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Continuous Assessment Scheme:

Continuous Assessment Scheme of Theory subjects

The evaluation scheme based on continuous evaluation pattern has three components viz. TAE (Teachers Assessment Examination), CAE (Class Assessment Examination) and ESE (End Semester Examination) having 20%, 20% and 60% weightage respectively.

Teacher's Assessment Examination (TAE)

It will be evaluated by the teacher / forum in-charge based on the options like surprise test, quiz, seminar, paper reading, group discussion and the performance of the student in the co-curricular and extracurricular activities and his / her attentiveness in the class. There will be total seven parameters, out of which best five will be considered and out of these five criteria, attentiveness in class will be the compulsory criteria

TAE Parameters

TAE – I Quiz/Question and Answer, TAE – II Surprise Test, TAE – III Submission of Tutorial Sheet/Home Assignment, TAE – IV Attendance, TAE – V Seminar/Presentation, TAE – VI Extra/Co-curricular Activities, TAE – VII Any others

Class Assessment Examination (CAE)

This examination will be conducted at the department as per programme. The CAE will be online / offline. The evaluated papers/marks shall be shown to the students within three working days. There will be three such examinations equi-spaced in the semester of 20 marks each. Average of CAE – I, II, III Marks will be considered for grading..

End Semester Examination (ESE)

The Controller of Examinations will conduct end semester examination (ESE) on completion of the teaching for which the date is given in the Academic Calendar. The time-table of the End Semester examination will be prepared before one month of start of examination. The duration of examination will be 3 hours as per teaching scheme.

Continuous Assessment Scheme of Practical's subjects

Students are required to perform specific number of experiments in five subjects in Ist & IInd semester. They are required to purchase practical record books for five subjects and Drawing Book prescribed by the college from library. In regular practical turn, after one week from the performance of experiment, it is evaluated as follows.

PWA**							PWE**	Total
Performanc	Result &	Report	Viva	Out of	No. of	Out of	Out of	Out of

e of Exp.	Interpretation				Exp* 10			
2 Marks	3 Marks	3 Marks	2 Marks	10 Marks	80 Marks	25 Marks	25 Marks	50 Marks

PWA**- Practical Work Assessment (Internal) PWE**- Practical Work Examination (External)

Audit Courses

Audit Courses shall not carry any credit but will be reflected in Grade Card as "Audit" and will be awarded "PP" grade, if student passes the course with minimum attendance and evaluation requirements. However, these courses will not be considered in the CGPA calculation but they are mandatory to pass for award of degree.

Grievances Mechanism:

Transparency in Examination: ESE answers Paper Showing & Grievances handling

There is a centralized evaluation of answer sheets followed by scrutiny and moderation. Answer sheets are shown to the student on the notified date and time only. If there are any grievances viz. unchecked part of answer, wrong posting of marks, total mistake etc then the answer paper is rechecked. For undervaluation the paper is rechecked by an expert only if there is 8% & above increase of the scored marks. Students are strictly not entertained beyond the notified date and time.

Open House for Grievances: The Open House is arranged for students to address any unresolved grievance even after the paper showing at the department level.

Rules of Choice Based Credit System(CBCS):

In the Choice Based Credit System (CBCS) there is shift in focus from teacher-centric to learner-centric education. CBCS allows learners to choose according to their own learning needs, interests and aptitudes. It helps self-paced learning. Learners may undertake as many credits as they can cope with without having to repeat all the courses in a given semester if they fail in one or more courses. Alternatively, they can choose other courses and continue their studies. It also gives more flexibility to the learners allowing them to choose inter-disciplinary courses, change majors, programs, etc. Following are the rules of CBCS.

1. Choice in the course registration per term maximum up to 30 credits however Exam Registration for minimum 15 credits in term is mandatory.
2. Choice in option of selecting courses from all offered courses list.
3. Option of choosing interdisciplinary courses in the form of electives as per usefulness of their professional career.
4. Choice for withdrawal of a course after 2 attempts.
5. Choice for dropping a course once in a term within ten instructional days/two weeks.
6. Choice for dropping complete term for training/project work within norms.
7. Additional Learning: Certification /Diploma / Post-Diploma from other disciplines.
8. UG students having a higher CGPA (8.75 or more) are permitted to credit a PG level course, in his/her major area of specialization to earn more credits for additional learning (Credit > 180).
9. Facility of grade improvement for CGPA less than 6.75.

