

**VINAYAKA MISSION'S RESEARCH FOUNDATION, SALEM**  
(Deemed to be University)

AARUPADAI VEEDU INSTITUTE OF TECHNOLOGY, CHENNAI  
&

VINAYAKA MISSION'S KIRUPANANDA VARIYAR ENGINEERING COLLEGE, SALEM

**FACULTY OF ENGINEERING AND TECHNOLOGY**

**STRUCTURED CHOICE BASED CREDIT SYSTEM**

**BOARD : MECHANICAL ENGINEERING**  
**REGULATION : 2017**  
**PROGRAM : B.Tech., – AERONAUTICAL ENGINEERING (FULL TIME-REGULAR)**

**CURRICULUM AND SYLLABUS**

<b>SEMESTER – I</b>								
S.NO	COURSE CODE	COURSE TITLE	OFFERING DEPARTMENT	CATEGORY	L	T	P	C
<b>THEORY</b>								
1		TECHNICAL ENGLISH	ENGLISH	FC(HSS)	3	0	0	3
2		ENGINEERING MATHEMATICS	MATHEMATICS	FC(BS)	2	2	0	3
3		PHYSICAL SCIENCES	PHYSICS & CHEMISTRY	FC(BS)	4	0	0	4
4		ESSENTIALS OF COMPUTING (Theory + Practice)	CSE	FC(ES)	2	0	2	3
5		BASICS OF CIVIL AND MECHANICAL ENGINEERING	CIVIL & MECHANICAL	FC(ES)	4	0	0	4
<b>PRACTICAL</b>								
6		ENGLISH LANGUAGE LAB	ENGLISH	FC(HSS)	0	0	4	2
7		PHYSICAL SCIENCES LAB	PHYSICS & CHEMISTRY	FC(BS)	0	0	4	2
8		ENGINEERING SKILLS PRACTICE LAB A. BASIC CIVIL ENGINEERING B. BASIC MECHANICAL ENGINEERING	CIVIL & MECHANICAL	FC(ES)	0	0	4	2
9		YOGA & MEDITATION	PHYSICAL EDUCATION	FC(HSS)	0	0	4	2
<b>TOTAL</b>					<b>15</b>	<b>2</b>	<b>18</b>	<b>25</b>
L – LECTURE HOUR		T – TUTORIAL HOUR		P – PRACTICAL HOUR		C – CREDIT		
HSS	HUMANITIES AND SOCIAL SCIENCES		CC	CORE COURSES				
BS	BASIC SCIENCES		EC	ELECTIVE COURSES				
ES	ENGINEERING SCIENCES		EEC	EMPLOYABILITY ENHANCEMENT COURSES + EXTRA CURRICULAR COURSES + CO - CURRICULAR COURSES				
PII	PROJECT + INTERNSHIP + INDUSTRY ELECTIVES							

COURSE CODE	SEMESTER – I				
	NAME OF THE COURSE : <b>TECHNICAL ENGLISH</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
	TOTAL HOURS : <b>45</b>	<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>
	PREREQUISITE : <b>NIL</b>				
<b>PURPOSE:</b>					
Strengthens the basic LSRW (Listening, Speaking, Reading and Writing) skills. Comprehension of English Language and Grammar.					
<b>INSTRUCTIONAL OBJECTIVES:</b>					
1.	To enable students to develop LSRW (Listening, Speaking, Reading and Writing) skills in English.				
2.	To make them to become effective communicators in English.				
3.	To ensure that learners use Electronic media materials for developing language skills.				
4.	To aid the students with employability skills.				
5.	To motivate students to continuously use English Language.				
<b>UNIT – I</b>					
					<b>9</b>
Self introduction – Simulations using E Materials – Whatsapp, Face book, Hiker, Twitter – Effective Communication with Minimum Words – Interpretation of Images and Films – Identify the different Parts of Speech – Word formation with Prefixes and suffixes – Common Errors in English – Scientific Vocabulary (definition and meaning) – Listening Skills – Passive and Active listening, Listening to Native Speakers – Characteristics of a good listener.					
<b>UNIT – II</b>					
					<b>9</b>
Articles – Phonetics (Vowels, Consonants and Diphthongs) – Pronunciation Guidelines – Listening to Indian speakers from different regions, intrusion of mother tongue – Homophones – Homonyms – Note taking and Note making - Difference between Spoken and Written English – Use of appropriate language – Listening and Responding to Video Lectures (Green India, environment, social talks) – Extempore.					
<b>UNIT – III</b>					
					<b>9</b>
Tense forms – Verbal and Non verbal Communication – Describing objects – Process Description – Speaking Practice – Paragraph Writing on any given topic (My favourite place, games / Hobbies / School life, etc.) – Types of paragraphs – Telephone Etiquettes – Telephonic conversation with dialogue.					
<b>UNIT – IV</b>					
					<b>9</b>
Impersonal Passive Voice – Conditional Sentences – Technical and Non technical Report Writing (Attend a technical seminar and submit a report) – News Letters and Editing – Skimming – Scanning – How to Improve Reading Speed – Designing Invitations and Poster Preparation.					
<b>UNIT – V</b>					
					<b>9</b>
Sentence Pattern (SVOCA) – Statement of Comparison – Transcoding (Flow Chart, Bar Chart and Pie Chart) – Informal letters – Resume Writing – Difference between Bio data, Resume and Curriculum Vitae.					
<b>TEXT BOOK:</b>					
1. “English for Engineers”, Department of English, VMKV Engineering College, Salem and AVIT, Chennai, Anuradha publishers, 2017.					

