

Rajarambapu Institute of Technology, Sakharale
(An Autonomous Institute, affiliated to Shivaji University, Kolhapur)
Proposed Curriculum Structure and Evaluation Scheme for Academic Year 2016-17
F. Y. B. Tech. Semester: I

Group A: Mechanical, Civil and Automobile

Subject Code	Subjects	Teaching Scheme				Evaluation Scheme					
		L	T	P	Credits	Scheme	Theory (Marks %)		Practical (Marks %)		
							Max	Min. for Passing	Max.	Min. for Passing	
SH 1012	Engineering Physics	3	-	-	3	ISE	20	40 %	40 %	---	---
						UT1	15			---	---
						UT2	15	40 %	40 %	---	---
						ESE	50			---	---
SH 1052	Engineering Mathematics I	3	1	-	4	ISE	20	40 %	40 %	---	---
						UT1	15			---	---
						UT2	15	40 %	40 %	---	---
						ESE	50			---	---
SH 1132	Engineering Graphics	3	-	-	3	ISE	20	40 %	40 %	---	---
						UT1	15			---	---
						UT2	15	40 %	40 %	---	---
						ESE	50			---	---
SH 123	Fundamentals of Civil Engineering	3	-	-	3	ISE	20	40 %	40 %	---	---
						UT1	15			---	---
						UT2	15	40 %	40 %	---	---
						ESE	50			---	---
SH 125	Mechanical Engineering Science	3	-	-	3	ISE	20	40 %	40 %	---	---
						UT1	15			---	---
						UT2	15	40 %	40 %	---	---
						ESE	50			---	---
SH 1512	Engineering Physics Lab	-	-	2	1	ISE	---	---	50	50%	
						ESE	---	---	50		
SH 1552	Engineering Graphics Lab	-	-	4	2	ISE	---	---	50	50%	
						ESE	---	---	50		
SH 171	Civil Engineering Lab	-	-	2	1	ISE	---	---	50	50%	
						ESE	---	---	50		
SH 173	Mechanical Engineering Lab	-	-	2	1	ISE	---	---	50	50%	
						ESE	---	---	50		
SH 175 / SH 181	Business Communication I Lab / Advanced Communication Lab	-	-	2	1	ISE	---	---	50	50%	
						ESE	---	---	50		
SH 1612	W/S Practice-I Lab	-	-	2	1	ISE	---	---	50	50%	
						ESE	---	---	---		
Total:		15	1	14	23						
Total Contact Hours:		30									

Note: Tutorials and practical shall be conducted in batches with batch strength not exceeding 25 students.

ISE: In Semester Evaluation

UT: Unit Test

ESE: End Semester Examination

Advanced Communication Lab- Students will be eligible for Advanced Communication Lab and Foreign Language Lab on the basis of a comprehensive test conducted at the beginning of Sem I; otherwise he/she has to select Business Communication I for Sem I and Business Communication II for Sem II.

Dr. Ms. D.M. Kadam



Rajarambapu Institute of Technology, Sakharale
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Proposed Curriculum Structure and Evaluation Scheme for Academic Year 2016-17
F. Y. B. Tech. Semester: I

Group B: Electrical, Electronics & Telecommunication, Computer Science & Information Technology

Subject Code	Subjects	Teaching Scheme				Evaluation Scheme					
		L	T	P	Credits	Scheme	Theory (Marks %)		Practical (Marks %)		
							Max	Min. for Passing	Max.	Min. for Passing	
SH 1032	Engineering Chemistry	3	-	-	3	ISE	20	40 %	40 %	---	---
						UT1	15			---	---
						UT2	15	40 %	40 %	---	---
						ESE	50			---	---
SH 1052	Engineering Mathematics I	3	1	-	4	ISE	20	40 %	40 %	---	---
						UT1	15			---	---
						UT2	15	40 %	40 %	---	---
						ESE	50			---	---
SH 1112	Engineering Mechanics	3	-	-	3	ISE	20	40 %	40 %	---	---
						UT1	15			---	---
						UT2	15	40 %	40 %	---	---
						ESE	50			---	---
SH 127	Computer Programming	3	-	-	3	ISE	20	40 %	40 %	---	---
						UT1	15			---	---
						UT2	15	40 %	40 %	---	---
						ESE	50			---	---
SH 129	Electrical Engineering	3	-	-	3	ISE	20	40 %	40 %	---	---
						UT1	15			---	---
						UT2	15	40 %	40 %	---	---
						ESE	50			---	---
SH 1532	Engineering Chemistry Lab	-	-	2	1	ISE	---	---	---	50	
						ESE	---	---	---	50	
SH 1631	Engineering Mechanics Lab	-	-	2	1	ISE	---	---	---	50	
						ESE	---	---	---	50	
SH 177	Computer Programming Lab	-	-	2	1	ISE	---	---	---	50	
						ESE	---	---	---	50	
SH 179	Electrical Engineering Lab	-	-	2	1	ISE	---	---	---	50	
						ESE	---	---	---	50	
SH 175/ SH 181	Business Communication I Lab /Advanced Communication Lab	-	-	2	1	ISE	---	---	---	50	
						ESE	---	---	---	50	
SH 1612	W/S Practice-I Lab	-	-	2	1	ISE	---	---	---	50	
						ESE	---	---	---	50	
Total:		15	1	12	22						
Total Contact Hours:						28					

Note: Tutorials and practical shall be conducted in batches with batch strength not exceeding 25 students.

ISE: In Semester Evaluation UT: Unit Test

ESE: End Semester Examination

Advanced Communication Lab- Students will be eligible for Advanced Communication Lab and Foreign language lab on the basis of a comprehensive test conducted at the beginning of Sem I otherwise he/she has to select Business Communication I for Sem I and Business Communication II for Sem II.

Dr. M. D. M. Kadam



Rajarambapu Institute of Technology, Sakharale
(An Autonomous Institute, affiliated to Shivaji University, Kolhapur)
Proposed Curriculum Structure and Evaluation Scheme for Academic Year 2016-17
F. Y. B. Tech. Semester: II

Group B: Electrical, Electronics & Telecommunication, Computer Science & Information Technology

Subject Code	Subjects	Teaching Scheme				Evaluation Scheme					
		L	T	P	Credit	Scheme	Theory (Marks %)		Practical (Marks %)		
							Max.	Min. for Passing	Max.	Min. for Passing	
SH 1012	Engineering Physics	3	-	-	3	ISE	20	40 %	40 %	---	---
						UT1	15			---	---
						UT2	15	---	---		
						ESE	50	40 %	---	---	
SH 1022	Engineering Mathematics II	3	1	-	4	ISE	20	40 %	40 %	---	---
						UT1	15			---	---
						UT2	15	---	---		
						ESE	50	40 %	---	---	
SH 1132	Engineering Graphics	3	-	-	3	ISE	20	40 %	40 %	---	---
						UT1	15			---	---
						UT2	15	---	---		
						ESE	50	40 %	---	---	
SH 123	Fundamentals of Civil Engineering	3	-	-	3	ISE	20	40 %	40 %	---	---
						UT1	15			---	---
						UT2	15	---	---		
						ESE	50	40 %	---	---	
SH 125	Mechanical Engineering Science	3	-	-	3	ISE	20	40 %	40 %	---	---
						UT1	15			---	---
						UT2	15	---	---		
						ESE	50	40 %	---	---	
SH 1512	Engineering Physics Lab	-	-	2	1	ISE	---	---	50	50%	
						ESE	---	---	50		
SH 1552	Engineering Graphics Lab	-	-	4	2	ISE	---	---	50	50%	
						ESE	---	---	50		
SH 171	Civil Engineering Lab	-	-	2	1	ISE	---	---	50	50%	
						ESE	---	---	50		
SH 173	Mechanical Engineering Lab	-	-	2	1	ISE	---	---	50	50%	
						ESE	---	---	50		
SH 156 / SH158 / SH 160	Business Communication II Lab/ Japanese Language Level I/ German Language Level I	-	-	2	1	ISE	---	---	50	50%	
						ESE	---	---	50		
SH 1522	W/S Practice-II Lab	-	-	2	1	ISE	---	---	50	50%	
						ESE	---	---	50		
SH 1542	Mini Project	-	-	2	1	ISE	---	---	50	50%	
						ESE	---	---	50		
Total:		15	1	16	24						
Total Contact Hours:		32									

Note: Tutorials and practical shall be conducted in batches with batch strength not exceeding 25 students.