PROMOTION RULES FOR CBCS

1. Minimum Number of credit earned before registration for III term-25
2. Minimum Number of credit earned before registration for V term-70
3. Minimum Number of credit earned before VII term-100

First Year B.Tech Structure & Evaluation Scheme

Semester - I														
S N	Subject Code	Subject Name	Teaching				Credits	Evaluation Scheme (Marks)						ESE Durati on (Hrs)
			Lect.	Tut.	Pract.	Total		Theory			Practical		Total	
								TAE	CAE	ESE	Cont. Assess ment	Ext		
1	BEML101	Engineering Mathematics-I	3	1	–	4	4	20	20	60	–	–	100	3
2	BPHL102 BPHP102 / BCHL103 BCHP103	Engineering Physics/Engineering Chemistry	4	1	2	7	6	20	20	60	25	25	150	3
3	BITL104 BITP104 / BECL105 BCEP105	Programming in C / Basic Electronics Engineering	2	–	2	4	3	10	10	30	25	25	100	2
4	BEEL106 BEEP106 / BCEL107 BCEP107	Basic Electrical Engineering /Engineering Mechanics	3	1	2	6	5	20	20	60	25	25	150	3
5	BMEL108 BMEP108/ BHUL113,B MEP111, BFYP112	Basic Mechanical and Engineering Graphics/ Communication Skills, Workshop, Mini modeling	2	–	2	4	3	20	20	60	25	25	150	3
6	BHUP109 / BIDL101	Environmental Studies and Professional Ethics / Bio System in Engineering	2	–	–	2	Audit Course	–	–	–	–	–	–	–
Total			16	3	8	27	21	90	90	270	100	100	650	14

Note:

TAE – Teachers Assessment Examination (20%)

CAE – Class Assessment Examination (20%)

ESE – End Semester Examination (60%)

First Year B.Tech Structure & Evaluation Scheme

Semester - II														
S N	Subject Code	Subject Name	Teaching				Credits	Evaluation Scheme (Marks)						ESE Durati on (Hrs)
			Lect.	Tut.	Pract.	Total		Theory			Practical		Total	
								TAE	CAE	ESE	Cont. Assess ment	Ext		
1	BEML110	Engineering Mathematics-II	3	1	–	4	4	20	20	60	–	–	100	3
2	BPHL102 BPHP102 / BCHL103 BCHP103	Engineering Physics/Engineering Chemistry	4	1	2	7	6	20	20	60	25	25	150	3
3	BITL104 BITP104 / BECL105 BCEP105	Programming in C / Basic Electronics Engineering	2	–	2	4	3	10	10	30	25	25	100	2
4	BEEL106 BEEP106 / BCEL107 BCEP107	Basic Electrical Engineering / Engineering Mechanics	3	1	2	6	5	20	20	60	25	25	150	3
5	BMEP111	Workshop	–	–	2	2	1	–	–	–	50	–	50	–
6	BFYP112	Mini Modeling	–	–	2	2	1	–	–	–	50	–	50	–
7	BMEL108 BMEP108/ BHUL113 & BMEP111	Basic Mechanical and Engineering Graphics/ Communication Skills	2	–	–	2	2	10	10	30	–	–	50	2
8	BHUP109 / BIDL101	Environmental Studies and Professional Ethics / Bio System in Engineering	2	–	–	2	Audit Course	–	–	–	–	–	–	–
Total			16	3	10	29	22	80	80	240	175	75	650	13

First Year B.Tech Grouping

Group A
Section : A, C, E.

Semester I		
Sr No.	Sub. Code	Name of Theory Sub.
1	BEML101	Engineering Mathematics-I
2	BPHL102	Engineering Physics
3	BITL104	Programming in C
4	BCEL107	Engineering Mechanics
5	BMEL108	Basic Mechanical & Engg. Graphics
6	BHUL109	Environmental Studies and Professional Ethics (Audit Course)

Group B
Section : B, D, F.

Semester I		
Sr No.	Sub. Code	Name of Theory Sub.
1	BEML101	Engineering Mathematics-I
2	BCHL103	Engineering Chemistry
3	BECL105	Basic Electronics Engineering
4	BEEL106	Basic Electrical Engineering
5	BHUL113	Communication Skills
6	BIDL101	Bio Systems in Engg. (Audit Course)

Sr No	Sub. Code	Name of Practical
7	BPHP102	Engineering Physics
8	BITP104	Programming in C
9	BCEP107	Engineering Mechanics
10	BMEP108	Basic Mechanical & Engg. Graphics

Sr No.	Sub. Code	Name of Practical
7	BCHP103	Engineering Chemistry
8	BECP105	Basic Electronics Engineering
9	BEEP106	Basic Electrical Engineering
10	BMEP111	Workshop Practice
11	BFYP112	Mini Modeling

Group A
Section : A, C, E.

Semester II		
Sr No.	Sub. Code	Name of Theory Sub.
1	BEML110	Engineering Mathematics-II
2	BCHL103	Engineering Chemistry
3	BECL105	Basic Electronics Engineering
4	BEEL106	Basic Electrical Engineering
5	BHUL113	Communication Skills
6	BIDL101	Bio Systems in Engg. (Audit Course)

Sr No.	Sub. Code	Name of Practical
7	BCHP103	Engineering Chemistry
8	BECP105	Basic Electronics Engineering
9	BEEP106	Basic Electrical Engineering
10	BMEP111	Workshop Practice
11	BFYP112	Mini Modeling

Group B
Section : B, D, F.

