

**Kolhapur Institute of Technology's
College of Engineering (Autonomous),
Kolhapur**



Structure and Curriculum

for

First Year B.Tech.

(Common for all branches)

Academic Year 2017-2018

Kolhapur Institute of Technology's
College of Engineering (Autonomous), Kolhapur
 Teaching and Evaluation Scheme for First Year B. Tech. Programme
 (Common for all branches)
Group A SEMESTER-I

Course Code	Course	Curriculum Component	Teaching Scheme				Evaluation Scheme (weightage in %)			
			L	P	T	C	Components	Max	Min for passing	
UBSH0101	Engineering Mathematics - I	BS	4	-	1	5	ISE-I	10	20	40
							MSE	30		
							ISE-II	10	20	
							ESE	50		
UBSH0102	Communication Skills	HS	2	-	-	2	ISE-I	10	20	40
							MSE	30		
							ISE-II	10	20	
							ESE	50		
UBSH0103	Applied Physics	BS	3	-	-	3	ISE-I	10	20	40
							MSE	30		
							ISE-II	10	20	
							ESE	50		
UBSH0104	Basic Electrical Engineering	ES	3	-	-	3	ISE-I	10	20	40
							MSE	30		
							ISE-II	10	20	
							ESE	50		
UBSH0105	Basic Civil Engineering	ES	3	-	-	3	ISE-I	10	20	40
							MSE	30		
							ISE-II	10	20	
							ESE	50		
UBSH0106	Computer Aided Engineering Drawing	ES	3	-	-	3	ISE-I	10	20	40
							MSE	30		
							ISE-II	10	20	
							ESE	50		
UBSH0162	Audit Course- German Language	HS	1	-	-	-	ISE	(100)	-	(40)
UBSH0131	Communication Skills (Lab)	-	-	2	-	1	ISE	25	10	
UBSH0132	Applied Physics (Lab)	-	-	2	-	1	ISE	25	10	
UBSH0133	Basic Electrical Engineering (Lab)	-	-	2	-	1	ISE	25	10	
UBSH0134	Basic Civil Engineering (Lab)	-	-	2	-	1	ISE	25	10	
UBSH0135	Computer Aided Engineering Drawing (Lab)	-	-	2	-	1	ISE	25	10	
UBSH0136	Workshop Practice	-	-	2	-	1	ISE	25	10	
Total Credits - 25 , Total Contact hours - 32			19	12	1	25		750		

BS	Basic Sciences	ISE	In Semester Evaluation	L	Theory	C	Credit
ES	Engineering Sciences	MSE	Mid Semester Examination	P	Practical		
HS	Humanities	ESE	End Semester Examination	T	Tutorial		

Kolhapur Institute of Technology's
College of Engineering (Autonomous), Kolhapur
 Teaching and Evaluation Scheme for First Year B. Tech. Programme
 (Common for all branches)

Group B SEMESTER-I

Course Code	Course	Curriculum Component	Teaching Scheme				Evaluation Scheme (weightage in %)			
			L	P	T	C	Components	Max	Min for passing	
UBSH0101	Engineering Mathematics - I	BS	4	-	1	5	ISE-I	10	20	40
							MSE	30		
							ISE-II	10	20	
							ESE	50		
UBSH0102	Communication Skills	HS	2	-	-	2	ISE-I	10	20	40
							MSE	30		
							ISE-II	10	20	
							ESE	50		
UBSH0107	Applied Chemistry	BS	3	-	-	3	ISE-I	10	20	40
							MSE	30		
							ISE-II	10	20	
							ESE	50		
UBSH0108	Computer Programming	ES	3	-	-	3	ISE-I	10	20	40
							MSE	-		
							ISE-II	15	20	
							ESE	50		
UBSH0109	Engineering Mechanics	ES	3	-	-	3	ISE-I	10	20	40
							MSE	30		
							ISE-II	10	20	
							ESE	50		
UBSH0110	Basic Mechanical Engineering	ES	3	-	-	3	ISE-I	10	20	40
							MSE	30		
							ISE-II	10	20	
							ESE	50		
UBSH0161	Audit Course- Basic Psychology	HS	1	-	-	-	ISE	(100)	-	(40)
UBSH0131	Communication Skills (Lab)	-	-	2		1	ISE	25	10	
UBSH0137	Applied Chemistry (Lab)	-	-	2		1	ISE	25	10	
UBSH0138	Computer Programming (Lab)	-	-	4		2	ISE	25	10	
							ESE	50	20	
UBSH0139	Engineering Mechanics (Lab)	-	-	2		1	ISE	25	10	
UBSH0140	Basic Mechanical (Lab)	-	-	2		1	ISE	25	10	
Total Credits - 25 , Total Contact hours - 32			19	12	1	25		750		

BS	Basic Sciences	ISE	In Semester Evaluation	L	Theory	C	Credit
ES	Engineering Sciences	MSE	Mid Semester Examination	P	Practical		
HS	Humanities	ESE	End Semester Examination	T	Tutorial		

Kolhapur Institute of Technology's
College of Engineering (Autonomous), Kolhapur
 Teaching and Evaluation Scheme for First Year B. Tech. Programme
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Group A SEMESTER-II

Course Code	Course	Curriculum Component	Teaching Scheme				Evaluation Scheme (weightage in %)			
			L	P	T	C	Components	Max	Min for passing	
UBSH0201	Engineering Mathematics - II	BS	4	-	1	5	ISE-I	10	20	40
							MSE	30		
							ISE-II	10	20	
							ESE	50		
UBSH0202	Communication and Personality Development	HS	2	-	-	2	ISE-I	10	20	40
							MSE	30		
							ISE-II	10	20	
							ESE	50		
UBSH0207	Applied Chemistry	BS	3	-	-	3	ISE-I	10	20	40
							MSE	30		
							ISE-II	10	20	
							ESE	50		
UBSH0208	Computer Programming	ES	3	-	-	3	ISE-I	10	20	40
							MSE	-		
							ISE-II	15	20	
							ESE	50		
UBSH0209	Engineering Mechanics	ES	3	-	-	3	ISE-I	10	20	40
							MSE	30		
							ISE-II	10	20	
							ESE	50		
UBSH0210	Basic Mechanical Engineering	ES	3	-	-	3	ISE-I	10	20	40
							MSE	30		
							ISE-II	10	20	
							ESE	50		
UBSH0261	Audit Course- Basic Psychology	HS	1	-	-	-	ISE	(100)	-	(40)
UBSH0231	Communication and Personality Development (Lab)	-	-	2		1	ISE	25	10	
UBSH0237	Applied Chemistry (Lab)	-	-	2		1	ISE	25	10	
UBSH0238	Computer Programming (Lab)	-	-	4		2	ISE	25	10	
							ESE	50	20	
UBSH0239	Engineering Mechanics (Lab)	-	-	2		1	ISE	25	10	
UBSH0240	Basic Mechanical (Lab)	-	-	2		1	ISE	25	10	
Total Credits - 25 , Total Contact hours - 32			19	12	1	25		750		

BS	Basic Sciences	ISE	In Semester Evaluation	L	Theory	C	Credit
ES	Engineering Sciences	MSE	Mid Semester Examination	P	Practical		
HS	Humanities	ESE	End Semester Examination	T	Tutorial		

Kolhapur Institute of Technology's
College of Engineering (Autonomous), Kolhapur
Teaching and Evaluation Scheme for First Year B. Tech. Programme
(Common for all branches)
Group B SEMESTER-II

Course Code	Course	Curriculum Component	Teaching Scheme				Evaluation Scheme (weightage in %)			
			L	P	T	C	Components	Max	Min for passing	
UBSH0201	Engineering Mathematics - II	BS	4	-	1	5	ISE-I	10	20	40
							MSE	30		
							ISE-II	10	20	
							ESE	50		
UBSH0202	Communication and Personality Development	HS	2	-	-	2	ISE-I	10	20	40
							MSE	30		
							ISE-II	10	20	
							ESE	50		
UBSH0203	Applied Physics	BS	3	-	-	3	ISE-I	10	20	40
							MSE	30		
							ISE-II	10	20	
							ESE	50		
UBSH0204	Basic Electrical Engineering	ES	3	-	-	3	ISE-I	10	20	40
							MSE	30		
							ISE-II	10	20	
							ESE	50		
UBSH0205	Basic Civil Engineering	ES	3	-	-	3	ISE-I	10	20	40
							MSE	30		
							ISE-II	10	20	
							ESE	50		
UBSH0206	Computer Aided Engineering Drawing	ES	3	-	-	3	ISE-I	10	20	40
							MSE	30		
							ISE-II	10	20	
							ESE	50		
UBSH0262	Audit Course- German Language	HS	1	-	-	-	ISE	(100)	-	(40)
UBSH0231	Communication and Personality Development (Lab)	-	-	2	-	1	ISE	25	10	
UBSH0232	Applied Physics (Lab)	-	-	2	-	1	ISE	25	10	
UBSH0233	Basic Electrical Engineering (Lab)	-	-	2	-	1	ISE	25	10	
UBSH0234	Basic Civil Engineering (Lab)	-	-	2	-	1	ISE	25	10	
UBSH0235	Computer Aided Engineering Drawing (Lab)	-	-	2	-	1	ISE	25	10	
UBSH0236	Workshop Practice	-	-	2	-	1	ISE	25	10	
Total Credits - 25 , Total Contact hours - 32			19	12	1	25		750		

BS	Basic Sciences	ISE	In Semester Evaluation	L	Theory	C	Credit
ES	Engineering Sciences	MSE	Mid Semester Examination	P	Practical		
HS	Humanities	ESE	End Semester Examination	T	Tutorial		

**COURSE WISE DETAILED
CURRICULUM**

Title of the Course: Engineering Mathematics-I		L	T	P	Credits
Course Code: UBSH0101		4	1	---	5
Tutorial will be conducted batch wise.					
Course Pre-Requisite: Basics of Matrix Algebra, Rules and Formulae of Derivative and Preliminary concepts of Complex Algebra.					
Course Description: This Course contains Linear Algebra, Complex Algebra, Finite Differences and Multivariable Differential Calculus.					
Course Objectives:					
<ol style="list-style-type: none"> 1. To learn mathematical methodologies and models since mathematics is the foundation of engineering and technology. 2. To develop mathematical skills and enhance logical thinking power of students. 3. To provide students with skills in linear algebra, complex numbers and differential calculus which would enable them to devise engineering solutions for given situations they may encounter in their profession. 4. To increase interest towards the use of mathematics in engineering module. 					
Course Outcomes:					
COs	After the completion of the course the student will be able to	Bloom's Cognitive			
		level	Descriptor		
CO1	Expand the functions of single variable in power series	II	Understanding		
CO2	Solve the systems of simultaneous linear equations using matrices and apply them to realistic problems.	III	Applying		
CO3	Solve examples on finding the eigen values & eigen vectors of matrix	III	Applying		
CO4	Use De Moivre's theorem to solve algebraic equations and verify analyticity of functions of complex variable.	III	Applying		
CO5	Choose appropriate interpolation formula and compute derivatives numerically from the given data.	III	Applying		
CO6	Determine extreme values of the functions of multi-variables	IV	Evaluating		
Assessments :					
Teacher Assessment:					
Two components of In Semester Evaluation (ISE), One Mid Semester Examination (MSE) and one End Semester Examination (ESE) having 20%, 30% and 50% weights respectively.					
Assessment		Marks			
ISE 1		10			
MSE		30			
ISE 2		10			
ESE		50			
ISE 1 and ISE 2 are based on assignment / tutorial evaluation / declared test / quiz / seminar / Group Discussions / open book exam etc.					
MSE: Assessment is based on 50% of course content (Normally first three units)					

ESE: Assessment is based on 100% course content with 60-70% weightage for course content (normally last three units) covered after MSE.

Course Contents:	Number of Hrs
Unit 1:--- Linear Algebra: Matrices and Linear System Equations 1. Revision of matrix and determinant operation. 2. Rank of matrix: definition, normal form and echelon form 3. Consistency of linear system equations 4. System of linear homogeneous equations 5. System of linear non-homogeneous equations 6. Linear and orthogonal transformations.	11
Unit 2:--- Linear Algebra: Eigen Values and Eigen Vectors 1. Linear dependence and independence of vectors 2. Eigen values and their properties. 4. Eigen vectors and their properties 6. Cayley-Hamilton's theorem (without proof) 7. Inverse and higher powers of matrix by using Cayley-Hamilton's Theorem	8
Unit 3:--- Complex Numbers 1. Revision of algebra of complex number and De Moivre's theorem. 2. Roots of complex numbers. 3. Circular functions of a complex variable - definitions 4. Hyperbolic functions, relation between circular & hyperbolic functions. 5. Inverse hyperbolic functions. 6. Functions of complex variable and analytic functions. 7. Cauchy- Riemann's equations.	10

<p>Unit 4:---Differential Calculus</p> <ol style="list-style-type: none"> 1. Functions of single variable, continuity and differentiability. 2. Fundamental theorems : Rolle's theorem, Lagrange's mean value theorem, Cauchy's mean value theorem. 3. Expansion of functions: Taylor's and Maclaurin's series. 4. Method of expansion: standard series, substitution, differentiation and integration. 5. Inderminate forms. 	9
<p>Unit 5:--- Partial Differentiation</p> <ol style="list-style-type: none"> 1. Partial derivatives: definition and partial derivatives of higher orders. 2. Total derivatives and differentiation of implicit function 3. Change of variables 4. Euler's theorem on homogeneous function of two variables 5. Jacobian, properties of Jacobian, Jacobian of implicit function 6. Errors and approximations 7. Maxima and minima of functions of two variables 	10
<p>Unit 6:--- Finite Differences</p> <ol style="list-style-type: none"> 1. Finite Difference: definition and higher order differences. 2. Newton's forward interpolation formula. 3. Newton's backward interpolation formula 4. Newton's divided difference formula for unequal intervals. 5. Numerical differentiation using these interpolation formulae 	8
<p>Recommended Books:</p> <ol style="list-style-type: none"> 1. A Text Book of Applied Mathematics, Vol. I by P. N. Wartikar & J. N. Wartikar, Pune Vidyarthi Griha Prakashan, Pune. 2. Higher Engineering Mathematics by Dr. B. S. Grewal, Khanna Publishers, Delhi. 	
<p>Reference Books:</p> <ol style="list-style-type: none"> 1 . Advanced Engineering Mathematics by Erwin Kreyszig, Wiley India Pvt. Ltd. 2. Advanced Engineering Mathematics by H. K. Dass, S. Chand, New Delhi. 3. A text book of Engineering Mathematics by N. P. Bali, Iyengar, Laxmi Publications (P) 	

Ltd., New Delhi.

4. Mathematics for Engineers Vol-I by Rakesh Dube, Narosa Publishing House.

Unit wise Measurable Outcomes:

Unit 1: Define and find the rank of matrix, Solve simultaneous linear system of equations.