ISE: In Semester Evaluation

UT: Unit Test

ESE: End Semester Examination

Foreign Language Lab- Students have to choose one course among the following courses:

SH 158- Japanese Language Level I

SH 160 - German Language Level I

Dr. M. D. M. Kadam



Course Code: SH 1012	Course Title: Engineering Physics (Theory)
Teaching Scheme: L:03hrs	T:00 hrs P:00hrs Credits:03
Evaluation Scheme:	
ISE: 20% UT 1:15% UT 2: 15% ESE: 50% (Minimum Passing Marks: 40%)	
Course Outcomes: After successful completion of the course, student will be able to	
<ol style="list-style-type: none"> 1. Apply the principles of interference, diffraction and polarization in various optical devices such as interferometer, spectrometer, and polarimeter etc. 2. Apply the knowledge of architectural acoustics for planning of acoustically good hall. 3. Explain the production methods of ultrasonic waves and its application in engineering field. 4. Apply fundamentals of semiconductor physics that is used in semiconductor devices. 5. Apply the concepts of light in optoelectronic devices such as lasers, optical fibers, photodiode, LCD, Solar Cell etc. and its various applications. 6. Apply the principles of quantum mechanics to solve problems based on 1D Schrodinger wave equation. 7. Select appropriate magnetic materials depending on its properties for various applications. 	

Unit No.	Details of Content	Hrs.
1.	Interference, Diffraction & Polarization Interference: Interference at parallel thin film, interference at wedge shaped film, Newton's rings. Diffraction: Types, difference, resolving power, Rayleigh's criterion of resolution, diffraction grating. Polarization: Double refraction, Huygens' theory of double refraction, Laurent's half shade polarimeter	6
2.	Acoustics & Ultrasonics Acoustics: Introduction, Basic requirements for acoustically good hall, reverberation, time of reverberation, Sabine's formula (No derivation), absorption coefficient, factors affecting architectural acoustics and their remedies, numerical. Ultrasonic: Introduction, production of ultrasonic waves by Piezoelectric and Magnetostriction method (Using transistor circuit only), properties of ultrasonic waves, determination of wavelength and velocity of ultrasonic waves, detection of ultrasonic waves, application of ultrasonic waves, numericals.	6
3.	Semiconductor Physics Band structure of solids, classification of solids into metals, semiconductors and insulators on the basis of band theory, types of semiconductors, concept of Fermi energy, Hall Effect and its application.	6



4.	Laser, Fibre optics & Optoelectronic devices Laser: Introduction, Absorption, spontaneous emission, stimulated emission, population inversion, pumping, characteristics of laser, He-Ne laser. Fiber Optics: Principle, propagation of light through cladded fibre, acceptance angle, acceptance cone, fractional refractive index change, Numerical aperture, numericals. Optoelectronic Devices: Photodiode, LCD, Solar cell.	6
5.	Quantum Physics Dual nature of light, Matter waves and Debroglie's hypothesis, Davisson and Germer experiment, Heisenberg's uncertainty principle and its application (Non existence of electron in nucleus, time independent and dependent Schrödinger wave equation, wave function and its properties, Particle in a box (One dimension), Quantum confinement effect.	6
6.	Magnetic Materials Magnetic properties of materials- Review of basic formulae, Magnetic susceptibility, Classification of dia, para and ferromagnetic materials, Langevin's Theory of dia and para magnetism (only classical treatment), Ferromagnetic domains, Hysteresis in ferromagnetic materials, Soft and Hard magnetic materials,	6

Text books:

1. H. K. Malik and A.K. Singh, Engineering Physics, Tata McGraw Hill Publications, New Delhi, 2010.
2. M. N. Avadhanulu & P. G. Kshirsagar, A textbook of Engineering Physics, S. Chand Publications, 2014.
3. N. Subramanyam & Brijlal, M. N. Avadhanulu, A Text Book of Optics, S. Chand Publications, 2012.

Reference books:

1. P.K. Palanisamy, Engineering Physics, Scitech Publications, 2005.
2. Pandey & Chaturvedi, Engineering Physics, Cengage learning Publications, 2012.
3. Arthur Beiser, Concepts of Modern Physics, Tata McGraw Hill Publications, 2009.
4. S. O. Pillai, Solid State Physics, New age international Publications, 2015.
5. R. K. Gaur and S. L. Gupta, Engineering Physics, Dhanpat Rai Publications, 2014.



Course Code: SH 1052	Course Title: Engineering Mathematics I (Theory)
Teaching Scheme: L:03hrs T:01hrs P: 00hrs	Credits:04
Evaluation Scheme:	
ISE: 20% UT 1:15% UT 2: 15% ESE: 50% (Minimum Passing Marks: 40%)	
Course Outcomes: After successful completion of the course, student will be able to	
<ol style="list-style-type: none"> 1. Demonstrate and understanding the nature of curves like Cardioid, Strophoid, and Witch of Agnesy by tracing the same using certain properties. 2. Use knowledge of partial differentiation to evaluate the maxima and minima of two variables, errors in function of two variables. 3. Estimate directional derivatives given a set of level curves. 4. Evaluate scaler point potential of an irrotational vector field. 5. Apply knowledge of multiple integrals to find mass of lamina and moment of inertia to the particular point. 6. Evaluate higher degree algebraic equations and all integral roots of complex numbers. 	

Unit No.	Details of Content	Hrs.
1.	Curve Tracing & Rectification: Review of one variable calculus: Continuity, Differentiability, Mean value theorem, Taylor's polynomial. Tracing of curve in Cartesian form; Tracing of curve in polar form, rectification of plane curves (Cartesian & polar form).	6
2.	Partial Differentiation & Applications: Definition, functions of two and three variables, Differentiations of composite functions Euler's theorem on homogeneous function, Jacobian.	6
3.	Vector Differentiation: Differentiation of vector, Gradient of Scalar point function, directional derivative, Divergence of vector point function, Curl of vector point function, irrotational & solenoidal vector fields.	6
4.	Multiple Integrals: Introduction to double integrals, Evaluation of double integrals (in Cartesian & polar), Evaluation of double integrals over the given region (in Cartesian & polar), change of order of integration, Evaluation of triple integrals with given limits.	6
5.	Applications of Multiple Integrals: Area under the curves using double integrals, mass of lamina, moment of inertia of a plane lamina.	6
6.	Complex numbers: Polar form of a complex number, Argand's diagram, de Moivre's theorem, roots of a complex number, Hyperbolic functions, circular functions of a complex variable and their relation.	6



Text Books:

1. J. Stewart, Calculus: early transcendental, Cengage Learning India Pvt. Ltd, 2003.
2. G.B. Thomas (Jr.), M.D. Weir and G. Hass, Thomas' calculus, 12th edition, Pearson, 2016
3. Erwin Kreyszig, Advanced Engineering Mathematics, Wiley Eastern, 9th edition, 2011

Reference Books:

1. B. S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 39th edition, 2005.
2. N. P. Bali, Ashok Saxena and N. Ch. S. N. Iyengar, A Text Book of Engineering Mathematics, Laxmi Publications, New Delhi, 6th edition, 2004
3. Peter V. O'Neil, Advanced Engineering Mathematics, Cole publishing house, 4th edition, 2002.
4. P. N. Wartikar and J. N. Wartikar, A Text book of Applied Mathematics, Vol. I, Vol. II, Vidyarthi Griha Prakashan, Pune. 9th Revised edition, October 1984, Reprints: September 2005.



Course Code: SH 1132	Course Title: Engineering Graphics (Theory)
Teaching Scheme: L:03hrs T:00hrs P:00hrs Credits:03	
Evaluation Scheme:	
ISE: 20% UT 1:15% UT 2: 15% ESE: 50% (Minimum Passing Marks: 40%)	
Course Outcomes: After successful completion of the course, student will be able to	
<ol style="list-style-type: none"> 1. Develop the various types of plane curves. 2. Visualize and develop the orthographic views of an object. 3. Imagine and develop the projection of regular solids and sectioned solids like Cone, Pyramid, Prism and Cylinder. 4. Develop the surfaces of regular solids and recognize the practical applications. 5. Develop the projection of point, line and plane by using method of first angle projection. 6. Visualise and develop the isometric view from orthographic views of an object. 	

Unit No.	Details of Content	Hrs.
1.	Plane curves Conic Sections -Ellipse, Parabola and Hyperbola, Involutives of circle and regular polygons, cycloids.	6
2.	Orthographic Projection Basic principles of orthographic projection (First and Third angle method), projection of point and line .Orthographic projection of objects by first angle projection method. Missing views, procedure for preparing scaled drawing, sectional views and types of cutting planes and their presentation, Hatching of sections.	6
3.	Projection of Solids Projection of prism, pyramid, cone, cylinder and cylinder by rotation method.	6
4.	Section of solids and Development of Surfaces Projections of regular solids cut by section plane and development of lateral surfaces for simple positions only. True shape of section.	6
5.	Projection of Point, Lines and Planes Projection of oblique line by rotation or auxiliary plane method. Projection of parallel, perpendicular, intersecting and skew lines. Traces of Lines True shape and angle between planes.	6
6.	Isometric Projection Isometric axes, line and planes, isometric projection and isometric view. Drawing isometric view of solids and objects.	6



Text Books:

1. Dhanjay A Jolhe, Engineering Drawing, Tata-Mcgarw hill (2008).
2. N. D. Bhatt, Elementary Engineering Drawing, Charotar Publishing House, Anand (India).
3. K. L. Narayana & P. Kannaiah , Text Book on Engineering Drawing, Scitech Publications (India) Pvt. Ltd., Chennai.