**REFERENCES:**

1. “English for Effective Communication”, Department of English, VMKV & AVIT, SCM Publishers, 2009.
2. “Practical English Usage”, Michael Swan (III<sup>rd</sup> Edition), Oxford University Press.
3. “Grammar Builder – I, II, III”, Cambridge University Press.
4. Pickett and Laster, “Technical English: Writing, Reading and Speaking”, New York: Harper and Row Publications, 2002.

**COURSE CODE :****NAME OF THE COURSE : TECHNICAL ENGLISH**

<b>COURSE DESIGNED BY</b>		<b>DEPARTMENT OF ENGLISH</b>										
		a	b	c	d	e	f	g	h	i	j	k
1	Student Outcomes		√		√		√	√		√	√	
2	Mapping of instructional objectives with student outcome		3,4		1,3		2,3,5	1,2,3,4,5		4,5	2	
3	Category	HSS	BS	ES	CC	EC	EEC	PII				
		√										

COURSE CODE	SEMESTER – I				
	NAME OF THE COURSE : <b>ENGINEERING MATHEMATICS</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
	TOTAL HOURS : <b>60</b>	<b>2</b>	<b>2</b>	<b>0</b>	<b>3</b>
	PREREQUISITE : <b>NIL</b>				
<b>PURPOSE:</b>					
To impart analytical ability in solving mathematical problems as applied to the respective branches of Engineering.					
<b>INSTRUCTIONAL OBJECTIVES:</b>					
1.	To apply advanced matrix knowledge to Engineering problems.				
2.	To equip themselves familiar with the functions of several variables.				
3.	To improve their ability in solving geometrical applications of differential calculus problems.				
4.	To have knowledge in multiple calculus.				
5.	To improve their ability in Vector calculus.				
<b>UNIT – I</b>	<b>MATRICES</b>				<b>12</b>
Characteristic equation – Eigen values and eigenvectors of a real matrix – Properties of eigenvalues and eigenvectors (Without proof) – Cayley-Hamilton theorem (excluding proof) – Orthogonal transformation of a symmetric matrix to diagonal form.					
<b>UNIT – II</b>	<b>DIFFERENTIAL CALCULUS</b>				<b>12</b>
Curvature – Cartesian and Parametric Co-ordinates – Centre and radius of curvature – Circle of curvature – Evolute.					
<b>UNIT – III</b>	<b>FUNCTIONS OF SEVERAL VARIABLES</b>				<b>12</b>
Partial Derivatives – Total Differentiation – Maxima and Minima constrained Maxima and Minima by Lagrangian Multiplier Method.					
<b>UNIT – IV</b>	<b>MULTIPLE INTEGRALS</b>				<b>12</b>
Double integration – change of order of integration – Cartesian and polar coordinates – Area as a double integral – Triple integration.					
<b>UNIT – V</b>	<b>VECTOR CALCULUS</b>				<b>12</b>
Directional derivatives – Gradient, Divergence and Curl – Irrotational and solenoidal – vector fields – vector integration – Green’s theorem, Gauss divergence theorem and Stoke’s theorem (excluding proof).					
<b>TEXT BOOKS:</b>					
1. “Engineering Mathematics I & II”, Department of Mathematics, VMKVEC (Salem) & AVIT (Chennai), (2017).					
2. Dr.A.Singaravelu, “Engineering Mathematics I & II”, 23 <sup>rd</sup> Edition, Meenakshi Agency, Chennai (2016).					
<b>REFERENCES:</b>					
1. Veerarajan T., “Engineering Mathematics”, Tata McGraw Hill Education Pvt, New Delhi (2011).					
2. Grewal B.S., “Higher Engineering Mathematics”, 42 <sup>nd</sup> Edition, Khanna Publishers, Delhi (2012).					
3. Kreyszig E., “Advanced Engineering Mathematics”, 8 <sup>th</sup> Edition, John Wiley and Sons (Asia) Pvt Ltd., Singapore (2012).					
4. Kandasamy P, Thilagavathy K, and Gunavathy K., “Engineering Mathematics”, Volumes I & II (10 <sup>th</sup> Edition), S. Chand & Co., New Delhi (2014).					