Unit 2: Illustrate the linear dependence and independence of vectors, find eigen values and eigen vectors, state and verify Cayley Hamilton theorem.

Unit 3: State De Moivre's theorem and use it to find the roots of complex numbers, determine whether the function of complex variable is analytic.

Unit 4: State Taylor's series & Maclaurin's series and use it to expand the function, recall standard series, apply L'Hospital's rule to evaluate limit.

Unit 5: Define partial derivative, verify Euler's theorem, find the total derivative, find approximate value, errors and the extreme values of functions of two variables.

Unit 6: Find the intermediate value for given data and differentiate numerically at given value for a set of tabulated data.

Title of the Course: Engineering Mathematics-II			L	T	P	Credits
Course Code: UBSH0201			4	1	-	5
Tutorial will be conducted batch wise.						
Course Pre-Requisite: Basics of Differential Equations, Rules and Formulae of Integration and Conics.						
Course Description: This Course contains Differential Equations, Special Functions and Integral Calculus.						
5. To learn mathematical methodologies and models since mathematics is the foundation of engineering and technology. 6. To develop mathematical skills and enhance logical thinking power of students. 3. To provide students with skills in integral calculus, differential equations & numerical techniques which would enable them to devise engineering solutions for given situations. 4. To increase interest towards the use of mathematics in engineering module.						
Course Outcomes:						
COs	After the completion of the course the student will be able to	Bloom's Cognitive				
		level	Descriptor			
CO1	Demonstrate numerical technique in getting numerical solution of ODE.	II	Understanding			
CO2	Solve ordinary differential equations of first order and first degree analytically and apply the knowledge in engineering and physical sciences.	III	Applying			
CO3	Make use of guidelines of tracing curves in Cartesian and	III	Applying			

	polar co-ordinate system		
CO4	Apply the knowledge of evaluation of multiple integral to various engineering problems.	III	Applying
CO5	Evaluate improper integrals by using appropriate properties of special functions or rule of differentiation under integral sign	IV	Evaluating
CO6	Evaluate multiple integrals in Cartesian and polar co-ordinates	IV	Evaluating

Assessments :

Teacher Assessment:

Two components of In Semester Evaluation (ISE), One Mid Semester Examination (MSE) and one EndSemester Examination (ESE) having 20%, 30% and 50% weights respectively.

Assessment	Marks
ISE 1	10
MSE	30
ISE 2	10
ESE	50

ISE 1 and ISE 2 are based on assignment / tutorial evaluation / declared test / quiz / seminar / Group Discussions / open book exam etc.

MSE: Assessment is based on 50% of course content (Normally first three units)

ESE: Assessment is based on 100% course content with 60-70% weightage for course content (normally last three units) covered after MSE.

Course Contents:	Numbers of Hrs
Unit 1:--- Ordinary Differential Equations of First Order and First Degree and Its Applications <ol style="list-style-type: none"> Linear differential equations Reducible to linear differential equations Exact differential equations Reducible to exact differential equations Applications to orthogonal trajectories (cartesian and polar equations) Applications to simple electrical circuits 	10
Unit 2:--- Numerical Solution of Ordinary Differential Equations of First Order and First Degree <ol style="list-style-type: none"> Taylor's series method Euler's method Modified Euler's method Runge-Kutta fourth order formula 	8

5. Simultaneous first order differential equations by Runge–Kutta method	
Unit 3:--- Special Functions 1. Gamma function and its properties 2. Beta function and its properties 3. Differentiation under integral sign 4. Error function and its properties	10
Unit 4:--- Curve Tracing and Rectification 1. Tracing of curves in Cartesian form a) Semi cubical parabola, b) Cissoid of Diocles, c) Strophoid, d) Astroid, e) Witch of Agnesi, f) Common Catenary, g) Folium of Descartes, 2. Tracing of curves in polar form a) Cardioid, b) Pascal’s Limacon, c) Lemniscate of Bernoulli, d) Parabola, e) Hyperbola, f) Rose curves 3. Rectification of plane curves (Cartesian and Polar form)	10
Unit 5:--- Multiple Integration 1. Double integration 2. Double integral evaluation in cartesian and polar. 3. Change of order of integration 4. Change of variable 5. Change into polar 6. Triple integral evaluation with given limits	10
Unit 6:--- Applications of Multiple Integration 1. Area enclosed by plane curves 2. Mass of a plane lamina 3. Center of gravity of plane lamina 4. Moment of inertia of plane lamina 5. Volume of solid of revolution.	8
Recommended Books: 1. A text book of Applied Mathematics, Vol. I by P. N. Wartikar & J. N. Wartikar, Pune Vidyarthi Griha Prakashan, Pune. 2. Higher Engineering Mathematics by Dr. B. S. Grewal, Khanna Publishers, Delhi.	

Reference Books:

- 1 . Advanced Engineering Mathematics by Erwin Kreyszig, Wiley India Pvt. Ltd.
2. Advanced Engineering Mathematics by H. K. Dass, S. Chand, New Delhi.
3. A text book of Engineering Mathematics by N. P. Bali, Iyengar, Laxmi Publications (P) Ltd., New Delhi.
4. Mathematics for Engineers Vol-I by Rakesh Dube, Narosa Publishing House.

Unit wise Measurable Outcomes:

- Unit 1:** Solve ODE of first order and first degree by using various methods, determine orthogonal trajectories of given family of curves and solve differential equation of simple electrical circuits.
- Unit 2:** Use numerical methods for solving IVP and solve simultaneous differential equations of first order and first degree by Runge-Kutta fourth order method.
- Unit 3:** Define Gamma and Beta function, evaluate improper integrals by using special functions and use the rule of differentiation under integral sign to evaluate the integrals.
- Unit 4:** Trace the curves of given functions and find the length of given curves.
- Unit 5:** Evaluate double integrals by using change of order, change of variables method and solve examples on evaluation of triple integrals.
- Unit 6:** Apply knowledge of multiple integration to find area, mass of lamina, center of gravity & moment of inertia of plane lamina, volume of solid formed by revolution of plane area.

Title of the Course: Applied Physics	L	T	P	Credits
Course Code: UBSH0103 / UBSH 0203	03	--	--	03
Course Pre-Requisite:				
<ol style="list-style-type: none"> 1. To know basic concepts and laws of geometric optics. 2. To have basic ideas of solid state physics and modern physics. 				
Course Description: In this course, concepts of optics, solid state physics and quantum physics and their applications in different engineering branches are included.				
Course Objectives:				
<ol style="list-style-type: none"> 1. To study phenomenon of light like interference, diffraction, polarization and their engineering applications like to study the physical properties of matter. 2. To understand monochromaticity, coherence, directionality of laser and their applications in Medical, industrial field and 3-D photography. 				

3. To explain principle, structure of optical fibre and its applications in different fields.
4. To explain formation of bands in solids and significance of Fermi level.
5. To define crystal as space grating and use of X-ray diffraction to study crystal structure.
6. To study principles of quantum mechanics, properties of matter wave and derive Schrödinger equation.
7. To describe how the properties of material change at nano scale and how the CNT's can be conducting or semiconducting depending on the geometries of CNTs and their applications.

Course Outcomes:

CO	After the completion of the course the students will be able to	Bloom's Cognitive	
		level	Descriptor
CO1	Define and state different concepts used in optics, solid state physics and principles of quantum physics.	I	Remembering
CO2	Explain fundamental properties of light, different concepts of crystallography, formation of bands in solid, dual nature and demonstrate recent trends in advanced materials.	II	Understanding
CO3	Demonstrate applications of different physical phenomena in engineering and technology.	II	Understanding
CO4	Compute required physical quantity from given data.	III	Applying

Assessments :

Teacher Assessment:

Two components of In Semester Evaluation (ISE), One Mid Semester Examination (MSE) and one EndSemester Examination (ESE) having 20%, 30% and 50% weights respectively.

Assessment	Marks
ISE 1	10
MSE	30
ISE 2	10
ESE	50

ISE 1 and ISE 2 are based on assignment/declared test/quiz/seminar/Group Discussions etc.

MSE: Assessment is based on 50% of course content (Normally first three Units)

ESE: Assessment is based on 100% course content with 60-70% weightage for course content (normally last three Units) covered after MSE.

Course Contents:	Number of Hours
<p>Unit 1:--- Interference, Diffraction and Polarization</p> <p>Interference: Introduction, Interference from thin films (reflected light)</p> <p>Diffraction: Introduction, Diffraction Grating – theory, determination of</p>	08

<p>wavelength using diffraction grating , Resolving power of grating</p> <p>Polarization: Introduction, Malus law, Double refraction, Quarter wave plate, Half wave plate, Optical activity – Laurent’s half shade polarimeter, applications</p>	
<p>Unit 2:--- Lasers & Optical Fibres: Introduction, Interaction of radiation with matter (induced absorption, spontaneous emission and stimulated emission), condition for laser production, Characteristics of lasers, Ruby laser, He-Ne laser, Semiconductor laser, Applications of LASER in medical and industrial field, Holography</p> <p>Fibre Optics: Introduction – principle, construction, Propagation of light through an optical fibre – Acceptance angle – Numerical aperture –fractional Refractive Index change, Types of optical fibres, Advantages and applications of optical fibre</p>	07
<p>Unit 3:--- Band Theory of Solids</p> <p>Formation of bands in solids, classification of solids, law of mass action, Fermi level in intrinsic and extrinsic semiconductors, effect of temperature and carrier concentration on Fermi level, Hall effect.</p>	07
<p>Unit 4:--- Crystallography</p> <p>Crystal systems - Bravais lattices, crystal defects(Point and line effects), atomic packing, HCP, CCP, diamond structure, Symmetry operations, Miller indices, Bragg’s law, Bragg’s spectrometer, Powder diffraction method.</p>	07
<p>Unit 5:--- Quantum mechanics</p> <p>Introduction, de Broglie’s hypothesis , Heisenberg’s uncertainty principle and its illustration (diffraction of a beam of electron by a slit), wave function and probability interpretation, Schrödinger time dependent and time independent wave equations, applications of Schrödinger wave equation - infinite square well potential (particle in a box).</p>	07
<p>Unit 6:--- Nanophysics</p> <p>Concept, Top down and bottom up approach for synthesis of nanomaterials,</p>	06

<p>Scanning tunneling microscopy and Atomic force microscopy, properties and applications of nanomaterials, Carbon nanotubes (CNTs) - structure and types, properties and applications of CNTs.</p>									
<p>Textbooks: 1. A textbook of Engineering Physics : M. N. Avadhanulu and P. G. Kshirsagar - S. Chand & Company Ltd., Delhi. 2. Engineering Physics: B. K. Pandey and S. Chaturvedi – Cengage Publications.</p>									
<p>References: 1 R. K. Gaur & S. L Gupta, Engineering Physics -Dhanapat Rai Publication. 2. B. L. Theraja -Modern Physics - S. Chand & Company Ltd., Delhi. 3. Subramanyam & Brij Lal, A Text Book of Optics –S. Chand & Company (P.) Ltd. 4.S. O. Pillai, Solid State Physics : Structure & Electron Related Properties, Eastern Ltd., New Age International Ltd. 5. Charles Kittel, Introduction to Solid State Physics - Wiley India Pvt. Ltd.(8th Edition). 6. V. Rajendran – Engineering Physics- Mc. Graw Hills 7. Alan Giambattista and others- Fundamentals of physics, Tata Mc. Graw Hills 8. G.Vijayakumari - Engineering Physics, Vikas Publications 9. Resnick Halliday, Physics Volume-I, Krane -John Wiley & Sons Pub. 10. Resnick Halliday, Physics Volume-II, Krane -John Wiley & Sons Pub. 11. Hitendra K. Malik, A. K. Singh – Engineering Physics - Tata Mc. Graw Hills Education Private Ltd. 12. A. Beiser – Concepts of Modern Physics - Tata Mc. Graw Hills 13. L. J. Schiff – Quantum Mechanics - Tata Mc. Graw Hills 14. David J. Griffiths - Introduction to Quantum Mechanics 15. Ajoy Ghatak - Basic Quantum Mechanics</p>									
<p>Unit wise Measurable students Learning Outcomes: 1. To demonstrate application of interference to measure thickness of plate and diffraction grating to measure wavelength of given source. 2. To explain applications of polarization in engineering. 3. To state characteristics, applications of laser and calculate acceptance angle of optical fibre. 4. To explain classification of solids on the basis of band theory and demonstrate dependence of Fermi level on temperature and carrier concentration. 5. To identify crystal structure from X – ray diffraction pattern. 6. To explain wave particle duality and derive Schrödinger’s equation. 7. To explain properties and applications of nanomaterial.</p>									
<p>Title of the Course: Basic Electrical Engineering Course Code: UBSH0104 / UBSH0204</p>	<table border="1"> <thead> <tr> <th>L</th> <th>T</th> <th>P</th> <th>Credits</th> </tr> </thead> <tbody> <tr> <td>03</td> <td>--</td> <td>--</td> <td>03</td> </tr> </tbody> </table>	L	T	P	Credits	03	--	--	03
L	T	P	Credits						
03	--	--	03						

Course Pre-Requisite: Modern Physics, Electro-magnetism, fundamental concepts of Electrical Engg.

Course Description: In this course, basic information about construction and working of common electrical devices is included. Also, analysis of dc and ac circuits is included.

Course Learning Objectives:

1. CLO1: To learn about socio economic issues, safety issues related to electrical engineering faced in day to day life.
2. CLO2: To learn construction and working of typical electric machines and devices used in day to day life
3. CLO3: To learn the theoretical concepts governing the working principle of electric machines.
4. CLO4: To analyze electric circuits.

Course Outcomes:

CO	After completion of the course the student should be able to	Bloom's Cognitive	
		Level	Descriptor
CO1	Summarize socio economic issues and safety issues related with electrical engineering.	II	Understanding
CO2	Utilize commonly used electric devices properly	III	Applying
CO3	Analyze typical electrical circuits.	IV	Analyzing

Assessments :

Teacher Assessment:

Two components of In Semester Evaluation (ISE), one Mid Semester Examination (MSE) and one End Semester Examination (ESE) having 20%, 30% and 50% weights respectively.

Assessment	Marks
ISE 1	10
MSE	30
ISE 2	10
ESE	50

ISE 1 and ISE 2 are based on assignment/test/quiz/seminar/Group Discussion/theory attendance etc.

MSE: Assessment is based on 50% of course content (Normally firstly taught three modules)

ESE: Assessment is based on 100% course content with 60-70% weight for course content (normally last three modules) taught after MSE.