Reference Book:

- 1 Warren Luzzader, Fundamentals of Engineering Drawing, Prentice Hall of India, New Delhi.
- 2 P. S. Gill, Engineering Graphics, S. K. Kataria and sons, New Delhi, (2009).
- 3 D.M. Kulkarni, A. P. Rastogi, & A. K. Sarkar, Engineering Graphics with AUTOCAD, PHI Publication, (2010).



Course Code: SH 123	Course Title: Fundamentals of Civil Engineering (Theory)
Teaching Scheme: L:03hrs T:00hrs P:00hrs	Credits:03
Evaluation Scheme:	
ISE: 20% UT 1:15% UT 2: 15% ESE: 50% (Minimum Passing Marks: 40%)	
Course Outcomes: After successful completion of the course, student will be able to	
<ol style="list-style-type: none"> 1. Apply the knowledge of civil engineering fundamental in day to day life. 2. Use building principle, bye-laws and methods of building construction. 3. Develop safety plan for building construction site. 4. Prepare quantity estimate for building. 5. Choose specific procedure for property transaction. 6. Compute horizontal and vertical measurement. 	

Unit No.	Details of Content	Hrs.
1.	Introduction to Civil Engineering Introduction of all branches and Sub branches of civil engineering and their application in allied fields, Civil engineering projects. Smart cities: Infrastructural requirements of smart cities, Green building concepts and rating.	6
2.	Building Planning Principles Building Planning Principles, Rules and regulation – municipal corporation, build Bye-Laws- (building line and control line, open space requirements, built up and super built up area, F.S.I., and height of building). Building plan sanction procedure and fees.	6
3.	Building Construction, Estimation and Costing Introduction, types of building, stages of building construction, Various agencies involved in building construction and their role and responsibility, Introduction to Quantity estimation and rate analysis (Minimum two components). Valuation Introduction, Principle, Cost, Prize and Value. Types of value, Valuation of property (Depreciation method)	6
4.	Property Transactions Land documents, property purchase and sale procedure. Property selection criteria and precautions (While purchasing property), Property taxes. Introduction to building finance	4
5.	Horizontal Measurement Principles of surveying, classification of surveys, linear and angular measurements, bearing systems by total station, Calculation of included angles and errors. Measurement of area by digital planimeter, Introduction of GIS and GPS.	7
6.	Vertical Measurement Terms used in levelling, introduction to level measuring instruments, methods calculation of RLs, types of levelling, contours, characteristics of contours, use of contour maps	7



Text Books:

1. "Objective Civil Engineering", R PH editorial board, Ramesh publishing house, Delhi, ISBN 10:9350125374
2. Beohar and R. Rajan, "Civil Engineering", Laxmi Publication, New Delhi

Reference Books:

1. Samdeep Mantra, The A to Z of practical building construction and its management, Satya prakashan, New Delhi, (2005).
2. S. K. Duggal, Building materials, New Age International, New Delhi, (2009).
3. Bindra Arrora, Building Construction, Dhanapat Rai Publications, (2008).
4. G. K. Hiraskar, Basic Civil Engineering, Dhanapat Rai Publications (India) Pvt. Ltd, New Delhi (2008).
5. N. Basak, Surveying, Tata Mc-Graw Hill Publication, (2006).
6. Surveying Vol. I, Laxmi Publications (2005).
7. Dr. B.C. Punmia & Ashok K. Jain, Higher Surveying Vol. III, Dr. B.C. Punmia, Ashok K. Jain, Laxmi Publications, (2005).
8. B. S. Patil, Civil Engineering Contracts and Estimates, Universities Press Private Ltd. 3-5-819 Hyderguda, Hyderabad, 500029 (A.P), India.
9. Devid Muir Wood, "Civil Engineering- A short Introduction", Oxford Publication, (2009)
10. Civil Engineering Procedure, Institution of Civil engineer, ICE Publication, 7th edition.



Course Code: SH 125 **Course Title: Mechanical Engineering Science(Theory)**
Teaching Scheme: L: 03 hrs T: 00 hrs P:00hrs Credits:03

Evaluation Scheme:

ISE: 20% UT 1:15% UT 2: 15% ESE: 50% (Minimum Passing Marks: 40%)

Course Outcomes: After successful completion of the course, Student will be able to

1. Select an appropriate power plant for specific application.
2. Apply ideal cycle analysis to heat engines to estimate various performance parameters.
3. Illustrate various energy conversion devices on the basis of their performance parameters.
4. Choose the suitable manufacturing method for making the product.
5. Identify and select power transmission devices for a given application.
6. Select proper machine elements or mechanism for a given application.

Unit No.	Details of Content	Hrs.
1.	Power Plants Current Energy scenario of India and Maharashtra, Hydroelectric-power, Thermal, Nuclear power plants. Solar, Wind, Solar-wind Hybrid power plants. (Description with block Diagrams).	5
2.	Thermodynamics Heat, work, Flow and non-flow process, Steady flow energy equation (SFEE) (Numerical Treatment), Carnot, Rankine, Otto, Diesel, and Dual Cycle. Comparison of Otto, Diesel and Dual cycles, calculation of air standard efficiencies	7
3.	Energy Conversion Devices Study of Pumps, Compressor, Hydraulic Turbines: Types, Construction, working and applications. Classification of heat engines. I.C. Engine- two stroke, four stroke, S.I., C.I. engines. Refrigerator and Window Air conditioner,	7
4.	Design Considerations and Manufacturing Process Design considerations- General design procedure, steps in design, concept of factor of safety Manufacturing Process- Introduction to Manufacturing Processes & their Applications-casting, sheet metal forming, and metal joining processes.	5
5.	Mechanical Power Transmission Types of belts, rope drives, calculation of length & power transmitted Belt tension ratio, sleep & creep of belt, chain drive, Types of gears and gear Trains.	6
6.	Machine Elements and mechanisms Shafts, Axles, Bearings, friction clutch (cone and single plate), brakes (types and applications only) Applications of these devices. Mechanisms:(Descriptive treatment only), Simple mechanisms, Slider crank mechanism, Four bar chain mechanism	6



Text Books:

1. Prabhu, T. J., Jai Ganesh, V. and Jebaraj, S., Basic Mechanical Engineering, Scitech Publications.
2. Sadhu Singh, Elements of Mechanical Engineering, S.Chand (G/L) & Company Ltd (1 December 2010)

Reference Books:

1. Dr. S. P. Sukathame, Solar Energy, Tata Mc-Graw Hill Publication
2. G. D. Rai, Non Conventional Sources of Energy, Khanna Publication
3. A. Achyutan, Engineering Thermodynamics, Prentice Hall of India.
4. R. K. Rajput, Thermal Engineering, Laxmi Publication, Delhi.
5. Patel and Karamchandani, Elements of Heat Engine (Vol. I, II, III) Acharya Book Depot.
6. Arora and Domkunwar, Power Plant Engineering, DhanpatRai and Sons.
7. S. Rao and Dr. B. B. Parulekar - Energy Technology, Khanna Publication
8. R.K.Rajput, Heat and Mass transfer, Laxmi Publication, Delhi.
9. Theory of Machines- S.S. Rattan , Tata MacgrawHill Pub.
10. Workshop Technology Vol. - I&II, Hajara and Choudhari.
11. V.B.Bhandari, Design of Machine Element, Tata McGraw-Hill Publication



Course Code: SH 1512	Course Title: Engineering Physics Lab
Teaching Scheme: L:00 T:00 P: 02 hrs	Credits:01
Evaluation Scheme: ISE: 50% ESE: 50 %	(Minimum Passing Marks: 50%)
Course Outcomes: After successful completion of the course, student will be able to	
<ol style="list-style-type: none"> 1. Verify theory of semiconductor physics in diodes, Hall Effect and Energy band gap. 2. Analyze the optical phenomena such as diffraction and interference to calculate wavelength of light. 3. Estimate the hysteresis loss in given magnetic material using B-H curve. 4. Deduce the parameters such as Numerical aperture of optical fiber and resolving power of telescope. 5. Determine velocity of ultrasonic waves in liquid. 	