COURSE CODE :												
NAME OF THE COURSE : ENGINEERING MATHEMATICS												
COURSE DESIGNED BY		DEPARTMENT OF MATHEMATICS										
1	Student Outcomes	a	b	c	d	e	f	g	h	i	j	k
		√				√						
2	Mapping of instructional objectives with student outcome	1,5				2,3,4						
3	Category	HSS	BS	ES	CC	EC	EEC	PII				
			√									

COURSE CODE	SEMESTER – I							
	NAME OF THE COURSE : <b>PHYSICAL SCIENCES</b> <b>PART A – ENGINEERING PHYSICS</b>				L	T	P	C
	TOTAL HOURS : <b>30</b>				<b>2</b>	<b>0</b>	<b>0</b>	<b>2</b>
	PREREQUISITE : <b>NIL</b>							
<b>PURPOSE:</b>								
The fundamental knowledge in physics will improve the scientific thinking of students.								
<b>INSTRUCTIONAL OBJECTIVES:</b>								
1.	To understand the significance of laser and its applications in technology.							
2.	To understand the basic principles of fibre optics and applications.							
3.	To understand various techniques used in Non-destructive testing.							
<b>UNIT – I</b>	<b>LASERS</b>						<b>10</b>	
Laser characteristics - Stimulated Emission – Population Inversion – Einstein coefficients – Lasing action – Types of Laser – Nd:YAG laser, CO <sub>2</sub> laser, GaAs laser – Applications of Laser – Holography – construction and reconstruction of a hologram.								
<b>UNIT – II</b>	<b>FIBRE OPTICS</b>						<b>10</b>	
Principle and propagation of light in optical fibres – numerical aperture and acceptance angle – types of optical fibres (material, refractive index, mode) – Applications: Fibre optic communication system – fibre optic displacement sensor and pressure sensor.								
<b>UNIT – III</b>	<b>NON-DESTRUCTIVE TESTING</b>						<b>10</b>	
Introduction – Types of NDT – Liquid penetrant method – characteristics of penetrant and developer – ultrasonic flaw detector – X-ray Radiography: displacement method – X-ray Fluoroscopy.								
<b>TEXT BOOK:</b>								
1. “Engineering Physics”, Department of Physics, VMKVEC, Salem and AVIT, Chennai, Anuradha publishers 2017.								
<b>REFERENCES:</b>								
1. Beiser, Arthur, “Concepts of Modern Physics”, 5 <sup>th</sup> Edition. McGraw-Hill, 2009.								
2. Halliday.D, Resnick.R, Walker.J, “Fundamentals of Physics”, Wiley & sons, 2013.								
3. Gaur R. K. and Gupta S. L., “Engineering Physics”, Dhanpat Rai publishers, New Delhi, 2001.								
4. Avanadhanulu.M.N., Arun Murthy.T.V.S, “Engineering Physics”, Volume-I, S.Chand, 2014.								
5. Rajendran. V, “Engineering Physics”, Tata McGraw Hill Publication and Co., New Delhi, 2009.								
6. Baldev Raj et al. “Practical Non-Destructive Testing”, Narosa Publications, 2017.								

