory capacity of the mind.

Part	Content	CO
I	Introduction of the Lab Activities. Description and Performance of the First Activity: Professional Self Introduction for 2 minutes	CO-1
	Self Introduction Written Document	CO-2
	Activity: Visual Extempore Description & Performance	CO-3
	Visual Extempore Written Document	CO-4
	Activity: Power Point Presentation Description, Understanding and Individual performance	CO-5
	Power Point Presentation Written Document	CO-6

References:
- The Audio CD accompanying S.P. Dhanavel's Book (Part 1 & 2)
- English Lab Software by Bureau for Health and Education Status Upliftment
- Various Video lectures on Power Point Presentation and Group Discussion