Instruction:

1. Minimum 10 experiments should be conducted.
2. Every student must perform experiment in individual not in group.

List of Practicals:

1. To determine band gap energy of semiconductor using Four Probe Setup.
2. To determine wavelength of laser using diffraction grating
3. To determine numerical aperture of Optical fiber using LED.
4. To determine wavelength of yellow, green, & violet colours using plane diffraction grating
5. To determination resolving power of telescope using auxiliary slit.
6. To find hall voltage of a given semiconductor.
7. To determine velocity of ultrasonic waves in given liquid
8. To plot the hysteresis curve for a ferromagnetic material and determine retentivity and coercivity.
9. To find radius of curvature of given lens using Newton's rings.
10. To determine specific rotation of optically active solution using Laurent's half shade polarimeter.
11. To determine wavelength of light using Fresnel's Biprism.
12. To plot V-I Characteristic of Silicon diode in Forward bias and Reverse bias.
13. To plot V-I Characteristic of Zener diode in Forward bias and Reverse bias.
14. To plot V-I Characteristic of LED diode in Forward bias and Reverse bias.
15. To calculate efficiency of half wave and full wave rectifier.



Course Code: SH 1552

Course Title: Engineering Graphics Lab

Teaching Scheme: L:00hrs T:00hrs P: 04hrs Credits:02

Evaluation Scheme: ISE: 50% ESE: 50 % (Minimum Passing Marks: 50%)

Course Outcomes: After successful completion of the course, student will be able to

1. Develop the various types of plane curves by using AUTOCAD software.
2. Visualize and develop the orthographic views of object by using AUTOCAD software.
3. Imagine and develop the projection of regular solids and sectioned solids like Cone, Pyramid, Prism and Cylinder by using AUTOCAD software.
4. Develop the surfaces of regular solids and recognize the practical applications by using AUTOCAD software.
5. Develop the projection of point, line and plane by using method of first angle projection by using AUTOCAD software.
6. Visualize and develop the isometric view from orthographic views of object by using AUTOCAD software.

List of Practicals:

- 1 Use and practice of basic AutoCAD command like draw (line, rectangle, polygon, point, arc, plane)
- 2 Use and practice of modify commands (copy, move, mirror, trim, extend, scale)
- 3 Use and practice of advanced modify commands(Rotate, Explode, Measure, Divide, Dtext, Mtext)
- 4 Use and practice of properties of line (color, line weight, line type), customization of tool bar
- 5 Develop and draw the conic section curves, involutes, cycloids.
- 6 Imagine and draw the Front view, top view and side view of given simple object
- 7 Imagine and draw the sectional front view or sectional side view, and top view
- 8 Draw the projections of solids (Cone, Cylinder, prism, Pyramid) in various conditions
- 9 Draw the sectional view of solid in given conditions of the planes
- 10 Draw the development of the surfaces of the solids in given conditions
- 11 Imagine and draw the isometric view of the from the given orthographic views
- 12 Develop the projection of lines and its traces, projection of planes

Note: Drawings of Theory paper of MSE and ESE exam will be completed by using AUTOCAD software.

Handwritten signature and initials: *202 YJ*

Course Code: SH 171	Course Title: Civil Engineering Lab
Teaching Scheme: L:00hrs T:00hrs P: 02hrs	Credits:01
Evaluation Scheme: ISE: 50% ESE: 50 %	(Minimum Passing Marks: 50%)
Course Outcomes: After successful completion of the course, student will able to	
<ol style="list-style-type: none"> 1. Plan building using principles and bye laws. 2. Perform horizontal and vertical measurement. 3. Use modern surveying techniques. 4. Perform rate analysis and valuation for items. 	

List of Practicals:

1. Collection of rules and regulation of any one municipal corporation.
2. Reading the submission and working drawing of existing building.
3. Preparation of submission plan for residential building. (using conventional method)
4. Preparation of rate analysis of any two items.
5. Compute valuation for building components.
6. Measurement of area by digital planimeter.
7. Calculation of RL by collimation plane method.
8. Calculation of RL by RISE and FALL method.
9. Perform Total station and Calculation of RL and included angle by TS
10. Application and use of GPS for calculation of length & area



Course Code: SH 173	Course Title: Mechanical Engineering Lab
Teaching Scheme: L:00hrs T:00hrs P: 02 hrs Credits:01	
Evaluation Scheme: ISE: 50% ESE: 50 % (Minimum Passing Marks: 50%)	
Course Outcomes: After successful completion of the course, Student will be able to	
<ol style="list-style-type: none"> 1. Identify elements of power plants. 2. Estimate the velocity ratio of a given transmission system. 3. Select right manufacturing process to convert raw material into product. 4. Carry out the routine maintenance work of a given device. 	

List of Experiments (Any 10 experiments):

1. Demonstration/trial on Steam Power plant.
2. A trial on solar panel system.
3. Demonstration/ trial on two stroke and four stroke engines.
4. Demonstration/ trial on diesel and petrol engine.
5. To estimate velocity ratio/gear ratio of transmission system.
6. To determine the efficiency of simple screw jack.
7. To calculate the Mechanical Advantage, Velocity Ratio and Efficiency of Worm and Worm Wheel.
8. Assembly and disassembly of Bicycle.
9. To build simple working mechanism.
10. To measure noise level in different machine tools.
11. Experiment to correlate head with discharge of centrifugal pump.
12. To select appropriate joining method for given application.
13. Demonstration/ trial on different machine tools.
14. Visit to Hydraulic/Wind power plant.



Course Code: SH 175

Course Title: Business Communication I Lab

Teaching Scheme: L-00hrs T-00hrs P: 02hrs Credits:01

Evaluation Scheme: ISE: 50% ESE: 50 % (Minimum Passing Marks: 50%)

Course Outcomes: After successful completion of the course, students will be able to

1. Demonstrate professional etiquette, manners and grooming.
2. Pronounce correctly the frequently used words using phonemic transcriptions.
3. Express themselves by using registers such as formal, technical, dialect etc.
4. Demonstrate reception skills of language.
5. Communicate messages using oral and written mode.

Instruction: All practicals should be compulsory.

List of Practical:

1. Basic Etiquette and Manners
 - Greetings
 - behavior – code of conduct (attitude, politeness, & assertiveness) , the 4 golden words
 - Gestures and postures.
2. Professional Appearance and Grooming
 - First impression, formal dressing, and grooming (for male and female)
3. Vocabulary building
 - Common idiomatic expressions, common phrasal verbs, one word substitution,
 - Homophones, homonyms, antonyms and synonyms
4. Phonetics:
 - Introduction to phonemic sounds, phonemic transcriptions,
 - Word stress, accent (reading dictionary, NGSL, standard videos with subtitles)
5. Listening
 - Active listening: DOs and DON'Ts,
 - Watching video and summarizing,
 - Listening to audio and answering questions
6. Reading
 - Reading techniques and its application;
 - Selected passages: skimming and scanning, guessing, and paraphrasing;
 - Selected dialogues
7. Oral Communication-I
 - Principles of oral communication,
 - Self -introduction and introducing others
8. Oral Communication-II
 - Extempore
9. Written Communication-I
 - Types of formal letters, student correspondence – format and language
10. Written Communication-II
 - Exercises on business letters and e-mails



Text Book:

1. John Seely, Oxford Guide to Effective Writing and Speaking, OUP, 2009

Reference Books:

1. D. Sudha Rani, Business Communication and Soft Skills Laboratory Manual, Pearson Education, Mumbai (2012)
2. Krishna Mohan and Meera Banerji, Developing Communication Skills, 2nd Edition, Macmillan India Ltd., New Delhi (2012)
3. Hewings Martin, Advanced English Grammar – A Self Study Reference Book, Prentice –Hall of India Pvt. Ltd., New-Delhi (2010)
4. S. Hariharan, et al, Soft Skills, MJP Publishers, Chennai (2010)
5. Sethi J. & Jindal D. V., A Handbook of Pronunciation of English Words, Prentice-Hall of India Private Limited, New Delhi (2004)
6. Meenakshi Raman and Sangeeta Sharma, Technical Communication: Principles and Practice, Third Edition, Oxford University Press, Third Edition (2015)
7. Robert J. Dixon, Everyday Dialogues in English, Prentice Hall India Pvt Ltd.,
8. Koneru, Professional Communication, Tata McGraw-Hill Education, 2008



Course Code: SH 181

Course Title: Advanced Communication Lab

Teaching Scheme: L-00hrs T-00hrs P: 02hrs Credits:01

Evaluation Scheme: ISE: 50% ESE: 50% (Minimum Passing Marks: 50%)

Course Outcomes: After successful completion of the course, students will be able to

1. Communicate effectively in English with proper usage of language.
2. Read and produce phonemic transcriptions and transcription of intonation patterns.
3. Design and deliver effective presentations.
4. Demonstrate effectively technical writing skills.

Instruction: All practicals should be compulsory.