Course Contents:	Number of Hours
<p>Unit 1:--- DC electric Circuits and magnetic circuits: Kirchoff's laws, Concept of constant voltage source, Analysis of series and parallel DC circuit with resistances, voltage rating, power rating of resistive devices, DC circuit with R-C (Charging and discharging of capacitor, Time constant for RC circuit.) DC circuit with R-L (Rise and decay of current in inductive circuit, Time constant for RL circuit.) Concept of mmf, reluctance, flux density, Magnetic circuits with dc excitation, Series and parallel Magnetic circuits with dc excitation, Magnetic materials for electric machines, for inductors, BH curve, magnetic circuits with AC excitation, hysteresis, eddy current loss, magnetic leakage & fringing, magnetic devices like solenoid, electromagnets, actuators and their applications. (Numerical treatment)</p>	08
<p>Unit 2:--- Single phase AC circuits Generation of sinusoidal voltage, RMS value, average value, form factor, peak factor, phasor representation, impedance and admittance of AC circuit, powers, power factor, R-L, R-C, R-L-C series and parallel circuits, resonance and its practical importance, Q-factor of coil, pf improvement. (Numerical treatment)</p>	07
<p>Unit 3:--- 3 phase AC circuits Three phase voltages, current and power-Star connected and delta connected balanced circuits, comparison between them, relation between line and phase quantities for each connection, advantages of 3 phase transmission, distribution, generation and 3 phase machinery. (Numerical treatment)</p>	05
<p>Unit 4:--- Single-phase transformer: Construction, various classifications, principle, EMF equation, voltage ratio, current ratio, working, phasor diagram, equivalent circuit, efficiency (power efficiency and all day efficiency) and voltage regulation, applications, auto-transformer. pulse transformer (Numerical treatment)</p>	06
<p>Unit 5:--- Electric Motors : Basic principle of an electric motor, Effect of speed on torque, Construction, principle, working, Speed torque characteristics and applications of Capacitor run type Induction motor, shaded pole induction motor, dc motor, uncompensated universal motor, Comparison between these motors, Hp rating of a motor,</p>	08
<p>Unit 6:--- Electrical Power System and Switchgear Electrical Energy scenario- Global, Indian and regional, Electrical Power System- Single Line Diagram, Transmission line, Substation, grid. Rewirable Fuse, HRC fuse, Miniature Circuit Breaker, Earth leakage circuit breaker, Necessity of Electrical earthing, plate earthing, lightning arrestor, Electrical safety precautions, electric shock hazards & treatments.</p>	06

Textbooks:

1. Electrical Technology Vol2, B L Theraja, (S. Chand)
2. Elements of Electrical Engineering, P V Prasad and Shivnagaraju , (Cengage Learning)
3. Basic Electrical Engineering, S.K.Sahdev, (Pearson)

References:

- 1] Basic Electrical Engineering, D.P. Kothari, I.J. Nagrath, TMH Publishing Co. Ltd., New Delhi, 3rd edition
- 2] Basic Electrical Engineering, J.S. Katre, M.A. Choudhari, S.M. Chaoudhari, Tech-Max Publication.
- 3] Basics of Electrical Engineering, P.P. Kulkarni.
- 4] Basic Electrical Engineering, B.H. Deshmukh, Nirali Prakashan

Unit wise Measurable students Learning Outcomes:

After completion of this course the student will be able -
1: To explain Kirchoff's laws and the basic properties of Magnetic circuits.
2: To list basic properties of ac circuits and to explain effect of power factor on energy saving.
3: To explain the electric power scenario in India.
4: To list the importance of three phase circuits in practice and to list the properties of star connected circuit and delta connected circuit.
5: To explain construction and working of a transformer.
6: To differentiate between dc motor, universal motor and induction motor.

Title of the Course: BASIC CIVIL ENGINEERING

Course Code: UBSH0105 / UBSH0205

L	T	P	Credit
3	-	-	3

Course Pre-Requisite:

Students must have basic knowledge about fundamentals of Science. Basic mathematical ability, units engineering systems.

Course Description:

Students will learn fundamentals of civil engineering; also they can identify various branches of civil engineering. Can solve basic surveying & leveling related numerical.

Course Objectives: Students will

1. Understand the relevance of Civil Engineering.
2. Able to solve fundamental problems related to surveying & leveling
3. Acquire knowledge about building design & systems.
4. Acquire knowledge about Environmental Engineering & allied fields.

Course Outcomes:

CO	After the completion of the course the student should be able to	Bloom's Cognitive	
		Level	Descriptor
CO1	Recall various branches of Civil engineering.	I	Remembering
CO4	Solve basic surveying & leveling problems.	III	Applying
CO2	Define various building components.	I	Remembering
CO3	Explain environmental engineering & allied fields.	II	Understanding

Assessments:**Teacher Assessment:**

Two components of In Semester Evaluation (ISE), One Mid Semester Examination (MSE) and one End Semester Examination (ESE) having 20%, 30% and 50% weights respectively.

Assessment	Marks Weightage
ISE 1	10
MSE	30
ISE 2	10
ESE	50

ISE 1 and ISE 2 are based on assignment/declared test/quiz/seminar/Group Discussions etc.

MSE: Assessment is based on 50% of course content (Normally first three modules)

ESE: Assessment is based on 100% course content with 60-70% weightage for course content (normally last three modules) covered after MSE.

Course Contents:

Unit Wise Content	No. of Hours
Unit 1: Significance of Civil Engineering Introduction, application of Civil Engineering in various branches of engineering	3

<p>& other allied Fields, Sub branches of civil engineering, Role of Civil Engineer in various construction activities & infrastructure development.</p>	
<p>Unit 2: Surveying Principles of surveying, Classification & types of surveys, Linear Measurement: Types metric chain and tapes, marking instruments Chain Surveying- Chaining, Ranging, Offsetting error in chaining, index plan, location sketch and recording of field book, Angular Measurements: Compass & its types, Meridian & its types, Bearing and its types, System of bearing, Calculation of included angles, local attraction & its correction, Introduction to GPS.</p>	8
<p>Unit 3: Leveling Terms in leveling, Types of bench marks, Types of Levels such as Dumpy level and Auto Level, Temporary adjustments of Dumpy Level, Methods of reduction of levels, Types of leveling, Contours, characteristics of contours, use of contour maps. Introduction and use of EDM's with special reference to Total Station. Measurement of area by planimeter – mechanical and digital.</p>	8
<p>Unit 4: Building Planning, Component Principles of planning, introduction to Bye-Laws regarding building line, height of building, open space requirements, F.S.I., setbacks, ventilation, sanitation as per the local authority. Elements of Sub structure & super-structures and their functions. Types of foundations- shallow and deep and their suitability. Types of buildings- Load bearing & framed structure</p>	8
<p>Unit 5: Building Materials and Design Types and properties of materials; Stone, Brick, Cement, Sand, Aggregate, Steel, Aluminium, timber, etc. Roofing materials: Types Roofing Tiles, Aluminium-Galvanized Iron-Polycarbonate Sheets Flooring materials: Types of Flooring Tiles-Kadappa, Shahabad, Marble, Granite etc. Introduction to types of loads, Factor of Safety, Concept of Stability.</p>	8
<p>Unit 6: Introduction to Transportation, Water Resources & Environmental Engineering</p>	7

<p>Transportation Engineering: Types of Roads (NH, SH, MDR, VR, Express Way) & Types of Pavement (rigid and flexible) Typical cross section of Road (Cutting & Embankment), Introduction to components of railway track & Rail Gauges.</p> <p>Water Resources Engineering: Sources of Water, Need & Methods of Water Conservation, Types of Dams (Earthen and Gravity Dam)</p> <p>Environmental Engineering: Components of water supply scheme (flow diagram), Introduction to Solid Waste Management, Effect of Air Pollution.</p>	
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Textbooks:

1. Basic Civil Engineering by S. S. Bhavikatti, New Age International Publications.
2. Surveying by N. Basak, Tata Mc-Graw Hill Publication.
3. Basic Civil Engineering by G. K. Hiraskar, Dhanpat Rai Publication.

References:

1. Civil Engineering Materials - Technical Teacher's Training Institute, Chandigarh
2. Surveying Vol.I, Vol.II, Vol.III by B.C. Punmia, Laxmi Publication.
3. Irrigation Engineering by B. C. Punmia, Dhanpat Rai Publications.

Unit wise Measurable students Learning Outcomes: At the end of course student will..

1. Understand the branches of Civil Engineering along with its applications
2. Understand elements of Substructure & Super Structure of Building
3. Study the use of properties of material and respective loading in framed structures.
4. Understand the fundamentals of Surveying & Leveling.
5. Understand the use of various surveying & Leveling instruments
6. Understand fundamentals of Environmental Engineering and allied fields.

Title of the Course: Computer Aided Engineering

Drawing

Course Code: UBSH0106 / UBSH0206

L	T	P	Credits
3	-	-	3

Course Pre-Requisite: Knowledge of Geometry at SSC Level

Course Description:

Course consists of engineering drawing of Projections of Planes and Solids, Sections of solids & Development of surfaces, Orthographic Projections, Isometric projections along with introduction to computer aided sketching

Course Objectives:

1. To create awareness and emphasize the need for Engineering Graphics in all the branches of engineering.
2. To follow basic drawing standards and conventions.
3. To inculcate the habits of logical analysis of the problem using engineering drawing.
4. To develop skills in visualizing 3-Dimensional engineering components

Course Outcomes:

CO	After the completion of the course the student should be able to	Bloom's Cognitive	
		Level	Descriptor
CO1	Recall different types of lines, dimensioning method and BIS conventions	I	Remembering
CO2	Demonstrate and projections of points, lines and planes by appropriate method	II	Understanding
CO3	Develop lateral surfaces and project solids and their cut sections	III	Applying
CO4	Develop and interpret the isometric and orthographic views of an object.	III	Applying

Assessments:**Teacher Assessment:**

Two components of In Semester Evaluation (ISE), One Mid Semester Examination (MSE) and one End Semester Examination (ESE) having 20%, 30% and 50% weights respectively.

Assessment	Marks
ISE 1	10
MSE	30
ISE 2	10
ESE	50

ISE 1 and ISE 2 are based on assignment/declared test/quiz/seminar/Group Discussions etc.

MSE: Assessment is based on 50% of course content (Normally first three modules)

ESE: Assessment is based on 100% course content with 60-70% weightage for course content (normally last three modules) covered after MSE.

Note: Unit -1 is only for practice and Internal Assessment and not for examination.

Course Contents:	Number of Hours
<p>Unit 1:---Introduction to Computer Aided Sketching</p> <p>Introduction, BIS conventions, Lettering, Dimensioning and free hand practicing. Graphical user interface of the CAD software, standard tool bars/menus and description of most commonly used tool bars, navigational tools. Co-ordinate system of 2D/3D environment. Selection of drawing size and scale. Study and use of drawing and modify commands.</p>	6
<p>Unit 2:---Projection of points and lines (1st Angle Projection only)</p> <p>a) Orthographic projection system, First and Third angle projection methods, Projection of points on regular reference planes (HRP,FRP,PRP)</p> <p>b) Projection of lines –Horizontal, Frontal, Profile and oblique lines; Rotation method for determining true length and angles of a line; determining true length view and point view of a line and applying the same for problems on parallel lines, intersecting lines, perpendicular lines, skew lines and angle between lines.</p>	6
<p>Unit 3:---Projections of Planes and Solids</p> <p>a) Projection of planes (regular polygons and circle) inclined to both HRP and FRP; Auxiliary plane method for determining edge view, true shape and inclinations with HRP/FRP of a plane.</p> <p>b) Projection of Solids such as Prisms, pyramids, cylinder and cone with their axis inclined to both the reference planes.</p>	8
<p>Unit 4:-- Sections of solids & Development of surfaces</p> <p>a) Sections of solids: obtaining true shape of cut sections of Prisms, Pyramids, Cylinders and Cones (Simple positions and axis inclined to one plane and parallel to other)</p> <p>b) Development of plane and curved lateral surfaces: Prisms, Pyramids, Cylinders and Cones (cutting planes specified).</p>	5
<p>Unit 5:--- Orthographic Projections</p> <p>Lines used, Selection of views, spacing of views, dimensioning and sections. Conversion of pictorial view into orthographic views including sectional</p>	10

orthographic view.	
Unit 6:--- Isometric projections Introduction to isometric, Isometric scale, Isometric projections and Isometric views/drawings, Circles in isometric view. Isometric views of simple solids and objects.	5

Textbooks:

1. Engineering Graphics with AutoCAD - D. M. Kulkarni, A. P. Rastogi, A. K. Sarkar, (PHI) Publisher 2010.
2. N.D.Bhatt, “Engineering Drawing”, Charotar Publisher, 41th Edition, 2016
3. Luzzerder, “Graphics for Engineering”, Prentice Hall International, 1st Edition,1964
4. Computer Aided Engineering Drawing - S. Trymbaka Murthy, -I.K. International Publishing House Pvt. Ltd., New Delhi.
5. A text book of Engineering Drawing by R. K. Dhawan, S. Chand and Co.

References:

1. Cencil Jensen, Jay D.Helsel , Dennis R. Short, “Engineering Drawing & Design”, TATA McGRAWHILL,7th Edition, 2012.
2. Basant Agrawal and C M Agrawal, “Engineering Graphics”, Tata Mc Graw Hill Education Pvt. Ltd.,New Delhi, 7th Edition, 2012
3. Computer Aided Engineering Drawing, Prof. M. H. Annaiah, New Age International Publisher, New Delhi, 2009

Unit wise Measurable students Learning Outcomes:

1. To Understand fundamental of engineering drawing, instruments and use of computer software for engineering drawing
2. To trace the projection of points, lines and planes.
3. To understand elements of basic solids and their position
4. To draw sectional views of basic solids and develop the lateral surfaces of solids.
5. To understand method of orthographic projections and draw various views.
6. To visualize orthographic projections of component and draw its isometric drawing.

Title of the Course: Communication Skills		L	T	P	Credits
Course Code: UBSH0102		2	-	-	2
Course Pre-Requisite: HSC Level					
Course Description: The course intends to make learners understand and develop various communication skills required in day today life as well as in professional contexts. As domain knowledge and skills have become equally important in today's technology driven world, the current course and the one succeeding it in the next semester will provide the learners a great opportunity to strengthen their communication and soft skills. Keeping in mind the current competence of the learners, the course aims to provide them revision and ample practice in the skills essential for their professional life. It includes six modules which cover basic concepts and theory of communication, business communication, English grammar, language learning skills, letter writing and comprehension. In addition to LSRW, the course sees Thinking as an essential language learning skill.					
Course Objectives: <ol style="list-style-type: none"> 1 Making students understand the fundamentals of communication theory and its relevance in professional context. 2 To make students better in English grammar and to help them to improve their listening and reading skills. 3 To introduce them to techniques to improve their spoken English and to provide them a platform for practicing these skills. 4 To enable them to write correct and effective business and official letters. 5 To hone their comprehension skills. 					
Course Outcomes:					
COs	After the completion of the course the student should be able to	Bloom's Cognitive level		Descriptor	
CO1	Recall basic English grammar like tenses, parts of speech and types of sentences	I		Remembering	
CO2	Demonstrate communication process, methods of communication and flow of communication in business context.	III		Applying	
CO3	Apply acquired LSRW skills into real life situations and in professional context	III		Applying	
CO4	Compose effective business letters using standard language, style and structure	VI		Creating	
Assessments :					
Teacher Assessment: Two components of In Semester Evaluation (ISE), one Mid Semester Examination (MSE) and one End Semester Examination (ESE) having 20%, 30% and 50% weights respectively.					
Assessment		Marks			
ISE 1		10			
MSE		30			
ISE 2		10			
ESE		50			
ISE 1 and ISE 2 are based on assignments/declared or surprise test/quiz/seminar/presentations /group discussions etc.					
MSE: Assessment is based on 50% of course content (Normally first three modules)					

ESE: Assessment is based on 100% course content with 60-70% weightage for course content (normally last three modules) covered after MSE.