<b>COURSE CODE :</b>												
<b>NAME OF THE COURSE : PHYSICAL SCIENCES</b>												
<b>PART A – ENGINEERING PHYSICS</b>												
<b>COURSE DESIGNED BY</b>		<b>DEPARTMENT OF PHYSICS</b>										
1	Student Outcomes	a	b	c	d	e	f	g	h	i	j	k
		√	√	√	√	√		√	√		√	√
2	Mapping of instructional objectives with student outcome	1	3	2	1	3		3	2		1	3
3	Category	HSS	BS	ES	CC	EC	EEC	PII				
			√									

COURSE CODE	SEMESTER – I							
	NAME OF THE COURSE : <b>PHYSICAL SCIENCES</b> <b>PART B - ENGINEERING CHEMISTRY</b>				L	T	P	C
	TOTAL HOURS : <b>30</b>				<b>2</b>	<b>0</b>	<b>0</b>	<b>2</b>
	PREREQUISITE : <b>NIL</b>							
<b>PURPOSE:</b>								
Enhancement of knowledge with the basic concepts of Chemistry and its application in Engineering and Technology.								
<b>INSTRUCTIONAL OBJECTIVES:</b>								
1.	To impart basic knowledge in Chemistry so that the student will understand the engineering concept and they can face the competitive examinations effectively.							
2.	To inculcate the knowledge of techniques, skills and modern engineering.							
3.	To lay foundation for practical applications of chemistry in engineering aspects.							
<b>UNIT – I</b>								
<b>ELECTROCHEMISTRY, BATTERIES AND FUEL CELLS</b>							<b>10</b>	
Electrode potential – Nernst equation – Electrodes (SHE, Calomel and Glass) – cells – EMF measurement. Primary battery (Daniel and dry cell) – secondary battery (lead Acid storage battery and Nickel – Cadmium battery) – Fuel cell (H <sub>2</sub> -O <sub>2</sub> fuel cell).								
<b>UNIT – II</b>								
<b>WATER TECHNOLOGY AND CORROSION</b>							<b>10</b>	
Sources of water – impurities – Hardness and its determination (problems to be avoided) – boiler troubles – water softening (Zeolite & Demineralisation) – Domestic water treatment – Desalination (Electrodialysis & Reverse Osmosis). Corrosion – Types – principles – corrosion control methods - Sacrificial anode and Impressed current method) - Electroplating and Electroless plating.								
<b>UNIT – III</b>								
<b>FUELS AND CHEMISTRY OF ADVANCED MATERIALS</b>							<b>10</b>	
Classification of Fuels (Solid, Liquid, Gaseous, Nuclear and Bio fuels) – Calorific Value of a fuel – Non Petroleum Fuels – Non conventional sources of Energy – combustion. Basics and Applications:- Organic electronic material, shape memory alloys, polymers (PVC, Teflon, Bakelite) – fibers (optical fibre), composites (FRP, MMC & PMC), Nanomaterials.								
<b>TEXT BOOK:</b>								
1. “Engineering Chemistry”, Department of Chemistry, VMKVEC, Salem, Anuradha Publishers, 2017.								
<b>REFERENCES:</b>								
1. “A text book of Engineering Chemistry”, S.S. Dara, S.Chand & company Ltd., New Delhi. 2. “Engineering Chemistry”, Jain & Jain, 15 <sup>th</sup> Edition Dhanpatrai Publishing Company (P) Ltd., New Delhi. 3. “A text book of Engineering Chemistry”, Shashi Chawla, Edition 2012, Dhanpatrai & Co., New Delhi. 4. “Engineering Chemistry”, Dr. A. Ravikrishnan, Sri Krishna Publications, Chennai.								

<b>COURSE CODE :</b>												
<b>NAME OF THE COURSE : PHYSICAL SCIENCES</b>												
<b>PART B - ENGINEERING CHEMISTRY</b>												
<b>COURSE DESIGNED BY</b>		<b>DEPARTMENT OF CHEMISTRY</b>										
1	Student Outcomes	a	b	c	d	e	f	g	h	i	j	k
		√	√	√	√	√	√	√	√	√	√	√
2	Mapping of instructional objectives with student outcome	1	3	2	1	1	1	1	3	1	3	2
3	Category	HSS	BS	ES	CC	EC	EEC	PII				
			√									



**REFERENCES :**

1. Aho.A.V., Hopcroft.J.E and Ullman.J.D, “The Design and Analysis of Computer Algorithms”, Pearson Education, 2004.
2. Knuth,D.E., “The Art of computer programming Vol 1:Fundamental Algorithms”, 3<sup>rd</sup> Edition, Addison Wesley, 1997.
3. Knuth,D.E., “Mathematical Analysis of algorithms”, Proceedings IFIP congress, 1971.