List of Practical:

1. Introduction to communication
 - Meaning
 - Process
 - Elements, Channels, Patterns
 - Barriers to communication.
2. Phonetics
 - Word stress
 - Weak and Strong forms
 - Important tips on transcription and accent
3. Study Skills
 - Note taking
 - Note making
 - Mind mapping
4. Study Skills
 - Literature Review
 - a. First pass reading
 - b. Second pass reading
 - c. Third pass reading
5. Visual Literacy
 - Information transfer from
 - a. Diagram to text
 - b. Image reading
 - c. Map reading
6. Technical paragraph development
7. Technical communication
 - Technical writing: project report
 - Introduction to letter - text combination format



8. Project Report Writing
9. Presentation Skills: project report presentation
 - Preparing presentations, tips and techniques of delivery
10. Project report presentation
 - Audience Questions
 - Constructive feedback

Text Book:

1. John Seely, Oxford Guide to Effective Writing and Speaking, OUP, 2009

Reference Books:

1. D. Sudha Rani, Business Communication and Soft Skills Laboratory Manual, Pearson Education, Mumbai (2012)
2. Krishna Mohan and Meera Banerji, Developing Communication Skills, 2nd Edition, Macmillan India Ltd., New Delhi (2012)
3. Sethi J. and Jindal D. V., A Handbook of Pronunciation of English Words, Prentice-Hall of India Private Limited, New Delhi (2004)
4. Meenakshi Raman and Sangeeta Sharma, Technical Communication: Principles and Practice, Third Edition, Oxford University Press, Third Edition (2015)
5. Koneru, Professional Communication, Tata McGraw-Hill Education, 2008
6. Nira Konar, Communication Skills for Professionals, Prentice-Hall Of India Pvt. Limited, 2011
7. John M. Lannon, Technical communication, Pearson, 13th edition, 2013
8. Sanjay Kumar and Pushpa Lata, Communication Skills, Oxford University Press India, 2nd edition, July 2015.



Course Code: SH 1612	Course Title: Workshop practice-I Lab
Teaching Scheme: L:00 hrs T:00hrs P: 02hrs	Credits:01
Evaluation Scheme: ISE: 50% ESE: 50 % (Minimum Passing Marks: 50%)	
Course Outcomes: After successful completion of the course, Student will be able to	
<ol style="list-style-type: none"> 1. Acquire skills in basic engineering practice. 2. Use of hand tools and power tools. 3. Develop sheet metal model for specific application. 4. Understand the various operations performed in machine shop. 5. Perform different joining operations 6. Perform pipe fittings operations. 7. Perform Soldering of various electronic components. 8. Use of different measuring instruments in electronic circuits 	

List of Experiment :

1. Demonstration of different carpentry operations useful for making wooden pattern, furniture items etc. with the help of hand tools and power tools.
2. To make small jobs like dovetail joint, butt joint or T-joint using carpentry tools.
3. Demonstration of different Sheet metal operations useful for Sheet metal objects like CPU cabinet, Enclosures of inverter, Tray etc. by performing operations like Cutting, Bending, Folding.
4. To make small jobs like Electrical meter cover, transformer clamping.
5. Demonstration of different machining operations useful for machining objects like crankshaft, camshaft, axis-symmetric parts etc. by performing centre drilling, facing, plain turning, knurling and chamfering.
6. Demonstration of different joining processes for metal rods, plates and sheet metal.
7. To make Lap joint, butt joint or T-joint using metal joining techniques.
8. Demonstration of different piping connections, plumbing techniques in G.I, PVC,UPVC, CPVC fittings.
9. Demonstration of Automobile routing maintenance and fault finding for moped & two wheelers.
10. Demonstration of household wiring connections, wiring for experiments and assembly & disassembly of various Electrical appliances.
11. Demonstration of soldering and testing of electronic components.
12. Demonstration of use of electronic control circuits.

(NOTE: All above experiments are to be performed in a group of two's)

Practical Distribution

Carpentry Shop - (2 Practicals)

Plumbing Shop - (1 Practical)

Sheet Metal Shop - (2 Practicals)

Automobile Maintenance - (1 Practical)

Machine Shop - (1 Practical)

Electrical and Electronics - (3 Practicals)

Welding Shop - (2 Practicals)



Course Code: SH 1032 **Course Title: Engineering Chemistry (Theory)**
Teaching Scheme: L:03hrs T:00hrs P:00hrs Credits:03
Evaluation Scheme:
ISE: 20% UT 1:15% UT 2: 15% ESE: 50% (Minimum Passing Marks: 40%)

Course Outcomes: After successful completion of the course, student will be able to

1. Select the proper instrumental methods for the analysis of materials.
2. Analyze the water and apply the treatment for industrial use.
3. Identify factors affecting corrosion and measures to be taken to prevent corrosion.
4. Apply the electrochemical principles in classical and modern batteries.
5. Classify types of fuel and its analysis by instruments and other techniques.
6. Identify and select the proper lubricant and lubrication method.

Unit No.	Details of the content	Hrs.
1.	<p>Analytical techniques</p> <p>A) Spectrometry: Introduction, Lamberts Law, Lambert-Beer or Beer's Law of spectrometry, single beam spectrophotometer instrumentation with its applications.</p> <p>B) Flame photometry: Principles, instrumentation, and applications of flame photometry.</p> <p>C) Chromatography: Introduction, types of chromatography, gas-liquid chromatography (GLC).</p> <p>D) Potentiometry: Introduction, principle, construction, working and application of potentiometer.</p>	6
2.	<p>Water treatment</p> <p>Introduction, water quality parameters like total solids, acidity, alkalinity, chlorides, dissolved oxygen and hardness. Hardness: Types of water, causes of hardness, types, units, calculation of hardness, ill effects of hard water in various industries and boilers. Treatment of hard water for domestic purpose by sedimentation, coagulation and sterilization, treatment of water for industrial purposes by cold and hot lime soda, zeolite and ion exchange process.</p>	6
3.	<p>Corrosion and its Control</p> <p>Introduction, Causes and types of corrosion, theories of corrosion and mechanism – Dry corrosion, Wet corrosion (Hydrogen evolution and Oxygen absorption), factors affecting corrosion. Corrosion control methods – Use of pure metals and metal alloys, Proper design, Cathodic protection, Surface coatings - methods of application on metals- hot dipping galvanizing, tinning, metal spraying.</p>	6



4.	Batteries and fuel cell Basic concepts, Battery characteristics – primary, secondary and reserve batteries with examples , super capacitors Classical batteries: Construction, working and applications of Zn – MnO ₂ , Lead acid storage and Ni – Cd batteries. Modern batteries: Construction, working and applications of Zn – air, Ni – metal hydride and Li – MnO ₂ batteries. Fuel cells – Differences between battery and fuel cell, construction and working of H ₂ – O ₂ and CH ₃ OH– O ₂ fuel cells.	6
5.	Fuels Introduction, Types of fuels, calorific value and its types, characteristics of good fuel, Bomb calorimeter and Boy’s gas calorimeter, proximate analysis of coal, Petroleum – Cracking by fluidized catalytic cracking process, Reformation of petrol, Octane and Cetane numbers. Knocking – mechanism and harmful effects. Antiknocking agents – TEL, Catalytic converters – Principle and working, Unleaded petrol, Power alcohol and Biodiesel.	6
6.	Lubricants Definition of lubricants, lubrication, purpose of lubrication, Classification of lubricants with examples: solid, semisolid, liquid, blended, synthetic, Mechanism of lubrication-thick film, thin film and extreme pressure lubrication, Physical and chemical properties of lubricant (definition and significance)-viscosity, viscosity index, flash and fire point, cloud and pour point, saponification value, acid value, additives of lubricants, selection of lubricants, numerical problems on saponification value.	6

Text Books:

1. A Textbook of Engineering Chemistry by S.S. Dara, 14th Edition, S. Chand and Company New Delhi.

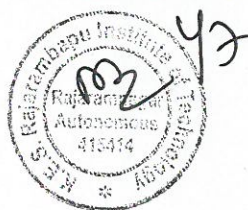
Reference Books:

1. Engineering chemistry by Jain and Jain, 15th Edition, Dhanpat Rai Publishing Company (P) Ltd, New Delhi.
2. Instrumental methods of chemical analysis by Chatwal and Anand, Himalaya Publishing House, New Delhi.
3. Engineering chemistry by B Sivasankar, TataMcGraw-Hill Publishing Company Ltd New Delhi.