Course Contents	Number of Hours
<p>Unit 1: Communication Theory</p> <ul style="list-style-type: none"> • Communication basics: Importance, process, levels • Forms/methods: verbal and non-verbal • Barriers and solutions 	6
<p>Unit 2: Communication in business context</p> <ul style="list-style-type: none"> • Flow/channels of business communication (Internal, External, Vertical, Horizontal, Diagonal, Grapevine), Problems and Solutions • Cross cultural communication 	2
<p>Unit 3: English Basics</p> <ul style="list-style-type: none"> • Grammar: parts of speech-using articles, conjunctions and prepositions; tense and aspects, passive voice • Vocabulary: Using dictionary, affixation, idioms, confusables, homonyms • Syntax: types of sentences, spotting errors in sentences with justification 	6
<p>Unit 4: Enhancing language learning skills (LSRWT)</p> <ul style="list-style-type: none"> • Effective listening: Process and advantages of listening, poor listening habits, types of listening, strategies for effective listening, listening barriers • Effective speaking: various oral business contexts/situations, preparing effective public speeches • Effective reading: Importance of reading, types, strategies • Effective writing: Importance of writing, paragraph writing techniques, diary writing, creative writing, punctuation marks • Thinking as a learning skill 	6
<p>Unit 5: Business Official Correspondence</p> <ul style="list-style-type: none"> • Principles, structure (elements) • Layout (complete block, modified block, semi-block), • Types (enquiry and replies, order, claim and adjustment) 	6
<p>Unit 6: Summarization and Comprehension</p> <ul style="list-style-type: none"> • Art of précis writing • Techniques to comprehend and summarize a given technical, scientific, or industry oriented text 	2

Important Note: One assignment on each unit covering all the sub topics will be given

Textbooks:

1. *Communication Skills* by Meenakshi Raman and Sangeeta Sharma, Oxford University Press (OUP), 2013.
2. *Business Communication* by Urmila Rai and S.M. Rai, Himalaya, 2014.
3. *Communication skills for Engineers and Scientists* by S. Sharma and B. Mishra, PHI Learning, 2015.

References:

1. *Business Communication* by S. Kalia and S. Agarwal, Wiley, 2015.
2. *Communication Skills* by Sanjay Kumar and Pushpa Lata, OUP, 2015.
3. *Technical Communication* by Meenakshi Raman and Sangeeta Sharma, OUP, 2013.
4. *Business Communication* by Meenakshi Raman and Prakash Singh, OUP, 2013.
5. *Business Communication* by Raymond Lesikar et al., McGraw Hill, 2015
6. *Communication Skills for Professionals* by Nira Konar, PHI Learning, 2011
7. *High School English Grammar and Composition* by Wren and Martin, Blackie, 2000
8. *A University Grammar of English* by Randolph Quirk and S Greenbaum, Pearson, 2007

Unit wise Measurable students Learning Outcomes:

- Unit 1.** Students will understand definitions, process, and cycle of communication and will be able to select appropriate type and method of communication.
- Unit 2.** They will understand communication process in business context
- Unit 3.** They will revise and strengthen basics of English.
- Unit 4.** They will be able to apply different strategies of LSRWT skills
- Unit 5.** They will learn different types and formats of official letters and draft various types of letters applying the knowledge gained
- Unit 6.** They will be able to comprehend and summarize given technical/ scientific passages

Title of the Course: Workshop Lab	L	T	P	Credit
Course Code: UBSH0136 / UBSH0236	-	-	2	1
Course Pre-Requisite: Nil				

Course Description: Being a practice-oriented course, the present course focuses on practicing various skills useful for making different components/jobs using various workshop operations.

Course Objectives

1. Acquire skills in basic engineering practice.
2. Perform different welding operations.

3. Use of different tools in carpentry.
4. Develop sheet metal model for specific application.
5. Understand the various fitting and smithy operations.

Course Outcomes:

CO	After the completion of the course the student should be able to	Bloom's Cognitive	
		level	Descriptor
CO1	Define basic engineering practices.	I	Understanding
CO2	Perform welding operations.	III	Applying
CO3	Use of different tools in carpentry.	III	Applying
CO4	Demonstrate various fitting and smithy operations	II	Comprehension
CO5	Develop sheet metal model for specific application.	VI	Creating

Assessments:

Teacher Assessment:

Assessment	Marks
ISE	25

ISE is based on practical performed/ Quiz/ Presentation/ Group Discussion/Role plays/Assignments, etc.

Distribution:

Term work shall consist of 5 jobs along with workshop Diary completion.

Attendance and practical performance- 10

Workshop Diary completion - 5

Industrial Visit attendance and Report -5

Job (5 jobs x 6)- 30

• Course Contents	Number of Hours
Lab 1: WELDING Introduction to various Welding Processes. Demonstration of metal arc welding processes for metal rods, plates etc.	2
To make Lap joint/butt joint or T-joint using metal arc welding. • Job preparation	2

To make Lap joint/butt joint or T-joint using metal arc welding. <ul style="list-style-type: none"> ● Operation Execution ● Job completion 	2
Lab 2: CARPENTRY Introduction to Carpentry tools and wood joints. Demonstration of different carpentry operations useful for making wooden pattern, furniture items etc. with the help of carpentry tools.	2
To make jobs like cross halving or T-joint/dovetail joint using carpentry tools as per given drawing. <ul style="list-style-type: none"> ● Job preparation 	2
To make jobs like cross halving or T-joint/dovetail joint using carpentry tools. <ul style="list-style-type: none"> ● Operation Execution ● Job completion 	2
Lab 3: SHEET METAL Demonstration of different Sheet metal operations useful for Sheet metal objects by performing operations like Cutting, Bending, and Folding.	2
To make jobs like pan, tray, Cone Cylinder using sheet metal process.	2
Lab 4: SMITHY Introduction to smithy operations/processes. Demonstration of Smithy process.	2
To make simple job using smithy.	2
Lab 5: FITTING Demonstration of fitting operation and its tools. Introduction to Lathe machine and CNC turning centre.	2
To make small jobs using fitting.	2
A visit to relevant industry on any of the above topics.	

Reference Books:

- Hajra and Choudhary S. K. “Elements of Workshop Technology Vol-1”.
- Rajender Singh. “Introduction To Basic Manufacturing Processes And Workshop Technology”.

- Raghuvanchi B. S. “Workshop Technology Vol-1”, Dhanpat Rai & Sons, Delhi, 2003.

Title of the Course: Applied Physics Lab		L	T	P	Credit
Course Code:UBSH0132 / UBSH0232		--	--	2	1
Course Pre-Requisite: To know how to calculate least count of measuring instrument and requisite theory concepts related to that experiment.					
Course Description: Experiments to verify the theory studied in applied physics course are included.					
Course Objectives: <ol style="list-style-type: none"> 1. To study phenomenon of light like interference, diffraction, polarization and their engineering applications. 2. To understand properties of laser. 3. To study Rayleigh’s criteria and determine resolving power of telescope and diffraction grating. 4. To demonstrate use of optical bench and biprism in wavelength determination 5. To analyze and obtain various crystal parameters from the XRD pattern 6. To demonstrate electrical properties of semiconducting sample. 					
Course Outcomes:					
CO	After the completion of the course the student will be able to	Bloom’s Cognitive level		Descriptor	
CO1	Explain fundamental properties of light.	II		Understating	
CO2	Demonstrate application of diffraction to determine wavelength of light.	II		Understating	
CO3	Explain different concepts of crystallography.	II		Understating	
CO4	Demonstrate electrical properties semiconducting material	II		Understating	
Assessments :					
Teacher Assessment: In Semester Evaluation (ISE) having 100% weightage.					
Assessment		Marks			
ISE		100%			
ISE is based on practical attendance / Practical performance / Quiz/ Journal submission/ Group Discussion/ Internal oral etc.					

Course Content:	Number of Hours
Experiment No. 1: Inverse square law of intensity of light. Aim and Objectives: To verify inverse square law of intensity of light.	2
Experiment No. 2: Divergence of LASER beam Aim and Objectives: To determine divergence of laser.	2
Experiment No. 3: Diameter of cylindrical obstacle Aim and Objectives: To determine thickness of given obstacle using diffraction.	2
Experiment No. 4: Diffraction grating using mercury vapour lamp Aim and Objectives: To determine wavelength of mercury vapour lamp using diffraction grating.	2
Experiment No. 5: Resolving power of plane transmission grating. Aim and Objectives: To determine resolving power of grating	2
Experiment No. 6: Biprism experiment Aim and Objectives: To determine wavelength of light using biprism.	2
Experiment No. 7: Study of crystal structure. Aim and Objectives: To analyse crystal structure from X-ray diffraction pattern.	2
Experiment No. 8: Hall effect Aim and Objectives: To determine Hall coefficient of semiconducting sample.	2
Experiment No. 9: Resolving power of telescope Aim and Objectives: To calculate resolving power of telescope.	2
Experiment No. 10: Polarimeter Aim and Objectives: To calculate specific rotation of sugar solution.	2
Experiment No. 11: Numerical aperture of optical fibre Aim and Objectives: To calculate Numerical Aperture of optical fibre.	2
Experiment No. 12: Four point probe method Aim and Objectives: To study electrical properties of given semiconducting sample using four point probe method.	2
<i>(Note: Students should perform 8 experiments out of 12)</i>	
Textbooks:	
1. M.N.Avadhanulu, A.A. Dani, P.M. Pokley. Experiments in Engineering Physics: S.	

Chand & Company Ltd., Delhi

References:

1. R. K. Gaur & S. L Gupta - Engineering Physics, Dhanapat Rai Publication
2. B. K. Pandey and S. Chaturvedi - Engineering Physics, Cengage Learning-2012
3. B. L. Theraja - Modern Physics, S. Chand & Company Ltd., Delhi.
4. S. O. Pillai - Solid State Physics: Structure & Electron Related Properties, Eastern Ltd, New Age International Ltd.
5. Charles Kittel - Introduction to Solid State Physics, Wiley India Pvt. Ltd.(8thEdition).

Experiment wise Measurable students Learning Outcomes:

1. To relate the intensity of light and distance of detector from source.
2. To explain properties of Laser.
3. To explain use of diffraction in thickness measurement.
4. To explain use of grating in determination of wavelength.
5. To define the resolving power and verify its dependency on order of diffraction and number of lines on grating.
6. To demonstrate use of optical bench and biprism in wavelength determination.
7. To analyze and obtain various crystal parameters from the XRD pattern.
8. To calculate carrier concentration of semiconductor.
9. To determine resolving power of telescope.
10. To determine specific rotation of sugar solution.
11. To calculate acceptance angle of optical fibre.
12. To explain advantages of four point probe method over two probe method.

Title of the Course: Basic Electrical Engineering (LAB)

Course Code: UBSH0133 / UBSH0233

Course Pre-Requisite: Modern Physics, Electro-

magnetism, theoretical concepts required for performing the experiments listed below.

L	T	P	Credit
--	--	2	1

Course Description: This course gives hands on experience to operate and obtain performance pattern of various electrical devices. This course is designed for verification of theoretical concepts in Electrical Engineering.

Course Learning Objectives:

CLO1: To verify the theoretical concepts about electric circuits.

CLO2: To study working of typical electric machines and devices used in day to day life

CLO3: To have hands on practice about typical practical situations and safety issues concerned with electrical engineering.

Course Outcomes:

CO	After the completion of the course the student will be able to	Bloom's Cognitive	
		level	Descriptor
CO1	Demonstrate use of assorted electrical equipments.	II	Understanding
CO2	Utilize transformer and motors	III	Applying
CO3	Analyze typical electrical circuits.	IV	Analyzing

Assessments :

Teacher Assessment:

One component of In Semester Evaluation (ISE) with 100% weight.

Assessment	Marks
ISE	100%

ISE is based on practicals performed/ Quiz/ Mini-Project assigned/ Presentation/ Group Discussion/ Internal oral etc. Typically evaluated over first 8-10 weeks.

Course Contents:	Number of Hours
Experiment No. 1:-- RLC circuit with variable inductance or capacitance.	2
Experiment No. 2:--- Power factor improvement.	2
Experiment No. 3:--- Three phase circuits properties verification	2
Experiment No. 4:--- BH curve of magnetic materials	2

Experiment No. 5:--- DC circuit analysis using Kirchhoff's laws.	2
Experiment No. 6:--- Load test on transformer	2
Experiment No. 7:--- Use of megger, wattmeter, tester to get hands on experience	2
Experiment No. 8:--- Electric lamp technologies and study of lamp circuits.	2
Experiment No. 9:--- Analysis of energy bill (residential and commercial) to discuss concept of tariff, parameters deciding the tariff.	2
Experiment No. 10:--- Visit to substation for study of transformer, switchgear, earthing.	2
Experiment No. 11:--- Visit to generating station.	2
Experiment No. 12:--- Seminar/presentation on latest trends/innovations/ideas in electrical engineering	2

Textbooks:

1. Electrical Technology, B L Theraja, (S. Chand)
2. Elements of Electrical Engineering, P V Prasad and Shrivastava, (Cengage Learning)

References:

- 1] Laboratory courses in Electrical Engineering, S G Tarnekar and P. K Kharbanda, S. Chand Publications.
- 2] D.P. Kothari, I.J. Nagrath, "Basic Electrical Engineering", (TMH Publishing Co. Ltd., New Delhi), 3rd edition

Experiment wise Measurable students Learning Outcomes:

1. To explain three operating cases of RLC circuit.
2. To explain effect of power factor on supply current.
3. To list properties of star connected circuit and delta connected circuit.
4. To explain saturation / unsaturation in magnetic circuits.
5. To demonstrate application of Kirchhoff's laws.
6. To explain effect of load on efficiency of a transformer.
7. To use megger, wattmeter, tester.

8. To list properties of typical electrical lamps.
9. To calculate energy bill from given parameters.
10. To explain the necessity of transformers and switchgears in a substation.
11. To present the seminar on selected topic.

Title of the Course: Basic Civil Engineering -Lab

Course Code:UBSH0134 / UBSH0234

L	T	P	Credits
--	--	2	1

Course Pre-Requisite: Students must have knowledge about fundamentals of Civil Engineering, applications of various instruments in field. Also knowledge about basic science, basic mathematical ability various units etc.

Course Description: Student will able to perform practical applications of various instruments in the field of Surveying, Leveling & Basic Civil Engineering instruments like planimeter in various civil engineering procedures.