**COURSE CODE :**

**NAME OF THE COURSE : ESSENTIALS OF COMPUTING**  
**(Theory + Practice)**

<b>COURSE DESIGNED BY</b>		<b>DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING</b>										
1	Student Outcomes	a	b	c	d	e	f	g	h	i	j	k
		√		√		√						√
2	Mapping of instructional objectives with student outcome	1-5		2-4		3,4						2,4
3	Category	HSS	BS	ES	CC	EC	EEC	PII				
				√								

COURSE CODE	SEMESTER – I							
	NAME OF THE COURSE : <b>BASICS OF CIVIL AND MECHANICAL ENGINEERING</b>				L	T	P	C
	<b>PART A – BASIC CIVIL ENGINEERING</b>							
	TOTAL HOURS : <b>30</b>				<b>2</b>	<b>0</b>	<b>0</b>	<b>2</b>
PREREQUISITE : <b>NIL</b>								
<b>PURPOSE:</b>								
The aim of the subject is to provide a fundamental knowledge of basic Civil Engineering.								
<b>INSTRUCTIONAL OBJECTIVES:</b>								
1.	To understand the basic concepts of surveying and construction materials.							
2.	To impart basic knowledge about building components.							
<b>UNIT – I   SURVEYING AND CIVIL ENGINEERING MATERIALS   15</b>								
<b>Surveying:</b> Objects – types – classification – principles – measurements of distances – angles – levelling – determination of areas – illustrative examples. <b>Civil Engineering Materials:</b> Bricks – stones – sand – cement – concrete – steel sections.								
<b>UNIT – II   BUILDING COMPONENTS AND STRUCTURES   15</b>								
<b>Foundations:</b> Types, Bearing capacity – Requirement of good foundations. <b>Superstructure:</b> Brick masonry – stone masonry – beams – columns – lintels – roofing – flooring – plastering – Mechanics – Internal and external forces – stress – strain – elasticity – Types of Bridges and Dams – Basics of Interior Design and Landscaping.								
<b>TEXT BOOK:</b>								
1. “Basic Civil and Mechanical Engineering”, VMU, (2017).								
<b>REFERENCES:</b>								
1. Ramamrutham S., “Basic Civil Engineering”, Dhanpatrai Publishing Co. (P) Ltd., 2009.								
2. Seetharaman S., “Basic Civil Engineering”, Anuradha Agencies.								

COURSE CODE :												
NAME OF THE COURSE : <b>BASICS OF CIVIL AND MECHANICAL ENGINEERING</b>												
<b>PART A – BASIC CIVIL ENGINEERING</b>												
COURSE DESIGNED BY		DEPARTMENT OF CIVIL ENGINEERING										
1	Student Outcomes	a	b	c	d	e	f	g	h	i	j	k
		√			√							
2	Mapping of instructional objectives with student outcome	1,2			1,2							
3	Category	HSS	BS	ES	CC	EC	EEC	PII				
				√								