Course Code: SH 1022	Course Title: Engineering Mathematics II (Theory)
Teaching Scheme: L:03hrs	T:01hrs P: 00 hrs Credits:04
Evaluation Scheme:	
ISE: 20% UT 1:15% UT 2: 15% ESE: 50% (Minimum Passing Marks: 40%)	
Course Outcomes: After successful completion of the course, student will be able to	
<ol style="list-style-type: none"> 1. Understand the concepts of matrices that serve as an essential basis for several computational techniques. 2. Understand the Vector approach with the help of Matrices. 3. Apply the knowledge of Ordinary differential Equations related to simple electrical circuits, orthogonal trajectory. 4. Select appropriate analytic techniques to compute solutions to differential equations related to liquid flows out through valve, stability and convergence, stiff systems. 5. Interpolate the values by using concerned numerical methods. 6. Recognize linear and non-linear equations and select appropriate numerical method to compute the solution. 	

Unit No.	Details of Content	Hrs
1.	Matrices: Rank of Matrix, Linear Dependence & Independence of vectors, Cayley Hamilton theorem, Eigen Values & Eigen Vectors of a square matrix, diagonalization of a real symmetric matrix.	8
2.	Ordinary Differential Equations of first order & first degree: Solution of Exact differential equations, Solution of Non-Exact differential equations using integrating factors, linear differential equations (with constant coefficients) of higher order, variation of constants formula.	6
3.	Applications Of Ordinary Differential Equations: orthogonal trajectories, applications to simple electrical circuits.	3
4.	Numerical Solution of Linear and Nonlinear equations: Solution of linear systems of equations using Gaussian elimination; modified Gaussian elimination with pivoting, Jacobi and Gauss-Seidel methods. Solution of non-linear equations using Bisection method, Secant method, Newton-Raphson method, and fixed point iterative method.	8
5.	Interpolation, Numerical Differentiation and Integration: Lagrange's and Newton's forms of interpolating polynomials. Newton's divided difference formulae. Forward, backward, central difference formulae for first order derivatives, formulae for higher order derivatives using interpolation, method of undetermined coefficients. Numerical integration formulae based on interpolation (Rectangle, mid-point, Trapezoidal, Simpson's rules).	8
6.	Numerical Solution of ordinary differential equations of first order & first degree: Euler's method, Modified Euler's methods, Runge-Kutta methods of second and fourth order.	3



Textbooks:

1. Erwin Kreyszig, Advanced engineering mathematics, 9th edition, Wiley, 2011.
2. R. L. Burden and J. D. Faires, Numerical Analysis: Theory and Applications, Cengage Learning India Pvt. Ltd, 2010.

Reference Books:

1. B. S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 39th edition, 2005.
2. N. P. Bali, Ashok Saxena and N. Ch. S. N. Iyengar, A Text Book of Engineering Mathematics, Laxmi Publications, New Delhi, 6th edition, 2004
3. Peter V. O'Neil, Advanced Engineering Mathematics, Cole publishing house, 4th edition, 2002.
4. P. N. Wartikar and J. N. Wartikar, A Text book of Applied Mathematics, Vol. I, Vol. II, Vidyarthi Griha Prakashan, Pune. 9th Revised edition, October 1984, Reprints: September 2005.



Course Code: SH 1112	Course Title: Engineering Mechanics(Theory)
Teaching Scheme: L:03hrs T:00hrs P: 00 hrs	Credits:03
Evaluation Scheme:	
ISE: 20% UT 1:15% UT 2: 15% ESE: 50% (Minimum Passing Marks: 40%)	
Course Outcomes: After successful completion of the course, student will be able to	
<ol style="list-style-type: none"> 1. Identify various forces and their effects, to analyze real life problems. 2. Construct free body diagram, to translate a physical problem into a form that can be analyzed mathematically by applying conditions of equilibrium. 3. Locate position of Centroid of the area and compute its moment of inertia about given axis required to design various structural elements. 4. Compute member forces of a truss subjected to external loads. 5. Apply fundamental concepts of Kinematics and Kinetics to the analysis of simple practical problems. 6. Apply fundamental concepts of lifting machines, to analyze real life problems. 	

Unit No.	Details of Content	Hrs.
1.	Force systems and Equilibrium of force systems: Introduction, Laws of Mechanics, Varignon's theorem, Resultant of force systems, Free body diagram, equilibrium, Lami's theorem, analysis of simple and compound beams.	8
2.	Centroid and Moment of Inertia: Centroid of plane and composite figures, parallel axis and perpendicular axis theorems, Moment of Inertia of plane and composite figures.	5
3.	Friction and Analysis of plane trusses: Friction: Introduction to Laws of friction, Surface friction for bodies on horizontal and inclined planes, Application to problems involving wedges, ladders. Analysis of plane trusses by using Method of joints and Method of sections.	6
4.	Kinematics and Kinetics Kinematics of a Particle: Kinematics: Introduction to rectilinear motion and circular motion, motion curves, projectile motion. Kinetics of a Particle: Force and Acceleration Kinetics: Newton's second law of motion, D' Alembert's Principle and concept of dynamic equilibrium, application to problems on horizontal plane and inclined plane.	6
5.	Kinetics of a particle: Work, Power & Energy, Impulse and Momentum Work, Power and Energy, Work - Energy Principle, Law of Conservation of Energy, Impulse and Momentum, Law of Conservation of momentum, Impact	6



	and collision, impulse momentum principle, direct central impact, coefficient of restitution	
6.	Lifting machines: Principles of machines to evaluate Mechanical Advantage, Velocity Ratio of simple machines, Simple and compound machines, Laws of Machines, reversible & non reversible machines.	5

Text Books:

1. Bhavikatti S.S. and Rajashekarappa, Engineering Mechanics, New age International publication (India) Pvt. Ltd. New Delhi, (2008), 3rd Edition.
2. R. K. Bansal, Engineering Mechanics, Laxmi Publications (India) Pvt. Ltd., New Delhi, (2005), 2th Edition

Reference Books:

1. Junnerkar S.B., Elements of Applied Mechanics, Charotar Publishing House (India) Pvt. Ltd., Anand (Gujarat), (2001), 12th Edition.
2. Ferdinand. P. Beer and E. Russell Johnson, Vector Mechanics for Engineers (Statics and Dynamics), The McGraw Hill Publication, New York, (2004), 8th Edition.
3. Ferdinand L. Singer, Engineering Mechanics (Statics and Dynamics), Harper and Collins Publications (India) Pvt. Ltd., Noida, (2005), 3rd Edition.
4. Timoshenko and Young, Engineering Mechanics (Statics and Dynamics), Mc GRAW-HILL International Editions, (2001), 4th Edition.



Course Code: SH 127	Course Title: Computer Programming (Theory)
Teaching Scheme: L:03hrs T:00hrs P: 00hrs	Credits: 03
Evaluation Scheme:	
ISE: 20% UT 1:15% UT 2: 15% ESE: 50% (Minimum Passing Marks: 40%)	
Course Outcomes: After successful completion of the course, student will be able to	
<ol style="list-style-type: none"> 1. Design algorithms and draw flowchart for given problems 2. Write, Compile and execute programs using C language 3. Analyse problems and design proper solutions using C language. 4. Design C programs involving control statements and apply them in relevant fields. 5. Describe the basic concepts of C programming language such as array, pointers and structures 	

Unit No.	Details of Content	Hrs.
1	Introduction to 'C' Language and Algorithm Importance of 'C' Language, Sample 'C' Program, Structure of 'C' Program, Constants, variables and data types. Operators and expressions. Algorithm: Fundamentals, designing simple algorithms for given problems, Definition of flowchart, notations, Applications of algorithms and flowchart	5
2	Managing I/O operations and Control Statements Managing input / output operations, Control statements: Decision making and branching, Decision making and looping.	7
3	Functions Basics of function, definition, declaration and calling of function, Function prototype, method of parameter passing- call by value	6
4	Arrays Array: Basics of array, array declaration and initialization, one and two dimensional arrays, character arrays, string.	6
5	Pointer Pointer: Fundamentals, pointer declaration, operations on pointer, pointer to an array, Method of parameter passing- call by value: Call by reference.	6
6	Structures Basics of structure, structure declaration and initialization, Methods of passing structure variable to function, Nested structure.	6



Text Books:

1. Rajaraman, Fundamentals of Computers, 4th Edition, PHI Publication.
2. K. Balaguruswamy, Programming in ANSI C TGMH Publication.
3. Hart Davis, Windows XP Home Edition, 3rd Edition, John Wiley and Sons Publication.

Reference Books:

1. B.W. Kernigghan and D. M. Ritchie, The 'C' Programming Language, Pearson Education.
2. Sandeep A. Thorat, C Language Interview Q&A 2nd Edition, Shroff Publishers



Course Code: SH 129	Course Title: Electrical Engineering (Theory)
Teaching Scheme: L:03 hrs T:00 hrs P:00hrs Credits:03	
Evaluation Scheme:	
ISE: 20% UT 1:15% UT 2: 15% ESE: 50% (Minimum Passing Marks: 40%)	
Course Outcomes: After successful completion of the course, student will be able to	
<ol style="list-style-type: none"> 1. Recognize electrical power system components and practice safety as well as precautionary measures in day to day electricity usage. 2. Apply knowledge gained to solve electric and magnetic circuits. 3. Compare Electric and Magnetic circuits 4. Explain construction, working, characteristics and state applications of Electric Machines 5. Draw wiring diagram and layout of general wiring and illumination system for a selected location. 6. Prepare Estimate of a typical wiring and illumination system. 	