Course Objectives: Student Will

1. Able to perform fundamental Surveying Leveling application practical's
2. Can solve Basic Civil Engineering problems using various instruments

Course Outcomes:

CO	After the completion of the course the student should be able to	Bloom's Cognitive	
		Level	Descriptor
CO1	Perform various practical's associated with Surveying & Leveling	II	Understanding
CO2	Explain various building components	II	Understanding
CO3	Utilize various instruments in Civil Engineering	III	Applying

Assessments:

Teacher Assessment:

In Semester Evaluation (ISE) having 100%.

Assessment	Marks
ISE	25

ISE are based on practical performed/ Quiz/ Mini-Project assigned/ Presentation/ Group Discussion/ Internal oral etc.

Course Contents:	Number of Hours
Experiment No. 1: Measurement of Distances and Chain Survey.	2
Experiment No.2: Plotting the outlines of building by chaining, ranging and offsetting	2
Experiment No. 3: Plotting of closed traverse by prismatic compass.	2
Experiment No. 4: Plotting of Open traverse by prismatic compass.	2
Experiment No. 5: Reduction of levels by rise and fall method.	2
Experiment No. 6 Reduction of levels by Height of Instrument method.	2
Experiment No. 7: Measurement of area by mechanical/digital planimeter	2
Experiment No. 8: Study of total station for various measurements	2
Experiment No. 9: Site visit to study various construction processes	2
Experiment No. 10: Drawing sheet showing various building elements.	2

Textbooks:

1. Surveying by N. Basak, Tata Mc-Graw Hill Publication.
2. Basic Civil Engineering by G. K. Hiraskar, Dhanpat Rai Publication.

References:

- 1] Civil Engineering Materials - Technical Teacher's Training Institute, Chandigarh

Experiment wise Measurable students Learning Outcomes: At the end of course student will...

1. Select appropriate chain for respective surveying purpose
2. Understand ranging and perform chaining and offsetting
3. Perform closed traverse and use Prismatic compass for closed traverse
4. Perform closed traverse and use Prismatic compass for open traverse
5. Discuss procedure related to finding R.L. by using Rise & Fall Method
6. Discuss procedure related to finding R.L. by using Height of Instrumentation Method
7. Perform practical based on area calculation using planimeter
8. Demonstrate the performance of advance surveying and leveling instruments such as Total Station.

9. List out different components of building
10. Describe various building elements on sheet.

Title of the Course: Computer Aided Engineering Drawing Lab		L	T	P	Credit
Course Code: UBSH0135 / UBSH0235		-	-	2	1
Course Pre-Requisite: Knowledge of Geometry at SSC Level					
Course Description: Course consists of engineering drawing of Projections of Planes and Solids, Sections of solids & Development of surfaces, Orthographic Projections, Isometric projections along with introduction to computer aided sketching					
Course Objectives: <ol style="list-style-type: none"> 1. To create awareness and emphasize the need for Engineering Graphics in all the branches of engineering. 2. To follow basic drawing standards and conventions. 3. To inculcate the habits of logical analysis of the problem using engineering drawing. 4. To develop skills in visualizing 3-Dimensional engineering components 					
Course Outcomes:					
CO	After the completion of the course the student should be able to	Bloom's Cognitive			
		Level	Descriptor		
CO1	Recall different types of lines, dimensioning method and BIS conventions	I	Remembering		
CO2	Demonstrate and projections of points, lines and planes by appropriate method	II	Understanding		
CO3	Develop lateral surfaces and project solids and their cut sections	III	Applying		
CO4	Develop and interpret the isometric and orthographic views of an object.	III	Applying		
Assessments :					
Teacher Assessment:					
In Semester Evaluation (ISE)					
Assessment		Marks			
ISE		50			
ISE are based on practical performed/ Quiz/ Mini-Project assigned/ Presentation/ Group Discussion/ Internal oral etc.					
Course Contents:					Number of Hours
Practical No. 1:--- Use and practice of basic CAD software commands					2
Practical No. 2:--- Advanced CAD commands, dimensioning, text, practice					2

sketches	
Practical No. 3: Draw the projections of lines (Minimum four problems)	4
Practical No. 4:- Draw the projections of planes (Minimum two problems)	2
Practical No. 5: Draw the projections of solids (Cone, Cylinder, prism, Pyramid) in various conditions (Minimum two problems)	2
Practical No. 6:- Draw the sectional view of solid & development of the surfaces of the solids in given conditions of the planes (Minimum two problems)	4
Practical No. 7:- Imagine and draw the orthographic views, (One simple orthographic & one Sectional Orthographic)	4
Practical No. 8:- Imagine and draw the isometric view from the given orthographic views	4

Textbooks:

1. Engineering Graphics with AutoCAD - D. M. Kulkarni, A. P. Rastogi, A. K. sarkar, (PHI) Publisher 2010.
2. N.D.Bhatt, “Engineering Drawing”, Charotar Publisher, 41th Edition,2006
3. Luzzerder, “Graphics for Engineering”, Prentice Hall International, 1st Edition,1964
4. Computer Aided Engineering Drawing - S. Trymbaka Murthy, -I.K. International Publishing House Pvt. Ltd., New Delhi.
5. A text book of Engineering Drawing by R. K. Dhawan, S. Chand and Co.

References:

1. Cencil Jensen, Jay D.Helsel , Dennis R. Short, “Engineering Drawing & Design”, TATAMcGRAWHILL,7th Edition, 2012.
2. Basant Agrawal and C M Agrawal, “Engineering Graphics”, Tata Mc Graw Hill Education Pvt. Ltd.,New Delhi, 7th Edition, 2012
3. Computer Aided Engineering Drawing, Prof. M. H. Annaiah, New Age International Publisher, New Delhi, 2009

Practical wise Measurable students Learning Outcomes:

After the completion of the each unit the student should be able to

- 1 Use and practice of basic drawing commands of CAD softwares like AutoCAD/Solid Edge (line, rectangle, polygon, point, arc, plane)
- 2 Use and practice of modify commands
3. To trace the projection of points, lines and planes.
4. To trace the projection of points, lines and planes.
5. To understand elements of basic solids and their position
6. To draw sectional views of basic solids and develop the lateral surfaces of solids.
7. To understand method of orthographic projections and draw various views.
8. To visualize orthographic projections of component and draw its isometric drawing.

Title of the Course: Communication Skills- Lab

Course Code: UBSH0131

L	T	P	Credit
-	-	2	1

Course Pre-Requisite: HSC Level

Course Description

This is a practice-oriented course, laying importance on application of various skills learnt in the earlier Communication Skills course such as grammar, techniques and strategies for improving English sub-skills and vocabulary, etc. In addition, this course focuses on English Phonology so that the learners will be able to use correct pronunciation, stress pattern and intonation.

Course Objectives

1. To acquaint the students with English phonology and make them practice correct pronunciation
2. To provide them ample practice for developing LSRWT skills
3. To strengthen their grammatical competence through practice

Course Outcomes:

COs	After the completion of the course the student should be able to	Bloom's Cognitive	
		level	Descriptor
CO1	Comprehend English Sounds, stress patterns and intonation	II	Understanding
CO2	Apply basic grammar rules to produce grammatically accepted sentences	III	Applying
CO3	Construct effective speeches, paragraphs and stories	III	Applying

Assessments :

Teacher Assessment:

Assessment	Marks
ISE	25

ISE is based on practical performed/ Quiz/ Presentation/ Group Discussion/Role plays/Assignments, etc.

Distribution:

- Attendance 05
- Practical Performance- 05
- Lab Tests-05
- Public Speech-05
- Lab Manual-05

Course Contents	Number of Hours
Practical 1: Ice breaking: Introducing self and others <ul style="list-style-type: none"> • Adjectives, phrases and clauses to describe oneself and others • Introducing oneself and others-practice 	2
Practical 2: Phonetics <ul style="list-style-type: none"> • Introduction to Phonetics-Consonants, Vowels and Diphthongs in English with videos samples • Stress, tone and intonation, pronunciation practice with audio-video samples 	4
Practical 3: Grammar practice <ul style="list-style-type: none"> • Vocabulary building games, practicing affixation, confusables, homonyms, using idioms • Using proper tenses, correct use of articles, conjunctions and prepositions • Types of sentences and conversion, active and passive voice, spotting errors in sentences with justification 	4
Practical 4: Listening and speaking practice <ul style="list-style-type: none"> • Listening comprehension, strategies for effective listening • Video samples of effective and ineffective public speeches, extempore (JAM) and prepared public speeches. 	6

Practical 5: Situational Conversations	4
<ul style="list-style-type: none"> • Role play: practicing various situational conversations, telephonic conversations 	
Practical 6: Reading and writing practice	4
<ul style="list-style-type: none"> • Aloud reading of novella/ technical news paper articles in turns with sequence, • Paragraph writing, creative writing – story building through pictures/ word triggers • Practicing summarization and comprehension 	
Software: ETNL Digital Language Lab	
Reference Books:	
<i>Better English Pronunciation</i> by J.D. O'Connor, CUP, 1980	
<i>A Practical Course in Spoken English</i> , J.K. Gangaj, PHI Learning Pvt. Ltd., 2014	
<i>English Language Laboratories</i> , by Nira Konar, PHI Learning, 2014	

Title of the Course: Engineering Chemistry	L	T	P	Credits
Course Code: UBSH0107 / UBSH0207	3	-	-	3
Course Pre-Requisite:				
Students should have knowledge about basic chemistry related to periodic table, properties of elements, thermodynamic laws, electrochemistry, physical and chemical properties of water, etc.				
Course Description: This course aims to impart fundamentals knowledge of advanced materials (nano, composite, polymer), and applied knowledge of water purification, instrumental, energy storage devices, prevention techniques of corrosion. Students will be expected to communicate knowledge to society and industry.				
Course Objectives:				
1. To develop confidence among students about the chemistry applications in technological field.				
2. To develop an interest among students regarding applied and engineering chemistry.				
3. To analyze quality parameters of water and metallic materials.				
4. To train students to effectively use knowledge of instrumental techniques.				
5. To understand the concept of chemistry related to various branches of engineering.				
Course Outcomes:				
CO	After the completion of the course the student should be able to	Bloom's Cognitive		
		level	Descriptor	
CO1	Recall the terms, basic properties of water that determine its industrial and domestic use.	I	Remembering	

CO2	Explain the central role of chemistry that plays in various engineering fields and advanced materials.	II	Understanding
CO3	Characterize and analyze various analytical samples by using instrumental methods.	III	Analyzing
CO4	Analyze engineering problems related to corrosion and metal finishing in achieving a practical solution.	III	Analyzing
CO5	Select the proper fuel for the generation of heat energy.	IV	Applying

Assessments :

Teacher Assessment:

Two components of In Semester Evaluation (ISE), One Mid Semester Examination (MSE) and one End Semester Examination (ESE) having 20%, 30% and 50% weights respectively.

Assessment	Marks
ISE 1	10
MSE	30
ISE 2	10
ESE	50

ISE 1 and ISE 2 are based on assignment/ test/quiz/seminar/Group Discussions *etc.*

MSE: Assessment is based on 50% of course content (Normally first three units)

ESE: Assessment is based on 100% course content with 60-70% weightage for course content (normally last three units) covered after MSE.

Course Contents:

Number of Hours.

Unit 1: Bio-environmental Technology

A) Introduction, Impurities in natural water, water quality parameters: acidity, alkalinity, chlorides, dissolved oxygen, BOD and COD. Hardness of water (causes, types, determination procedure and units), Disadvantages of hard water in industrial uses, numerical on hardness, Water treatment methods (Reverse osmosis, Electrodialysis and Ion exchange process).

B) Basic concepts of biotechnology engineering: Principles and applications.

7

Unit 2: Advanced Materials

A) Polymers: Introduction, Classification of Polymers, Properties of polymers, thermosoftening and thermosetting plastics, industrial important plastics like phenol formaldehyde, urea formaldehyde and epoxy resins, conducting polymers (doping, conjugation, conductivity), examples and applications, biodegradable plastics.

B) Nanomaterial's: Introduction and Synthesis methods (Chemical and Biological Method).

7

<p>Unit 3: Instrumental and Analytical Techniques An introduction of various analytical techniques, advantages and disadvantages of instrumental methods and classical methods.</p> <p>A) pH-metry: Introduction, pH measurement using glass electrode, applications of pH-metry.</p> <p>B) UV-Visible Spectrometry: Introduction of spectroscopy, Lamberts and Beer-Lambert's law, Single beam spectrophotometer (schematic and working).</p> <p>C) Thermal Gravimetric Analysis (TGA) and Differential Thermal Analysis (DTA): Principle, working and applications.</p> <p>D) Chromatography: Introduction, types, Gas-liquid chromatography (GLC), basic principle, instrumentation and applications.</p>	7
<p>Unit 4: Fuel and Energy storage devices</p> <p>A) Fuel: Introduction, classification, properties of ideal fuel, calorific value, Calculation of calorific value by Dulong's formula, Determination of calorific value by Bomb calorimeter and Boy's calorimeter.</p> <p>B) Energy Conversion devices: Fuel cell classification, H₂-O₂ Fuel Cell, Phosphoric Acid Fuel Cell (PAFC), Polymer Electrolyte Membrane Fuel Cell (PEMFC), Molten carbonate fuel cell (MCFC), Microbial fuel Cell.</p>	7
<p>Unit 5: Metallic and Composite Materials</p> <p>A) Metallic materials: Introduction, alloy-definition and classification, purposes of making alloys. Ferrous alloys: Plain carbon steels (mild, medium and high), stainless steels. Nonferrous alloys: Copper alloy (Brass), Nickel alloy (Nichrome), Aluminium alloy (Duralumin and Alnico).</p> <p>B) Composite materials: Introduction, types of composites, Industrial composites- glass fiber reinforced plastic (GRP). Cement-Types, chemical constitutes and composition, setting and hardening of cement.</p>	7
<p>Unit 6: Corrosion and Its Prevention: Introduction, types-atmospheric corrosion (oxidation corrosion) and electrochemical corrosion (hydrogen evolution and oxygen absorption mechanism), factors affecting on the rate of corrosion. Prevention of corrosion by proper design and material selection, cathodic protection, hot dipping process, metal spraying, metal cladding and electroplating.</p>	7
<p>Textbooks:</p> <ol style="list-style-type: none"> 1. Engineering Chemistry by Jain and Jain, Dhanpat Rai Publishing Company Ltd., New Delhi. 2. A Textbook of Engineering Chemistry by S. S. Dara and S. S. Umare, S. Chand and Company Ltd., New Delhi. 3. A text Book of Engineering Chemistry by Shashi Chawla, Dhanpat Rai & Co. (Pvt.) Ltd, Delhi. <p>Reference books:</p>	

1. D. A. Skoog, D. M. West, Fundamentals of Analytical Chemistry, Cengage Learning.
2. A. I. Vogel, Quantitative Chemical Analysis, Longmann Publication
3. Chatwal and Anand, Instrumental Methods of Chemical Analysis, Himalaya Publishing House, New Delhi.
4. S. K. Kulkarni, Nanotechnology: Principles and Practices, Capital Publishing Company.
5. B. K. Sharma, Environment Chemistry, Goel Publication, Meerut.
6. K. J. Sundars, Organic Polymer Chemistry, Springer Publication.
7. B. K. Sharma, Instrumental Methods of Chemical Analysis, Goel Publication, Meerut.