COURSE CODE	SEMESTER – I											
	NAME OF THE COURSE : <b>BASICS OF CIVIL AND MECHANICAL ENGINEERING</b>								L	T	P	C
	<b>PART B - BASIC MECHANICAL ENGINEERING</b>											
	TOTAL HOURS: <b>30</b>								<b>2</b>	<b>0</b>	<b>0</b>	<b>2</b>
PREREQUISITE: <b>NIL</b>												
<b>PURPOSE:</b>												
The aim of the subject is to provide knowledge of fundamentals of Mechanical Engineering.												
<b>INSTRUCTIONAL OBJECTIVES :</b>												
1.	To understand foundry and welding processes of manufacturing.											
2.	To impart fundamentals of automotive engines and important components.											
<b>UNIT – I    FOUNDRY AND WELDING</b>												
										<b>15</b>		
<b>Foundry:</b> Introduction to Casting – Types, Pattern – Definition, Function. Foundry tools. Green Sand Moulding application.												
<b>Welding:</b> Introduction to welding, Classification – Gas welding, Arc Welding, TIG, MIG, Plasma – Definitions. Arc Welding – Methods and Mechanisms – Applications.												
<b>UNIT – II    AUTOMOTIVE ENGINES AND COMPONENTS</b>										<b>15</b>		
Introduction, Two stroke and four stroke cycle – Petrol and Diesel Engines – Construction and working. Fundamentals of automotive components – Brakes, Clutches, Governor, Flywheel, Axles, Drives etc., Fuel supply systems, Exhaust emission and control.												
<b>TEXT BOOK:</b>												
1. “Basic Civil and Mechanical Engineering”, School of Mechanical Engineering Sciences, VMU, Salem, (2017).												
<b>REFERENCES:</b>												
1. K.Venugopal, V.Prabhu Raja, G. Sreekanjana, “Basic Civil and Mechanical Engineering”, Anuradha Publications.												
2. G.Shanmugam, M.S.Palanichamy, “Basic Civil and Mechanical Engineering”, Tata McGraw Hill Publications.												

COURSE CODE :												
NAME OF THE COURSE : <b>BASICS OF CIVIL AND MECHANICAL ENGINEERING</b>												
<b>PART B - BASIC MECHANICAL ENGINEERING</b>												
COURSE DESIGNED BY		DEPARTMENT OF MECHANICAL ENGINEERING										
1	Student Outcomes	a	b	c	d	e	f	g	h	i	j	k
		√				√						
2	Mapping of instructional objectives with student outcome	1-2				1-2						
3	Category	HSS	BS	ES	CC	EC	EEC	PII				
				√								

<b>COURSE CODE</b>	<b>SEMESTER – I</b>					
	<b>NAME OF THE COURSE : ENGLISH LANGUAGE LAB</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>	
	<b>TOTAL HOURS : 60</b>	<b>0</b>	<b>0</b>	<b>4</b>	<b>2</b>	
	<b>PREREQUISITE : NIL</b>					

**PURPOSE:**

1. Better performance in Group Discussion and Interview.
2. More placement opportunities.
3. Better job opportunities in corporate companies.

**INSTRUCTIONAL OBJECTIVES:**

1.	To understand communication nuisances in the corporate sector.
2.	To understand the role of mother tongue in second language learning and to avoid interference of mother tongue.
3.	To communicate effectively through different activities.
4.	To understand and apply the telephone etiquette.
5.	Case study to understand the practical aspects of communication.

**EXERCISE:**

1. Ice Breaker, Grouping, Listening – (Hearing and listening – Active Listening – Passive Listening – Listening to a song and understanding – fill in the blanks) Telephone Conversation).
2. Influence of mother tongue, videos, understanding nuances of English language (video) puzzle to solve, Activity.
3. Why is English important, Communication skills, TED (video) Communication in different scenario – a case study, ingredients of success, Activity – chart, speak the design, feedback on progress, Group wise, Individual.
4. Telephone Etiquette, Dining Etiquette, Meeting Etiquette.
5. Case study of Etiquette in different scenario.

**COURSE CODE :**

**NAME OF THE COURSE : ENGLISH LANGUAGE LAB**

<b>COURSE DESIGNED BY</b>		<b>DEPARTMENT OF ENGLISH</b>										
1	Student Outcomes	a	b	c	d	e	f	g	h	i	j	k
			√		√		√	√		√	√	
2	Mapping of instructional objectives with student outcome		1-5		1-5		1-5	1-5		1-5	1-5	
3	Category	HSS	BS	ES	CC	EC	EEC	PII				
		√										

<b>COURSE CODE</b>	<b>SEMESTER – I</b>							
	<b>NAME OF THE COURSE : PHYSICAL SCIENCES LAB PART A - REAL AND VIRTUAL LAB IN PHYSICS</b>				<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
	<b>TOTAL HOURS : 30</b>				<b>0</b>	<b>0</b>	<b>2</b>	<b>1</b>
	<b>PREREQUISITE : NIL</b>							

**PURPOSE:**

1. Students will have the knowledge of taking measurements precisely.
2. Through the hand-on experience gained by the students in virtual laboratory, students will be able to self-learn any experiment in the future course of study.