Unit No.	Details of Content	Hrs.
1.	Overview of Electrical Power System: Single Line Diagram, Components of EPS – Transmission line, Substation, Fuse, MCB, CT, PT, etc. Smart grid, wind and solar energy systems, Global and regional energy scenario, Electrical safety precautions, electric shock hazards & treatments	6
2.	A.C. Circuits Generation of sinusoidal voltage, R.M.S. & Average value, Phasor representation, R-L, R-C, R-L-C series and parallel circuits powers, power factor, pf improvement (numerical expected), energy conversion from electrical to mechanical & thermal, tariff (numerical expected), 3 phase supply, Alternator construction, Star (Y) & Delta (Δ) Connection, balanced three phase system, relation between line and phase quantities	6
3.	Magnetic Circuits: MMF, reluctance, Series/parallel Magnetic Circuits, magnetic leakage & fringing, BH curve, Magnetic losses, comparison between mag. & elect. Circuits. (numerical expected), Simple design calculations of solenoid, electromagnets, actuators. (numerical expected), Applications of solenoids in industry.	6
4.	Transformers Single phase Transformer: Construction, operating principle, Types, EMF equation, transformer ratio, applications, (numerical expected) Three phase transformer: Construction, Types of connections.	6
5.	Electric Machines Construction, types, operating principle of DC machines, back emf, Induction motors, special types of machines like universal motor, stepper motor, Applications.	6
6.	Electric wiring, Lamps and Illumination Different types of wires and cables, wiring and illumination layout, estimation, lamps.	6



Text books:

1. Edward Huges, "Electrical Technology", Pearson, 10th edition, 2014
2. A. Chakraborti, C.K. Chanda, "Basic Electrical Engineering", 1st edition, TMG, 2010
3. Rajendra Prasad, "Fundamentals of Electrical Engineering" 3rd edition, 2014, PHI
4. C. L. Wadhava, "Basic Electrical Engineering", 2nd edition, 2011, New Age International

Reference Books:

1. Rizzoni, Principles and Applications of Electrical Engineering, 5th ed., McGraw Hill companies.
2. PV Prasad and S. Shivanaraju, Electrical Engineering Concepts and Applications, CENGAGE Learning
3. Bharati Dwivedi and Anurag Tripathi, Fundamentals of Electrical Engineering, Wiley PRECISE Text Book
4. Nagrath I.J. and D. P. Kothari (2001), Basic Electrical Engineering, Tata McGraw Hill
5. Ashfaq Husain. Fundamentals of Electrical Engineering, Dhanpat Rai &co.
6. B.L Theraja, Electrical Technology, Vol I &II, S. Chand.



Course Code: SH 1532	Course Title: Engineering Chemistry Lab
Teaching Scheme: L:00hrs T:00hrs P: 02hrs	Credits:01
Evaluation Scheme: ISE: 50% ESE: 50 % (Minimum Passing Marks: 50%)	
Course Outcomes: After successful completion of the course, student will be able to	
<ol style="list-style-type: none"> 1. Analyze the materials by using analytical instruments. 2. Identify the quality of water for industrial and domestic purposes. 3. Apply the knowledge of electrochemistry for design of various cells and batteries. 4. Select proper Lubricant for different machines according to working condition. 5. Identify the quality of fuel. 	

List of Practicals:

1. Determination of concentration of metals by using spectrophotometer.
2. Estimation of iron by photo-calorimeter.
3. Estimation of Sodium and Potassium in the given sample of water using Flame Photometer.
4. Measurement of pH of different sample solution by pH meter.
5. To estimate strength of given hydrochloric acid solution by titrating it against sodium hydroxide solution (0.1N) by potentiometer.
6. Separation of components from the mixture by using TLC/Paper Chromatography.
7. Estimation of total hardness/ chloride content of given sample.
8. Estimation of acidity /alkalinity of given water sample.
9. Determination of corrosion rate of steel in acid medium by weight loss method.
10. Determination of moisture, volatile mater and ash content of a given coal sample by proximate analysis.
11. Determination of calorific value of fuel by using bomb calorimeter instrument.
12. Determination of viscosity/ Acid value/ Saponification number of given lubricating oil by Viscometer.



Course Code: SH 1631 **Course Title: Engineering Mechanics Lab**
Teaching Scheme: L:00hrs T:00hrs P:02hrs Credits:01
Evaluation Scheme: ISE: 50% ESE: 50 % (Minimum Passing Marks: 50%)

Course Outcomes: After successful completion of the course, student will be able to

1. Verify law of polygon of forces, law of triangle of forces and principle of moment.
2. Correlate theoretical and practical results of support reactions and Centroid of plane lamina.
3. Compare coefficient of friction of various surfaces in contact.
4. Verify Work-Energy and D' Alembert's Principle.
5. Calculate mechanical advantage, velocity ratio and efficiency of lifting machines.
6. Function effectively as an individual and in a team as effective team member to perform given task.

Instruction: Students have to perform minimum 8 experiments from Part I and 2 experiments from part II.

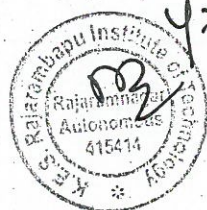
List of Practicals:

PART-I

1. Law of polygon of forces
2. Bell Crank Lever
3. Jib Crane
4. Support Reactions
5. Lami's Theorem
6. Centroid of plane & composite figures
7. Friction on inclined plane
8. D' Alembert's Principle
9. Work- Energy Principle
10. Gravitational Acceleration
11. Resultant of Concurrent/ Non concurrent/ Support Reactions of beams

PART-II

12. Simple wheel and axel
13. Differential axel and wheel
14. Single Gear crab
15. Worm and worm wheel single
16. Simple screw jack



Course Code: SH 177

Course Title: Computer Programming Lab

Teaching Scheme: L:00hrs T:00hrs P: 02hrs Credits:01

Evaluation Scheme: ISE: 50% ESE: 50 % (Minimum Passing Marks: 50%)

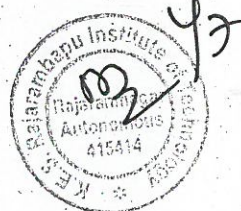
Course Outcomes: After successful completion of the course, student will be able to

1. Design algorithms and draw flowchart for given problems.
2. Write, Compile and execute programs using C language.
3. Analyse problems and design proper solutions using C language.
4. Design C programs involving control statements and apply them in relevant fields.
5. Describe the basic concepts of C programming language such as array, pointers and structures.

Instruction: The laboratory should consist of minimum 12 experiments based on the given topics

List of Practicals:

1. Algorithm: Different problem statements are given to draw an algorithm and flowcharts
2. Basics of C Language
3. Control Statements: Decision making and branching
4. Control Statements: Decision making and looping
5. Function: Call By value
6. Array:- Basics of one dimensional and two dimensional array
7. Basics of Sting and operation on string
8. Pointer: Call By reference
9. Array of Pointer
10. Structure



Course Code: SH 179

Course Title: Electrical Engineering Lab

Teaching Scheme: L:00 hrs T:00 hrs P:02 hrs Credits:01

Evaluation Scheme: ISE: 50% ESE: 50 % (Minimum Passing Marks: 50%)

Course Outcomes: After successful completion of the course, student will be able to

1. Demonstrate electrical safety precautions
2. Identify electrical components & equipment and Use symbolic representation to represent in any electric circuit.
3. Verify Laws and Theorems for DC circuits like KCL, KVL, etc.
4. Draw magnetization curve for magnetic material
5. Calculate electrical parameters like Resistance, Inductance, Capacitance with appropriate measuring instruments.
6. Verify relation between electrical parameters in 3 phase circuits.
7. Determine capacitor rating for power factor improvement.
8. Calculate efficiency and regulation of a 1 phase transformer.
9. Determine performance of electrical machines and equipments.
10. Perform wiring and electrification for domestic appliances.

List of Practicals:

- 1 Demonstration about Basic Electrical Engineering Laboratory, experimental setups, instruments, Electrical Symbols and safety precautions.
- 2 Verification of Kirchhoff's Voltage Law and Kirchhoff's Current Law.
- 3 Draw B-H curve for magnetic material.
- 4 Analysis of RLC series and parallel network.
- 5 Verification of relation between Line and Phase quantities in three phase star-delta circuit connection.
- 6 Determination of reactive power requirement of an electrical installation for power factor improvement.
- 7 Direct on load test on 1 phase transformer.
- 8 Load test on Induction motor.
- 9 Wiring of two-way and three way switching of lamp; Use of Fuse and Miniature Circuit breaker.
- 10 Calibration of single phase energy meter.
- 11 To test a battery for its charged and discharged condition and to make connections for charging.
- 12 To connect a tube light and to study its minimum operating voltage, current, power factor and power.
- 13 Calculation of earth resistance and Discuss importance of earthing for electrical installations.