Unit wise Measurable students Learning Outcomes:

1. Recall basic concepts and fundamentals of water technology, biotechnology and its applications.
2. Explain the construction and working of various types of instruments by demonstration.
3. Explain the determination of calorific value of fuels and study of energy storage devices.
4. Explain composition, properties and applications of advanced, metallic and non metallic materials.
5. Analyze degree of corrosion and study of its controlling techniques.

Title of the Course: Computer Programming	L	T	P	Credits
Course Code: UBSH0108 / UBSH0208	2	-	-	2

Course Pre-Requisite: Nil

Course Description:

The C programming language is one of the most popular and widely used programming languages. It is a general-purpose programming language and there are very few computer systems in existence that are not set up for its use (i.e. where a C compiler does not exist). This course introduces you to the basics of programming in C. You will learn how programming languages work with data, what program flow is, and how to use functions, methods and routines. You will also get step-by-step instructions on how to create simple C programs and how to run them all while you learn C programming.

Course Objectives:

- 1** To understand number system and logic gates.

- 2 To understand C programming environment.
- 3 To write, compile and debug programs in C language.
- 4 Implement C programs for various problem statements.

Course Outcomes:

CO	At the end of the course, student will be able to -	Bloom's Cognitive	
		level	Descriptor
CO1	List logic gates and number system	I	List
CO2	Recall the basic terminology used in computer programming.	II	Recall
CO3	Make use of C programming constructs in writing simple/moderate mathematical and logical problems.	III	Make use of
CO4	Examine C code for deciding output or error if any.	IV	Exmaine
CO5	Design flowcharts for solving mathematical and logical problems	VI	Design

Assessments:

Teacher Assessment:

Two components of In Semester Evaluation (ISE) and one End Semester Examination (ESE) having 20% and 80% weight respectively.

Assessment	Marks
ISE 1	5
MSE	--
ISE 2	5
ESE	40

ISE 1 and ISE 2 are based on assignments/declared test/quiz/seminar/Presentations/Group Discussions etc. ESE: Assessment is based on MCQ Examination.

Course Contents	Number of Hours
<p>Unit 1: Introduction</p> <p>Number Systems: Decimal, Binary, Octal, Hex. Conversion from one number system to another. Logic Gates: NOT, OR, AND, XOR, NOR, NAND. The meaning of Algorithms, Flowcharts, writing algorithms and drawing flowcharts for simple exercises, concept of computer memory, C Program development environment.</p>	5
Unit 2: Introduction to `C' Language	

Importance of `C' Language, Sample `C' Program, Structure of `C' Program, Identifiers, Literals, Variables, Constants, Data Types, Operators, Expressions, Managing input/output operations, Flow Control-- if, if..else, nested if..else, switch..case, Loop Control-- for, while, do..while	7
Unit 3: Functions Need for user defined functions, elements of user defined functions, defining functions, return values and their types, function calls, function declaration, methods of parameter passing, user defined and library functions.	4
Unit 4: Arrays and Strings The meaning of an array, one dimensional and two dimensional arrays, declaration and initialization of arrays, reading, writing and manipulation of arrays, multidimensional arrays. Declaring and initialing string variables, reading string from terminal, writing string to screen, arithmetic operations on characters, putting strings together, string handling functions.	5
Unit 5: Structures Defining a structure, declaring structure variables, accessing structure members, structure initialization, copying and comparing structure variables, operations on individual members, array of structures, structures and functions.	3
Unit 6: File Management in C Defining and opening a file, closing a file, input/output operations on files, error handling during I/O operations, random access files, command line arguments.	4

Textbooks:

1. *Programming with C by Bryon Gottfried, Schaum's Outlines.*
2. *Let Us C by Yashwant Kanetkar 14th Edition BPB Publication*
3. *C Programming Laboratory: Handbook for Beginners by Sidnal, Wiley India Limited.*
4. <http://www.spoken-tutorial.org/> NMEICT Project of Govt. Of India.
5. *Linux MAN pages*

Reference books

1. *C How to Program, Harvey M. Deitel , Paul J. Deitel, Abbey Deitel, Pearson Publication*

2. *The 'C' Programming Language, By B.W. Kernighan and D. M. Ritchie, Pearson Education.*

Title of the Course: Engineering Mechanics	L	T	P	Credits
Course Code: UBSH0109 / UBSH0209	3	-	-	3

Course Pre-Requisite:

Preliminary knowledge of Physics and Mathematics

Course Description:

Engineering mechanics forms a core subject which is taught to students of all disciplines of engineering. The study of this subject is aimed at developing a thorough understanding of basic concepts and principles of mechanics and their application to solve engineering problems.

Course Objectives:

1. To explain the concepts of force and its effects.
2. To enable the student to identify the appropriate concept for study of force systems
3. To enhance the analytical skills in the application of force mathematics.
4. To develop techniques of understanding motion and its parameters of a moving body.

Course Outcomes:

CO	After the completion of the course the student should be able to	Bloom's Cognitive	
		level	Descriptor
CO1	Define and distinguish between the various force systems acting on matter.	I	Define
CO2	Evaluate the geometric properties of a plane shapes important in study of mechanics.	II	Evaluate
CO3	Calculate the resultant force acting on a body, either at rest or in motion.	III	Calculate
CO4	Identify the effects of a force system on a rigid body.	IV	Identify
CO5	Apply the various principles of kinetics for the study of a moving body.	IV	Apply

Assessments :

Teacher Assessment:

Two components of In Semester Evaluation (ISE), One Mid Semester Examination (MSE) and one End Semester Examination (ESE) having 20%, 30% and 50% weights respectively.

Assessment	Marks
ISE 1	10
MSE	30
ISE 2	10
ESE	50

ISE 1 and ISE 2 are based on assignment/declared test/quiz/seminar/Group Discussions etc.
MSE: Assessment is based on 50% of course content (Normally first three modules)

ESE: Assessment is based on 100% course content with 60-70% weightage for course content (normally last three modules) covered after MSE.

Course Contents:	Number of Hours
Unit 1:--- Fundamentals of Statics Basic Concepts and Fundamental Laws, Force, System of Forces, Resultant, Resolution and Composition of Forces, Moment, Varignon's Theorem, Law of Moments, Couple, Resultant at a point.	07
Unit 2:--- Centroid and Moment of Inertia Centroid and Center of Gravity, Moment of Inertia of Standard shapes from first principle, Parallel and perpendicular axis theorem, Moment of Inertia of plain and composite figures, Radius of Gyration.	07
Unit 3:--- Equilibrium Equilibrium of Forces, Equilibrium conditions, Lamis' Theorem, Free Body Diagram, Surface friction for bodies on horizontal and inclined planes.	07
Unit 4:--- Beams Types of Loads, Types of supports, Analysis of Simple and Compound beams, Virtual work method for support reactions. Analysis of Truss Types of Trusses, Assumptions, Methods of Analysis:- Method of Joints, Analysis of Simple truss with maximum seven members, Method of Section for trusses with more than seven members.	06
Unit 5:--- Kinematics of Linear and Circular motion Introduction to basic terminologies. Equations of motion for uniform and variable acceleration, vertical motion, Study of motion curves, (no numerical on kinematics), Kinetics of Linear and Circular motion Kinetics of linear motion, Newton's Laws, D'Alembert's Principle, Work- Energy Principle, Impulse Momentum Principal, Kinetics of Circular Motion, Banking of roads, Super elevation.	09
Unit 6:--- Impact and Collision Impact, Types of Impact, Law of conservation of Momentum, Coefficient of Restitution, Numerical on Direct and oblique central Impact .	04

Textbooks:

1. P.G. Despande, Applied Mechanics, Mahalaxmi Publication.

References:

1. S. S. Bhavikattis, Engineering Mechanics, New Age International Pvt. Ltd.
2. R. K. Bansal and Sanjay Bansal, Engineering Mechanics
3. F. P. Beer and E. R. Johnston, Vector Mechanics for Engineers Vol.-I and II, Tata Mc-Graw Hill Publication.

4. K. I. Kumar, Engineering Mechanics, Tata Mc-Graw Hill Publication.
5. S. B. Junnerkar, Engineering Mechanics.
6. Irving H. Shames, Engineering Mechanics, Prentice Hall of India, New Delhi.
7. S. N. Saluja, Applied Mechanics, Satya Prakashan, New Delhi.
8. Ferdinand Singer, Engineering Mechanics by Statics and Dynamics, Harper and Row Publications.
9. R. S. Khurmi, Engineering Mechanics, S. Chand Publications
10. S. Rajasekaran, G. Sankarasubramanian, Fundamentals of Engineering Mechanics, Vikas Publishing House.

Unit wise Measurable students Learning Outcomes:

1. Be able to find the resultant and/or equilibrant of coplanar and non coplanar force systems.
2. Be able to find the centroid and moment of inertia of plane geometric figures.
3. Be able to apply the concept of equilibrium.
4. Be able to find beam reaction and member forces of truss.
5. Be able to solve problems involving kinematics and kinetics of linear and rotational motion.
6. Be able to understand the concept of impact of bodies.

Title of the Course: Basic Mechanical Engineering		L	T	P	Credits
Course Code:UBSH0110 / UBSH0210		3	-	-	3
Course Pre-Requisite: Chemistry, Mathematics					
Course Description: This course aims to impart preliminary knowledge of various mechanical systems like heat engines, refrigeration and air conditioning systems, power plants, energy conversion devices, power transmission devices and manufacturing processes.					
Course Objectives:					
<ol style="list-style-type: none"> 1. Acquire basic knowledge of mechanical engineering 2. Understand principle of energy conversion system and power plants 3. Understand and identify power transmission devices with their functions 4. Learn and understand manufacturing process 5. Impart knowledge of basic concepts of thermodynamics to industrial applications. 6. Describe the scope of mechanical engineering in multidisciplinary industries. 					
Course Outcomes:					
CO	After the completion of the course the student should be able to	Bloom's Cognitive level		Descriptor	
CO1	Recall the terms, basic concepts and laws of thermodynamics.	I		Remembering	
CO2	Explain the working of various mechanical systems like I.C.Engines, Refrigeration and air conditioning systems, power plants, energy conversion devices and power transmission devices.	II		Understanding	

CO3	Explain various types of manufacturing processes.	II	Understanding
CO4	Apply steady flow energy equation to various work producing and work absorbing devices in thermal engineering to find heat or work transfer.	III	Applying
CO5	Analyze power transmission devices with their functions.	IV	Analyzing

Assessments :

Teacher Assessment:

Two components of In Semester Evaluation (ISE), One Mid Semester Examination (MSE) and one EndSemester Examination (ESE) having 20%, 30% and 50% weights respectively.

Assessment	Marks
ISE 1	10
MSE	30
ISE 2	10
ESE	50

ISE 1 and ISE 2 are based on assignment/declared test/quiz/seminar/Group Discussions etc.

MSE: Assessment is based on 50% of course content (Normally first three modules)

ESE: Assessment is based on 100% course content with 60-70% weightage for course content (normally last three modules) covered after MSE.

Course Contents:

Number of Hours

Unit 1: Thermodynamics

Thermodynamic system, properties, state, process, cycle, path and point functions, heat and work, internal energy, thermodynamic equilibrium, Zeroth law, first law of thermodynamics, applications of first law to steady flow process, numerical treatment on steady flow energy equation, PMM-I, limitations of first law, statements of second law, PMM-II. Heat transfer: modes of heat transfer (no numerical treatment).

7

Unit 2: Applications of Thermal Engineering

Introduction to I.C.Engines:

Carnot cycle, Construction and working of two stroke, four stroke S.I. and C.I. engines, Introduction to Automobile: Main components of an automobile.

Introduction to Refrigeration and Air Conditioning:

Carnot refrigerator, vapour compression refrigeration system, refrigerant types and properties, construction and working of household refrigerator and window air conditioner

7

Unit 3: Energy Sources and Power Plants

Renewable and non-renewable energy sources, solar collectors and photovoltaic cells, applications of solar energy, hydroelectric, steam thermal power plant, wind energy, tidal energy, geothermal power plant, nuclear power plant, biogas, biomass and bio-diesel.

6

Unit 4: Energy Conversion Devices

Hydraulic pumps: Construction, working and applications of reciprocating (single and double acting) pump, centrifugal pump, gear and vane pump.

Air compressors: Construction, working and applications of reciprocating, centrifugal and axial compressors

Hydraulic turbines: Impulse and reaction turbine, Construction and working of Pelton wheel, Francis and Kaplan turbine.

7

Construction, working and applications of fluid power actuators such as hydraulic and pneumatic cylinders and motors.	
<p>Unit 5: Machine Elements and Mechanical power transmission</p> <p>Machine elements: Sketch and functions of axle, shaft, keys and pulleys.</p> <p>Power transmission devices: belt drives, types of belts, length of open and cross belt, numerical treatment on power transmitted by belt drive, sleep and creep in belt, chain drive, types of gears and gear trains, Couplings: Construction, working and applications of rigid and flexible couplings, Oldhams coupling, universal joint, Bearings: Construction, working and applications of ball and Journal bearing.</p>	8
<p>Unit 6: Manufacturing Processes</p> <p>Classification of manufacturing processes, metal casting-steps in sand casting, advantages and applications of casting, metal deformation processes such as forging, rolling and sheet metal working, metal joining processes welding: Electric arc, gas welding and resistance welding with their applications, brazing and soldering, metal cutting operations such as turning, drilling, milling and grinding (working principle only).</p>	8
<p>Textbooks:</p> <ol style="list-style-type: none"> 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) 3. Basant Agrawal and C. M. Agrwal, Basic Mechanical Engineering, Wiley India Pvt. Ltd. 	
<p>References:</p> <ol style="list-style-type: none"> 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. Theory of Machines- S.S. Rattan , Tata MacgrawHill Pub. 9. Workshop Technology Vol. - I&II, Hajara and Choudhari. 10. V.B.Bhandari, Design of Machine Element, Tata McGraw-Hill Publication 11. Dr. P.C.Sharma, Production Technology, S.Chand Pulications, New Delhi. 12. Dr.Kripal Singh, Automobile Engineering Volume I, Standard Education and Publishers. 	
<p>Unit wise Measurable students Learning Outcomes:</p> <ol style="list-style-type: none"> 1. Recall basic concepts and fundamentals of thermodynamics, first law and its applications and second law of thermodynamics. 2. Explain the working cycles, construction and working of various types of engines and refrigeration systems by demonstration 3. Explain the renewable and non-renewable energy sources and types of power plants. 4. Explain construction and working of various energy conversion devices like pumps, compressors, turbines and fluid power actuators. 5. Analyze the power transmission devices and explain various types of couplings and bearings 6. Explain various types of manufacturing processes. 	