**INSTRUCTIONAL OBJECTIVES:**

- |    |  |
|----|--|
| 1. | To understand the Physics Experiments through online virtual demonstration followed by real hands-on experience. |
| 2. | To gain the knowledge of taking precise readings from equipments.  |

**LIST OF EXPERIMENTS:**

1. Young's modulus of a bar – Non-uniform bending.
2. Rigidity modulus of a wire – Torsional Pendulum.
3. Viscosity of a liquid – Poiseuille's method.
4. Velocity of ultrasonic waves in liquids – Ultrasonic Interferometer.
5. Particle size determination using Laser.
6. Wavelength of spectral lines – grating – Spectrometer.
7. Thickness of a wire – Air wedge Method.
8. Thermal conductivity of a bad conductor – Lee's disc.
9. Band gap determination of a thermistor – Post Office Box.
10. Specific resistance of a wire – Potentiometer.

**COURSE CODE :**

**NAME OF THE COURSE : PHYSICAL SCIENCES LAB  
PART A - REAL AND VIRTUAL LAB IN PHYSICS**

<b>COURSE DESIGNED BY</b>		<b>DEPARTMENT OF PHYSICS</b>										
		a	b	c	d	e	f	g	h	i	j	k
1	Student Outcomes		√	√		√	√		√			√
2	Mapping of instructional objectives with student outcome		1	1		1	2		2			2
3	Category	HSS	BS	ES	CC	EC	EEC	PII				
			√									

COURSE CODE	SEMESTER – I								
	NAME OF THE COURSE : <b>PHYSICAL SCIENCES LAB PART B - REAL AND VIRTUAL LAB IN CHEMISTRY</b>					L	T	P	C
	TOTAL HOURS : <b>30</b>					0	0	2	1
	PREREQUISITE : <b>NIL</b>								

**PURPOSE:**

1. Familiarize the basic concepts of Chemistry and its application in Engineering & Technology.
2. Through the hand-on experience gained by the students in virtual laboratory, students will be able to self-learn any experiment in the future course of study.

**INSTRUCTIONAL OBJECTIVES:**

1.	To impart basic skills in Chemistry so that the student will understand the engineering concept.
2.	To inculcate the knowledge of handling equipments.
3.	To lay foundation for practical applications of chemistry in engineering aspects.
4.	To create awareness of global issues.

**LIST OF EXPERIMENTS:**

1. Determination of Hardness by EDTA method.
2. Estimation of Hydrochloric acid by conductometric method.
3. Acid base titration by pH method.
4. Estimation of ferrous ion by Potentiometric method.
5. Determination of Dissolved oxygen by Winkler's method.
6. Estimation of Sodium by Flame photometer.
7. Estimation of copper from Copper Ore Solution.
8. Estimation of iron by spectrophotometer.

**COURSE CODE :**

**NAME OF THE COURSE : PHYSICAL SCIENCES LAB**

**PART B - REAL AND VIRTUAL LAB IN CHEMISTRY**

COURSE DESIGNED BY		DEPARTMENT OF CHEMISTRY										
		a	b	c	d	e	f	g	h	i	j	k
1	Student Outcomes	√	√	√	√			√	√		√	√
2	Mapping of instructional objectives with student outcome	1	2	3	2			1	4		4	3
3	Category	HSS	BS	ES	CC	EC	EEC	PII				
			√									

COURSE CODE	SEMESTER – I				
	NAME OF THE COURSE : <b>ENGINEERING SKILLS PRACTICE LAB PART A - BASIC CIVIL ENGINEERING</b>	L	T	P	C
	TOTAL HOURS : <b>30</b>	<b>0</b>	<b>0</b>	<b>2</b>	<b>1</b>
	PREREQUISITE : <b>NIL</b>				
<b>PURPOSE:</b>					
The aim of the subject is to provide a fundamental knowledge of basic Civil Engineering.					
<b>INSTRUCTIONAL OBJECTIVES:</b>					
1.	Ability to fabricate carpentry components and pipe connections including plumbing works.				
<b>LIST OF EXPERIMENTS:</b>					
<b>Buildings:</b>					
1. Study of plumbing and carpentry components of residential and industrial buildings, Safety aspects.					
<b>Plumbing Works:</b>					
2. Study of pipeline joints, its location and functions: valves, taps, couplings, unions, reducers, elbows in household fittings.					
3. Study of pipe connections requirements for pumps and turbines.					
4. Preparation of plumbing line sketches for water supply and sewage works.					
5. Hands-on-exercise: Mixed pipe material connection – Pipe connections with different joining components.					
6. Demonstration of plumbing requirements of high-rise buildings.					
<b>Carpentry using Power Tools only:</b>					
7. Study of the joints in roofs, doors, windows and furniture.					
8. Hands-on-exercise: Wood work, joints by sawing, planing and cutting.					
<b>REFERENCE:</b>					
1. Laboratory Reference Manual.					