Self-Learning activity

Students will be given any of the following activity in a group as one experiment

- 1 Analyze the performance of battery system used in various applications such as automobile, Inverters, UPS, etc.
- 2 Investigate domestic electric bill and understand various costs involved according to classification of consumers.
- 3 Prepare Illumination scheme and its estimation for any of the following;
a) Class room b) Laboratory c) Bank or corporate office d) Landscape
e) Outdoor Illumination of sports ground f) any other
- 4 Examination of domestic electrical appliances- Working principle, construction, components and troubleshooting.
- 5 Analysis of wiring layout service mains, meter board and distribution boards and preparation of Bill of Materials and estimation for electrification of a building.
- 6 Evaluate different luminaries such as Incandescent lamp, vapor lamps, fluorescent tube, CFL, LED lamps for various applications.
- 7 Practice soldering of various electric and electronic components.



Course Code: SH 156

Course Title: Business Communication II Lab

Teaching Scheme: L-00hrs T-00 hrs P: 02 hrs Credits:01

Evaluation Scheme ISE: 50% ESE: 50 % (Minimum Passing Marks: 50%)

Course Outcomes: After successful completion of the course, student will be able to

1. Exhibit core soft skills like team skills, body language, and interpersonal communication.
2. Demonstrate appropriate body language.
3. Exhibit team skills.
4. Participate in professional communication (oral & written).
5. Prepare for power point presentations.

Instruction: All practicals should be compulsory.

List of Practical:

1. Goal Setting (SMART) and SWOT/C analysis
2. Body Language - I
 - Postures
 - Gestures
 - Facial expressions
3. Body Language - II
 - Oculistics
 - Proxemics
 - Haptics
4. Team Skills - I
 - Activity followed by discussion on team skills.
 - Time management
5. Team Skills - II
 - Exercises on team skills
6. Situational conversations
Role plays on-
 - Real life situations
 - Business situations
7. PPT Presentation - I
 - Preparing for presentations
8. PPT Presentation - II
 - Group presentations
9. Business Correspondence - I
 - Notices, circulars, and memos
10. Business Correspondence - II
Business letters -
 - Inquiry, complaint, quotation, placing order
 - Acceptance, refusal, thanking note



Text Book:

1. John Seely, Oxford Guide to Effective Writing and Speaking, OUP, 2009

Reference Books:

1. D. Sudha Rani; Business Communication and Soft Skills Laboratory Manual, Pearson Education, Mumbai (2012)
2. Krishna Mohan and Meera Banerji; Developing Communication Skills, 2nd Edition, Macmillan India Ltd., New Delhi (2012).
3. Hewings Martin; Advanced English Grammar – A Self Study Reference Book, Prentice – Hall of India Pvt. Ltd., New Delhi (2010)
4. S. Hariharan, et al; Soft Skills, MJP Publishers, Chennai (2010)
5. Sethi J. & Jindal D. V.; A Handbook of Pronunciation of English Words, Prentice-Hall of India Private Limited, New Delhi (2004)
6. Meenakshi Raman and Sangeeta Sharma, Technical Communication: Principles and Practice, Third Edition, Oxford University Press, Third Edition (2015)
7. Robert J. Dixon, Everyday Dialogues in English, Prentice Hall India Pvt Ltd.,
8. Koneru, Professional Communication, Tata McGraw-Hill Education, 2008



Course Code: SH 158 **Course Title: Japanese Language Level I**
Teaching Scheme: L-00hrs T-00 hrs P: 02 hrs Credits:01
Evaluation Scheme: ISE: 50% ESE: 50 % (Minimum Passing Marks: 50%)

Course Outcomes: After successful completion of the course, student will be able to

1. Demonstrate Japanese scripts through oral and written communication.
2. Express themselves by using simple sentences and responses to questions.
3. Converse in Standard Japanese to perform basic communicative tasks (e.g., exchange greetings/personal information, give time/directions/daily activities)

Instruction: All practicals should be compulsory.

List of Practical:

1. Script: Hiragana, Katakana, Kanji
2. Classroom Instructions: Daily greetings and expressions
3. Numerals, Clock, Calendar
4. Grammar: Use of Demonstratives
5. Use of Adjectives
6. Different Tenses and it's negation
7. Conversation: Self Introduction, Asking address
8. Conversation: Inviting someone, Asking meaning of word/ sentence
9. Asking impression or opinion of listener
10. Japanology: History and Geography of Japan, Festivals and traditions in Japan
11. Japanology: Working styles of Japanese people, Arts in Japan
12. Practice session

Note: There will not be any fixed text book for the above given syllabus

The extra notes will be provided to the students to complete the required syllabus



Course Code: SH 160	Course Title: German Language Level I
Teaching Scheme: L-00hrs T-00 hrs P: 02 hrs	Credits:01
Evaluation Scheme: ISE: 50% ESE: 50 %	(Minimum Passing Marks: 50%)
Course Outcomes: After successful completion of the course, student will be able to	
<ol style="list-style-type: none"> 1. Understand and use familiar everyday expressions and basic phrases. 2. Apply correct usage of German grammar. 3. Interact in a simple way 	
Instruction: All practicals should be compulsory.	
List of Practical:	
<ol style="list-style-type: none"> 1. Introduction: Name, country, living place, languages etc., Asking the other person's information, Greetings 2. Introduction: German Alphabets, Numbers (1 -100), Giving and asking Information related to numbers (age, telephone number, mobile number etc.) 3. Formal And Informal Form 4. Grammar: Personal Pronouns, verb conjugation, Definite , indefinite, negative articles Possessive Articles with the reference of all the nouns 5. Watch timings learning: Routine activities Questions related to time, (use of prepositions am, um) 6. Conjugation of strong verbs: Use of separable verbs in the sentences 7. Vocabulary Building: Eating and drinking , Use of accusative in the sentences 8. My house/ my room: Learning of vocabulary related to living (furniture, room names etc.), Teaching of ordinal numbers. 9. Telling about the position of things in the room/ in the house: Changing Prepositions with Position question Wo?, Introduction of Dativ 10. Keeping the things on the proper place: Changing Prepositions with the action question Wohin? 11. Learning the professions: Telling about and asking for the professions 12. Learning modal verbs with reference to the professions 	

Note: There will not be any fixed text book for the above given syllabus

The extra notes will be provided to the students to complete the required syllabus



Course Code: SH 1522	Course Title: Workshop practice-II Lab
Teaching Scheme: L:00 hrs T:00hrs P: 02hrs	Credits:01
Evaluation Scheme: ISE: 50% ESE: 50 % (Minimum Passing Marks: 50%)	
Course Outcomes: After successful completion of the course, student will be able to:	
<ol style="list-style-type: none"> 1. Make wooden job. 2. Make Sheet metal job. 3. Make job by various machining processes. 4. Make job by joining processes. 5. Make electronic circuits. 	

Based on the skills acquired by students in Semester-I, they will choose any two jobs of their interest and make them with the help of these skills individually. Following is the list of some sample jobs which can be selected but not limited. They can choose any product and make it. Assessment will be based on the quality of product.

Sample Job list :

- Office tray
- Switch board
- Wooden stool
- Wooden table
- Material handling wooden dolly
- Mailbox
- Tray
- Picture frame
- Water Level Indicator
- Metal detection system
- Magazine rack
- Stackable shelves
- Wooden Paat
- Transformer enclosure
- Domestic water motor cover
- Dustbin
- Dust-collector tray
- Electric motor cover
- Light control indicator
- Strain measurement system

Practical Distribution:

Job-1

- Week-1** Selection of Job and approval from instructor.
- Week-2** Preparation of drawing, approval of drawing and material selection.
- Week-3** To make a job as per the drawing by using various operations in different sections of workshop.
- Week-4** To make a job as per the drawing by using various operations in different sections of workshop.
- Week-5** To make a job as per the drawing by using various operations in different sections of workshop.
- Week-6** Assessment of Job.



Job- 2

- Week-7** Selection of Job and approval from instructor.
- Week-8** Preparation of drawing, approval of drawing and material selection.
- Week-9** To make a job as per the drawing by using various operations in different sections of workshop.
- Week-10** To make a job as per the drawing by using various operations in different sections of workshop.
- Week-11** To make a job as per the drawing by using various operations in different sections of workshop.
- Week-12** Assessment of Job.