Title of the Course: Communication and Personality Development		L	T	P	Credits
Course Code: UBSH0202		2	-	-	2
Course Pre-Requisite: Course Pre-Requisite: Communication Skills, Communication Skills-Practice					
<p>Course Description: The present course is subsequent part of the course Communication Skills studied in FE Sem-I. Assuming that the learners have acquired essential skills from the previous course, the present course further intends them to understand and develop advanced communication skills and techniques to improve their personality. Consequently, the present course focuses on such skills which are directly linked with the employability of the learners. The modules included in the course cover employment communication, report writing, presentation skills, business meetings, preparing business proposals and interpersonal skills/behavioural skills.</p> <p>The current course will definitely help the learners to increase their employability and foster various indispensable soft skills.</p>					
<p>Course Objectives:</p> <ol style="list-style-type: none"> 1. Develop their employment communication through group discussion, personal interview, job application and resume writing. 2. To acquaint students with business report writing with practice. 3. To introduce students with some of the interpersonal skills and their importance in business and day-to-day context. 4. To make students deliver effective professional presentations. 5. To make them understand business meetings and prepare business proposals. 					
Course Outcomes:					
COs	After the completion of the course the student should be able to	Bloom's Cognitive			
		level	Descriptor		
CO1	Comprehend the employment skills to have an effective first impression	II	Understanding		
CO2	Construct effective technical reports and business proposals	III	Applying		
CO3	Illustrate various presentation skills and present oneself professionally	III	Applying		
CO4	Use various interpersonal skills as per the need of situation and context	III	Applying		
Assessments :					
Teacher Assessment:					
Two components of In Semester Evaluation (ISE), One Mid Semester Examination (MSE) and one End Semester Examination (ESE) having 20%, 30% and 50% weights respectively.					
Assessment		Marks			
ISE 1		10			
MSE		30			
ISE 2		10			

ESE	50
<p>ISE 1 and ISE 2 are based on assignments/declared or surprise test/quiz/seminar/ presentations /group discussions etc.</p> <p>MSE: Assessment is based on 50% of course content (Normally first three modules)</p> <p>ESE: Assessment is based on 100% course content with 60-70% weightage for course content (normally last three modules) covered after MSE.</p>	
Course Contents:	Number of Hours
<p>Unit 1: Employment Communication</p> <ul style="list-style-type: none"> • Covering letter and resume • Group discussion • Interviews • Career planning 	7
<p>Unit 2: Technical report writing</p> <ul style="list-style-type: none"> • Importance of reports, objectives, characteristics • Types/categories, formats (Manuscript, memo, letter) • Structure/elements of manuscript reports 	6
<p>Unit 3: Presentation skills</p> <ul style="list-style-type: none"> • Techniques of effective professional presentations, collaborative/team presentations • Team presentation of a technical report using ICT tools 	3
<p>Unit 4: Business Meetings</p> <ul style="list-style-type: none"> • Types of meetings, strategies of conducting meetings effectively • Documentation (notice, agenda, minutes) 	2
<p>Unit 5: Business proposals</p> <ul style="list-style-type: none"> • Types, components, format, layout and design • Key elements of winning business proposals 	2
<p>Unit 6: Interpersonal skills</p> <ul style="list-style-type: none"> • Developing personality • Self esteem: Know thyself • Attitude building • Emotional Intelligence • Teamwork • Leadership • Time management • Lateral thinking/motivation 	8
<p>Important Note: One assignment on each unit covering all the sub topics will be taken.</p> <p>Textbooks:</p>	

1. *Communication Skills* by Meenakshi Raman and Sangeeta Sharma, Oxford University Press (OUP), 2013.
2. *Business Communication* by S. Kalia and S. Agarwal, Wiley, 2015.
3. *An Introduction to Professional English and Soft Skills* by Das et al, Cambridge University Press, 2012.

References:

1. *Business Communication* by Urmila Rai and S.M. Rai, Himalaya, 2014.
2. *Business Correspondence and Report Writing* by R.C. Sharma and Krishna Mohan, Tata McGraw Hill, 2007.
3. *Technical Communication* by Meenakshi Raman and Sangeeta Sharma, OUP, 2013.
4. *Business Communication* by Raymond Lesikar et. al., McGraw Hill, 2015
5. *Soft Skills* by K. Alex, S. Chand and Company, 2013
6. *Personal Development for Life and Work* by Masters and Wallace, Cengage Learning, 2011.
7. *Managing Soft Skills for Personality Development* by B.N. Ghosh, Tata McGraw Hill, 2012.
8. *Soft Skills* by K. Alex, S. Chand and Company, 2014.

Unit wise Measurable students Learning Outcomes:

1. Students will be able to prepare their job application and resume, understand basic Do's and Don'ts of GD and learn effective interview skills.
2. Students will understand basics of report writing, types of reports, methods of data collection and will prepare a mini project report on a technical topic.
3. Students will learn and demonstrate professional presentation skills.
4. They will understand strategies for conducting business meetings effectively and prepare various documents essential for meetings
5. They will be able to prepare effective business proposals
6. Students will understand different interpersonal skills and be able to use them in their day today as well as corporate life.

Course Code: UBSH0137 / UBSH0237	-	-	2	1
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Course Pre-Requisite:

Students should have preliminary knowledge about the handling of glass wares, apparatus and preparation of chemicals.

Course Description:

This course aims to study qualitative and quantitative chemical laboratory techniques and sampling. Also course providing experience with instrumental techniques *viz.*, pH meter, Spectrophotometer, Chromatography, *etc.*

Course Objectives:

1. To understand water quality parameters and purification processes.
2. To describe the importance of instrumental methods in industry as well as in domestic purposes.
3. To analyze various analytical samples by using instrumental methods.
4. To estimate rate of corrosion of metals.

Course Outcomes:

CO	After the completion of the course the student should be able to	Bloom's Cognitive	
		level	Descriptor
CO1	Recall students about the practical hand skill.	I	Remembering
CO2	Understand the concept of practical's related to theory and mechanism of engineering chemistry.	II	Understanding
CO3	Develop an interest among the students regarding practical chemistry.	III	Applying
CO4	Expert students to effectively handling of glass wares and instruments.	V	Creating

Assessments :

Teacher Assessment:

In Semester Evaluation (ISE) having 100% weightage.

Assessment	Marks
ISE	100

ISE is based on practical attendance / Practical performance / Quiz/ Journal submission/ Group Discussion/ Internal oral etc.

Course Contents:	Number of Hours
Experiment No. 1: Standardization of solutions	2
Experiment No. 2: Acidity of water	2
Experiment No. 3: Alkalinity of water	2
Experiment No. 4: Chloride contents in water	2
Experiment No. 5: Dissolved oxygen (D.O.) of water	2
Experiment No. 6: Total hardness of water	2
Experiment No. 7: Preparation of urea-formaldehyde resin	2
Experiment No. 8: Preparation of phenol-formaldehyde resin	2
Experiment No. 9: pH Meter	2
Experiment No. 10: Photo-colorimeter/spectrophotometer	2
Experiment No. 11: Paper chromatography	2
Experiment No. 12: Brass alloy analysis	2
Experiment No. 13: Rate of corrosion	2
Experiment No. 14: Analysis of ash content in a coal sample	2
* (Note: Students should perform 10 experiments out of 14)	
<p>Reference books:</p> <p>1] A. I. Vogel, Quantitative Chemical Analysis, Longmann Publication</p> <p>2] B. K. Sharma, Instrumental Methods of Chemical Analysis, Goel Publication, Meerut.</p> <p>3) B. K. Sharma, Environment Chemistry, Goel Publication, Meerut</p> <p>4) Engineering Chemistry by Renu Bapna and Renu Gupta, MacMillan Publishers (India) Ltd, Delhi</p>	
<p>Experiment wise Measurable students Learning Outcomes:</p> <ol style="list-style-type: none"> 1. To study different water quality parameters. 2. To study designing of material of engineering applications. 3. To study advantages and disadvantages of instrumental methods. 4. To study various instrumental techniques 5. To understand uses of instrumental methods. 6. To understand properties and applications of metallic materials and different purposes of an alloys. 7. To understand mechanism of different techniques of corrosion control methods. 	

Title of the Course: Computer Programming -Lab

Course Code: UBSH0138 / UBSH0238

Course Pre-Requisite: Nil

L	T	P	Credits
-	-	4	2

Course Description:

The C programming language is one of the most popular and widely used programming languages. It is a general-purpose programming language and there are very few computer systems in existence that are not set up for its use (i.e. where a C compiler does not exist). This course introduces you to the basics of programming in C. You will learn how programming languages work with data, what program flow is, and how to use functions, methods and routines. You will also get step-by-step instructions on how to create simple C programs and how to run them all while you learn C programming.

Course Objectives:

- 5 To understand number system and logic gates.
- 6 To understand C programming environment.
- 7 To write, compile and debug programs in C language.
- 8 Implement C programs for various problem statements.

Course Outcomes:

CO	At the end of the course, student will be able to -	Bloom's Cognitive	
		level	Descriptor
CO1	Explain C programming environment under Linux.	II	Explain
CO2	Construct number system and logic gates.	III	Construct
CO3	Make use of C programming constructs in writing simple/moderate mathematical and logical problems.	III	Make use of
CO4	Test C code for deciding output or error if any	IV	Test for
CO5	Create C programs for solving mathematical and logical problems	VI	Create

Assessments:

Teacher Assessment:

One component of In Semester Evaluation (ISE) and one End Semester Examination (ESE) having 50%, and 50% weights respectively.

Assessment	Marks
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ISE	25
ESE(POE)	50

ISE are based on practical performed/ Quiz/ Mini-Project assigned/ Presentation/ Group Discussion/ Internal oral etc.

ESE: Assessment is based on Practical and Oral Examination (POE)

Laboratory Work:

Laboratory work will consist of minimum 12 experiments to be completed by students on following topics.

	Number of Hours
Assignment 1: Logic Gates <ul style="list-style-type: none"> • Verify truth table of Basic and Universal Gates • Derive different types of Gates by using NAND and NOR Gates 	4
Assignment 2: Introduction <ul style="list-style-type: none"> • Introduce Programming, Algorithm and Flowchart. • Setting up C programming environment. • Demonstrate process of writing, compiling and executing c program. 	4
Assignment 3: Input / Output, Operators and Expressions <ul style="list-style-type: none"> • Calculate simple interest • Find roots of given quadratic equation 	4
Assignment 4: Flow Control – if .. else <ul style="list-style-type: none"> • Deciding Even/Odd number • Finding biggest of three numbers • Deciding leap year 	4
Assignment 5: Flow Control – switch .. case <ul style="list-style-type: none"> • Writing menu for programs 	4
Assignment 6: Loop Control – for, do .. while, while <ul style="list-style-type: none"> • Fibonacci numbers • Producing patterns • Pascal Triangle • Number guessing game 	6
Assignment 7: Functions	4

<ul style="list-style-type: none"> • Implementing power() function • Prime Number • Sum of Digits 	
Assignment 8: Arrays <ul style="list-style-type: none"> • Searching for a number in an array • Finding smallest and largest number in an array • Matrix addition • Merging sorted arrays 	6
Assignment 9: Strings <ul style="list-style-type: none"> • Palindrome • Reversing String • Removing vowels 	6
Assignment 10: Structures <ul style="list-style-type: none"> • Demonstrate use of structure for the entities like - book, student, employee, bank account, etc 	4
Assignment 11: File handling <ul style="list-style-type: none"> • Display contents of file, copy file, random access file, etc • Command line arguments. 	6

Textbooks:

1. *Programming with C by Bryon Gottfried, Schaum's Outlines.*
2. *Let Us C by Yashwant Kanetkar 14th Edition BPB Publication*
3. <http://www.spoken-tutorial.org/> NMEICT Project of Govt. Of India.
4. *Linux MAN pages*

Note: The suggested environment for C programming lab is as below –

Operating System – Linux

Editor – CodeBlocks/SciTE

Compiler – gcc 4.8

Title of the Course: Engineering Mechanics (LAB)

Course Code: UBSH0139 / UBSH0239

Course Pre-Requisite:

Preliminary knowledge of Physics and Mathematics

Course Description:

L	T	P	Credits
-	-	2	1

Engineering mechanics forms a core subject which is taught to students of all disciplines of engineering. The study of this subject is aimed at developing a thorough understanding of basic concepts and principles of mechanics and their application to solve engineering problems.

Course Objectives:

1. To explain the fundamental laws of mechanics.
2. To describe and be able to predict the conditions of rest of the bodies under the action of forces.

Course Outcomes:

CO	After the completion of the course the student should be able to	Bloom's Cognitive	
		level	Descriptor
CO1	Perform the analytical experiments to improve analytical skills and attitude which help them to apply these skills in their field of engineering.	II	Psychomotor Domain
CO2	Demonstrate the practical knowledge of various mechanics phenomena by performing of experiments.	III	Applying

Assessments :

Teacher Assessment:

One component of In Semester Evaluation (ISE) and one End Semester Examination (ESE) having 50%, and 50% weights respectively.

Assessment	Marks
ISE	100

ISE are based on practical performed/ Quiz/ Mini-Project assigned/ Presentation/ Group Discussion/ Internal oral etc.

ESE: Assessment is based on oral examination

Course Contents:	Number of Hours
Experiment No. 1:--- Verification of Law of Polygon of Forces Aim and Objectives: To verify the polygon law of forces.	02
Experiment No. 2:--- Determination of Forces In the Members of Simple Jib Crane. Aim and Objectives: To verify the forces in the members of a Jib Crane.	02
Experiment No. 3:--- Verification of Law of Moment Aim and Objectives: To verify the Principle of Moments using the Bell Crank Lever apparatus.	02
Experiment No. 4:--- Determination of Reaction at the Simply Supported Beam. Aim and Objectives: To verify the reactions at the support of a simply supported beam.	02
Experiment No. 5:--- Composition of Non concurrent force system by Graphical method. (One numerical on each).	02

Aim and Objectives: To Determine the Resultant of Non-Concurrent & Parallel Force System by using Graphical Method.	
Experiment No. 6:--- Analysis of beam and truss by Graphical method. (One numerical on each). Aim and Objectives: To Determine the Beam Reaction & Forces in the Member of Truss for Equilibrium Condition by using Graphical Method.	02

Textbooks:

1. P.G. Despande, Applied Mechanics, Mahalaxmi Publication.
2. R.S. Khurmi, Text book of Engineering Mechanics, S. Chand Publications.