COURSE CODE: NAME OF THE COURSE : <b>ENGINEERING SKILLS PRACTICE LAB PART A - BASIC CIVIL ENGINEERING</b>												
COURSE DESIGNED BY		DEPARTMENT OF CIVIL ENGINEERING										
1	Student Outcomes	a	b	c	d	e	f	g	h	i	j	k
		√	√									√
2	Mapping of instructional objectives with student outcome	1	1									1
3	Category	HSS	BS	ES	CC	EC	EEC	PII				
				√								

<b>COURSE CODE</b>	<b>SEMESTER – I</b>											
	<b>NAME OF THE COURSE: ENGINEERING SKILLS PRACTICE LAB PART B - BASIC MECHANICAL ENGINEERING</b>								<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
	TOTAL HOURS: <b>30</b>								<b>0</b>	<b>0</b>	<b>2</b>	<b>1</b>
	PREREQUISITE: <b>NIL</b>											
<b>PURPOSE:</b>												
The aim of the subject is to make students understand the basic manufacturing operations.												
<b>INSTRUCTIONAL OBJECTIVES:</b>												
1.	To create ability to make fittings, casting moulds, wooden joints and welding joints.											
<b>LIST OF EXPERIMENTS:</b>												
1. Tee – Fitting 2. Vee – Fitting 3. Preparation of a mould for a single piece pattern 4. Preparation of a mould for a split piece pattern 5. Half- Lap Joint in Carpentry 6. Dove Tail Joint in Carpentry 7. Lap Joint – Welding 8. Butt Joint – Welding												
<b>REFERENCES:</b>												
“Engineering Skill Practices Lab Manual”, School of Mechanical Sciences, VMU.												

<b>COURSE CODE :</b>														
<b>NAME OF THE COURSE : ENGINEERING SKILLS PRACTICE LAB PART B - BASIC MECHANICAL ENGINEERING</b>														
<b>COURSE DESIGNED BY</b>				<b>DEPARTMENT OF MECHANICAL ENGINEERING</b>										
1	Student Outcomes			a	b	c	d	e	f	g	h	i	j	k
				√	√	√	√	√						
2	Mapping of instructional objectives with student outcome			1	1	1	1	1						
3	Category			HSS	BS	ES	CC	EC	EEC	PII				
						√								

<b>CATEGORY :</b>			
HSS	HUMANITIES AND SOCIAL SCIENCES	CC	CORE COURSES
BS	BASIC SCIENCES	EC	ELECTIVE COURSES
ES	ENGINEERING SCIENCES	EEC	EMPLOYABILITY ENHANCEMENT COURSES + EXTRA CURRICULAR COURSES + CO - CURRICULAR COURSES
PII	PROJECT + INTERNSHIP + INDUSTRY ELECTIVES		

<b>STUDENT OUTCOMES :</b>	
<b>a.</b>	An ability to apply knowledge of Mathematics, Science and Engineering.
<b>b.</b>	An ability to design and conduct experiments, as well as to analyze and interpret data.
<b>c.</b>	An ability to design a system, component, or process to meet desired needs within realistic constraints such as Economic, Environmental, Social, Political, Ethical, Health and Safety, Manufacturability and Sustainability.
<b>d.</b>	An ability to function on Multi Disciplinary Teams.
<b>e.</b>	An ability to identify, formulate and solve Engineering Problems.
<b>f.</b>	An understanding of professional and Ethical Responsibility.
<b>g.</b>	An ability to Communicate Effectively.
<b>h.</b>	The broad education necessary to understand the impact of Engineering Solutions in Global, Economic, Environmental and Social Context.
<b>i.</b>	A recognition of the need for, and an ability to engage in Life-Long Learning.
<b>j.</b>	A knowledge of contemporary issues.
<b>k.</b>	An ability to use the Techniques, Skills and Modern Engineering Tools necessary for Engineering Practice.