References:

1. S. S. Bhavikattis, Engineering Mechanics, New Age International Pvt. Ltd.
2. R. K. Bansal and Sanjay Bansal, Engineering Mechanics

Experiment wise Measurable students Learning Outcomes:

1. Be able to find the resultant coplanar and non coplanar force systems.
2. Be able to apply the concept of equilibrium.
3. Be able to apply the principle of moment.
4. Be able to find beam reaction.
5. Be able to find the resultant coplanar and non coplanar force systems by graphical method.
6. Be able to find beam reaction and member forces of truss by graphical method.

Title of the Course: Basic Mechanical Engineering Lab	L	T	P	Credits
Course Code:UBSH0140 / UBSH0240	-	-	2	1

Course Description: This course aims to impart preliminary knowledge of various mechanical systems like heat engines, refrigeration and air conditioning systems, power plants, energy conversion devices, power transmission devices and manufacturing processes.

Course Objectives:

1. Acquire basic knowledge of mechanical engineering
2. Understand principle of energy conversion system and power plants
3. Understand and identify power transmission devices with their functions
4. Learn and understand manufacturing process.

Course Outcomes:

CO	After the completion of the course the student should be able to	Bloom's Cognitive	
		level	Descriptor
CO1	Explain and demonstrate the working of various mechanical systems like I.C.Engines, Refrigeration and air conditioning systems, power plants and steam generators.	II	Understanding
CO2	Explain and demonstrate the construction and working of mechanical power transmission devices.	II	Understanding
CO3	Explain and demonstrate the construction and working of energy conversion devices.	II	Understanding
CO4	Explain and demonstrate the construction and working of centre lathe, drilling and milling machine.	II	Understanding

Assessments :**Teacher Assessment:**

In Semester Evaluation (ISE)

Assessment	Marks
ISE	25

ISE are based on practical performed/ Quiz/ Mini-Project assigned/ Presentation/ Group Discussion/ Internal oral etc.

Course Contents:**Number
of
Hours.****Experiment No. 1:** Study of steam thermal power plant**02****Experiment No. 2:** Study and demonstration of steam generators**02****Experiment No. 3:** Demonstration of I.C.Engine and assembly and dismantle of I.C.Engine.**02****Experiment No. 4:** Identification of Auto-components**02****Experiment No. 5:** Identification of functions and components of domestic refrigerator and window air conditioner.**02****Experiment No.6:** Demonstration of hydraulic pump, air compressor and hydraulic turbines.**02****Experiment No. 7:** Demonstration of fluid power systems and working of fluid power actuators with help of circuit trainer.**02****Experiment No. 8:** Demonstration of power transmission devices such as gears, couplings and bearings.**02****Experiment No. 9:** Study and demonstration of centre lathe, drilling machine and milling machine.**02**

Industries to which these experiments are applicable: MAHAGENCO Thermal power Plant, Thermax Ltd., I.C.Engine Manufacturers such as; Kirloskar Oil Engines,Cummins,Rocket Engines, etc.,Automotive Manufacturers such as: Maruti Suzuki, Tata Motors,Ford,Hyundai, Honda,Bajaj Auto, Hero Motocorp, Eton Valves, Blue Star,Voltas,etc.

Textbooks:

4. Prabhu, T. J., Jai Ganesh, V. and Jebaraj, S., Basic Mechanical Engineering, Scitech Publications.
5. Sadhu Singh, Elements of Mechanical Engineering, S.Chand (G/L) & Company Ltd (1 December 2010)
6. Basant Agrawal and C. M. Agrwal, Basic Mechanical Engineering,Wiley India Pvt. Ltd.

References:

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. Theory of Machines- S.S. Rattan , Tata MacgrawHill Pub.

9. Workshop Technology Vol. - I&II, Hajara and Choudhari.
10. V.B.Bhandari, Design of Machine Element, Tata McGraw-Hill Publication
11. Dr. P.C.Sharma, Production Technology, S.Chand Publications, New Delhi.
12. Dr.Kripal Singh, Automobile Engineering Volume I, Standard Media and Publishers, New Delhi.

Experiment wise Measurable students Learning Outcomes:

1. Explain construction and working of steam thermal power plant.
2. Classify steam generators and explain working of Cochran and Babcock Wilcox boiler.
3. Explain and demonstrate the constructional details of I.C.Engine.
4. Identify various components of an automobile and state their functions.
5. Identify various components of domestic refrigerator and window air conditioner and state their functions.
6. Explain and demonstrate the construction and working of energy conversion devices
7. Identify various components of fluid power system and state their functions.
8. Demonstrate types of gears, gear trains, couplings and bearings.
9. Identify various parts of centre lathe, drilling machine and milling machine with their functions.

Title of the Course: Communication and Personality		L	T	P	Credits
Development- Lab		-	-	2	1
Course Code: UBSH0231					
Course Pre-Requisite: Communication Skills, Communication Skills-Practice					
Course Description:					
This practice and application oriented course provides ample scope for practicing essential employment skills, such as group discussion and interview, and strengthening learners' interpersonal skills. It also focuses on various business communication forms such as meetings, business proposals and professional presentations. With this course, the learners will understand the core communication areas in business/professional context, grasp them and start increasing their employability by cultivating them through practice.					
Course Objectives:					
<ol style="list-style-type: none"> 1. To motivate the learners to take part in various spoken and team activities 2. Enhance their GDPI skills 3. Discuss preparing effective business proposals 4. To develop professionalism in them 					
Course Outcomes:					
COs	After the completion of the course the student should be able to	Bloom's Cognitive level		Descriptor	
CO1	Comprehend essentials of GDPI for better performance	II		Understanding	
CO2	Show various interpersonal skills	III		Applying	
CO3	Organise effective written business communication and presentations	VI		Creating	

Assessments :	
Teacher Assessment:	
Assessment	Marks
ISE	25
ISE is based on practical performance/Quiz/ Presentation/ Group Discussion/Role plays/Assignments, etc.	
Distribution:	
<ul style="list-style-type: none"> • Attendance 05 • Practical Performance- 05 • Final GD Performance- 05 • Report Writing and presentation-10 	
Course Contents:	Number of Hours
Practical 1: Group Discussion <ul style="list-style-type: none"> • Group discussion tips, Do's and Don'ts, video samples • Mock GD-1, analysis and comments on individual performances • Mock GD-2, evaluation, progress check and suggestions 	6
Practical 2: Interview <ul style="list-style-type: none"> • Discussing interview FAQs in detail, video samples • Mock interviews (prepared and formal) 	4
Practical 3: Business meetings <ul style="list-style-type: none"> • Drafting documentations for a business meeting, mock meetings on business related issues 	2
Practical 4: Presentation Skills <ul style="list-style-type: none"> • Individual presentations on a technical project, product, firm or idea 	2
Practical 5: Business Proposals <ul style="list-style-type: none"> • Forming teams, preparing and presenting business proposals (teamwork) 	4
Practical 6: Project report presentation <ul style="list-style-type: none"> • Dividing students into a team of 5 to 6 members (preferably branchwise or mixing allied branches or interdisciplinary wherever applicable) • Preparing a mini project report based on latest technical topics and presenting it in teams with the help of ICT tools 	2
<p>Important note: All the practical sessions should focus on developing various interpersonal skills.</p> <p>Software: ETNL Digital Language Lab</p> <p>Reference Books: <i>A Practical Course in Spoken English</i>, J.K. Gangaj, PHI Learning Pvt. Ltd., 2014 <i>English Language Laboratories</i>, by Nira Konar, PHI Learning, 2014 <i>Soft Skills</i> by K. Alex, S. Chand and Company, 2013</p>	

Title of the Course: Basic Psychology		L	T	P	Credit
Course Code: UBSH0161 / UBSH0261		1	-	-	-
Course Pre-Requisite:					
Course Description: The course will introduce the students the fundamentals of psychology. It has been designed to provide students with the tools necessary for the study of psychology, as an academic discipline and an applied field. The units here will cover individual differences, personality, human abilities, emotions and mental well being, which will help students to get a deeper knowledge and understanding about themselves and others. The focus will be on the students to be able to manage and enhance their emotional and mental well being.					
Course Objectives:					
1. To introduce the students the subject of psychology.					
2. To familiarizes the concepts used in psychology and to facilitate their knowledge about causes of behavior.					
3. To provide basic understanding about the theories in psychology.					
4. To promote the understanding of emotional stability and mental hygiene.					
Course Outcomes:					
CO	After the completion of the course the student should be able to	Bloom's Cognitive level		Descriptor	
CO1	Understand psychology as behavioral science, its importance and application.	II		Understanding	
CO2	Demonstrate perceptual processes using Gestalt's laws.	II		Understanding	
CO3	Identify their own emotions and learn to manage them effectively.	III		Applying	
CO4	To distinguish between individuals based on personality, gender, intelligence etc.	IV		Analyzing	
Assessments :					
Teacher Assessment:					
Two components of In Semester Evaluation (ISE)-ISE 1 and ISE 2 are based on assignments/ case studies/declared test/quiz/seminar, etc.					
Course Contents:					
Unit 1:---Introduction to Psychology Definition of Psychology, Psychology and scientific methods, psychology in relation to other sciences, psychology as an art and also as a science, application of psychology to societal problems, various branches of psychology and its application to society.					-1- Hrs.
Unit 2:--- Development of Human Behavior A) Individual Differences Major areas of difference, heredity and its mechanism, environment,					--2 Hrs.

<p>interaction of environment and heredity (nature v/s nurture)</p> <p>B) Personality Definition and concept, theories of personality, psychoanalytic, trait and type approaches, determinants of personality, measurement of personality.</p>	
<p>Unit 3:--- Human Abilities</p> <p>A) Intelligence Definition and concept, concept of I.Q and its measurement, the extremes of intelligence- mental retardation and giftedness</p> <p>B) Emotional intelligence Definition and concept, IQ v/s EQ</p> <p>C) Gardner’s concept of Multiple Intelligence</p>	-- 2Hrs.
<p>Unit 4:--- Perceptual Processes</p> <p>A) Attention Definition and nature, attention processes and types.</p> <p>B) Perception: Definition and nature, perceptual organization, Gestalt Laws of perceptual organization Perceptual phenomenon: perceptual constancy (form, size, colour), motion perception, perceptual illusion</p>	-3- Hrs.
<p>Unit 5:--- Motivation and Emotion</p> <p>A) Motivation: Definition and concept, psychological and physiological basis of motivation and emotion, Maslow’s Hierarchy of motivation</p> <p>B) Emotion: Definition, nature and importance of emotions, six basic emotions, nature and effects of anxiety, aggression, frustration and stress.</p>	--3 Hrs.
<p>Unit 6:--- Adjustment and Mental Health Concept of adjustment, characteristics of a well-adjusted person, maladjustment, conflicts of motives and frustration, resolution of conflicts, mental hygiene.</p>	-3- Hrs.
<p>Textbooks:</p> <p>1. Feldman, Robert (2009). Understanding Psychology, 9th edition, Tata Mcgraw Hill. 2. Morgan, King, Weisz, Schopler(2001). Introduction to Psychology, Tata Mcgraw Hill. . .</p>	
<p>References:</p> <p>1] General psychology- S.K. Mangal</p>	
<p>Unit wise Measurable students Learning Outcomes:</p> <p>1 Explain psychology as an art and also as a science 2 Elaborate in detail nature versus nurture on the grounds of personality, gender, intelligence etc. 3 Define perceptual phenomenon (Form, size, colour etc.) 4 Effective ways of stress management</p>	

Title of the Course: German Language	L	T	P	Credits
Course Code: UBSH0162 / UBSH0262	1	-	-	-

COURSE DESCRIPTION

- Basic German course based on the Common European Framework of Reference for Languages, Level A1.1, for students with no previous knowledge of German language.

LEARNING OBJECTIVES

- Development of basic skills of speaking, listening, reading and writing German language in situations of daily life.
- Build confidence in Students and prepare them to communicate effectively in both, oral and written.
- The learning objectives are achieved in a step-by-step process through an inductive and communicative teaching approach that addresses the complete spectrum of language abilities.
- Exercises become progressively more complex and generally train specific abilities like listening comprehension, speaking, reading comprehension, or writing.
- Classroom activities include individual and group work and are complemented by compulsory homework exercises.

Course Outcome

On completion of the Course, the students will be able to:

- Communicate in German e.g.
- Give self Introduction
- Share knowledge
- Form correct grammatical sentences
- Express their views on various topics of his interest. E.g. they are able to talk about themselves and their areas of study and ask others about personal details, work, hobbies, and interests.
- Able to understand German Text
- Able to read German Text
- Able to write letter / e-mail
- Ask / Answer Questions in German
- Understand and Translate German text in English and vice versa
- Present himself confidently

COURSE MATERIALS

extracts of

- **Studio d A1.1 (Cornelsen)**

- **Netzwerk A1 (Cornelsen)**

- **Lernziel Deutsch**

- **and various materials developed according to the group's interests and needs**

Assessments :

Teacher Assessment:

Two components of In Semester Evaluation (ISE)-ISE 1 and ISE 2 are based on assignments/declared test/surprise test/quiz/seminar, etc.

Course Contents:	Number of Hours
Unit- 1: Personal information, basics <ul style="list-style-type: none"> • Expressions in German e.g Good morning, How are you..... • Introduction to German Alphabets & its pronunciation • Personal pronouns i.e I, we, you, he..... • Introduction to regular verbs and its conjugations • Self introduction 	3
Unit- 2: Day to day life situations <ul style="list-style-type: none"> • How to ask questions and give answers i.e wo, woher, wohin • Introduction to verbs and its conjugations • Numbers :- 1,2,3 eins, zwei, drei....., Days, Months, years, seasons • Exercise small Dialogues in German • Time, hobbies and activities • Conjunctions – use of und, aber, denn, sondern (and, but, because) 	3
Unit- 3: Understand small texts and Paragraphs, emails and letters <ul style="list-style-type: none"> • Introduction to helping verbs and its conjugations i.e. wollen, können... • Definite and indefinite articles – der, die, das, die / ein, eine, ein / kein, keine, kein • Possessive pronouns : mein, dein, ihr... • Exercises 	2
Unit-4: Listening to the dialogues in German and understand <ul style="list-style-type: none"> • Listening skills (Hearing dialogues and understand) • Playing situations, picture descriptions • Translations (German-English & vice versa) • Reading skills (Texts & dialogues) • Test on Grammar 	2
Unit-5: Grammar <ul style="list-style-type: none"> • Revision • Conjunctions – use of und, aber, denn, sondern (and, but, because) • Accusative case – den die das die – Rules • Dative case – dem der dem den+n • Exercises 	2
Unit-6: Comprehension <ul style="list-style-type: none"> • Past Tense and Past Participle – Rules, examples • Exercises • Accusative & Dative Prepositions 	2
<p>ASSIGNMENTS Various assignments based on communicative approach inside class (applying learned vocabulary in dialogues, descriptions, small discussions etc)</p> <p>PRACTICE MATERIALS - e.g. texts, dialogues, pictures to be described, emails, letters, etc.</p> <ul style="list-style-type: none"> • Exam in 4 parts • Writing (Schreiben), Listening(Hören), Reading (Leseverstehen), speaking (Sprechen) 	