Semester II		
Sr No.	Sub. Code	Name of Theory Sub.
1	BEML110	Engineering Mathematics-II
2	BPHL102	Engineering Physics
3	BITL104	Programming in C
4	BCEL107	Engineering Mechanics
5	BMEL108	Basic Mechanical & Engg. Graphics
6	BHUL109	Environmental Studies and Professional Ethics (Audit Course)

Sr No	Sub. Code	Name of Practical
7	BPHP102	Engineering Physics
8	BITP104	Programming in C
9	BCEP107	Engineering Mechanics
10	BMEP108	Basic Mechanical & Engg. Graphics

First Year B.Tech Structure & Evaluation Scheme

Semester - I GROUP - A (THEORY SUBJECTS)											
SN	Subject Code	Subject Name	Teaching			Credits	Evaluation Scheme (Marks)				ESE Duration (Hrs)
			Lect.	Tut.	Total		Theory			Total	
							TAE	CAE	ESE		
1	BEML101	Engineering Mathematics-I	3	1	4	4	20	20	60	100	3
2	BPHL102	Engineering Physics	4	1	5	5	20	20	60	100	3
3	BITL104	Programming in C	2	–	2	2	10	10	30	50	2
4	BCEL107	Engineering Mechanics	3	1	4	4	20	20	60	100	3
5	BMEL108	Basic Mechanical and Engineering Graphics	2	–	2	2	20	20	60	100	3
6	BHUL109	Environmental Studies and Professional Ethics	2	–	2	Audit Course	–	–	–	–	–
Total			16	3	19	17	90	90	270	450	14

Semester - I GROUP - A (PRACTICAL SUBJECTS)								
SN	Subject Code	Subject Name	Teaching		Practical			ESE Duration (Hrs)
			Pract.	Credits	Cont. Assessment	Ext	Total	
1	BPHP102	Engineering Physics	2	1	25	25	50	2
2	BITP104	Programming in C	2	1	25	25	50	2
3	BCEP107	Engineering Mechanics	2	1	25	25	50	2
4	BMEP108	Basic Mechanical and Engineering Graphics	2	1	25	25	50	2
Total			8	4	100	100	200	8

Total Credits (Theory + Practical) = 17 + 4 = 21

Total Marks (Theory + Practical) = 450 + 200 = 650

First Year B.Tech Structure & Evaluation Scheme

Semester - I GROUP - B (THEORY SUBJECTS)

SN	Subject Code	Subject Name	Teaching			Credits	Evaluation Scheme (Marks)				ESE Duration (Hrs)
			Lect.	Tut.	Total		Theory			Total	
							TAE	CAE	ESE		
1	BEML101	Engineering Mathematics-I	3	1	4	4	20	20	60	100	3
2	BCHL103	Engineering Chemistry	4	1	5	5	20	20	60	100	3
3	BECL105	Basic Electronics Engg.	2	–	2	2	10	10	30	50	2
4	BEEL106	Basic Electrical Engg.	3	1	4	4	20	20	60	100	3
5	BHUL113	Communication Skills	2	–	2	2	10	10	30	50	2
6	BIDL101	Bio System in Engineering	2	–	2	Audit Course	–	–	–	–	–
Total			16	3	19	17	80	80	240	400	13

Semester - I GROUP - B (PRACTICAL SUBJECTS)

SN	Subject Code	Subject Name	Teaching		Practical			ESE Duration (Hrs)
			Pract.	Credits	Cont. Assessment	Ext	Total	
1	BCHP103	Engineering Chemistry	2	1	25	25	50	2
2	BECP105	Basic Electronics Engg.	2	1	25	25	50	2
3	BEEP106	Basic Electrical Engg.	2	1	25	25	50	2
4	BMEP111	Workshop	2	1	50	–	50	2
5	BFYP112	Mini Modeling	2	1	50	–	50	2
Total			10	5	175	75	250	10

Total Credits (Theory + Practical) = 17 + 5 = 22

Total Marks (Theory + Practical) = 400 + 250 = 650

First Year B.Tech Structure & Evaluation Scheme

Semester - II GROUP - A (THEORY SUBJECTS)											
SN	Subject Code	Subject Name	Teaching			Credits	Evaluation Scheme (Marks)				ESE Duration (Hrs)
			Lect.	Tut.	Total		Theory			Total	
							TAE	CAE	ESE		
1	BEML110	Engineering Mathematics-II	3	1	4	4	20	20	60	100	3
2	BCHL103	Engineering Chemistry	4	1	5	5	20	20	60	100	3
3	BECL105	Basic Electronics Engg.	2	–	2	2	10	10	30	50	2
4	BEEL106	Basic Electrical Engg.	3	1	4	4	20	20	60	100	3
5	BHUL113	Communication Skills	2	–	2	2	10	10	30	50	2
6	BIDL101	Bio System in Engineering	2	–	2	Audit Course	–	–	–	–	–
Total			16	3	19	17	80	80	240	400	13

Semester - II GROUP - A (PRACTICAL SUBJECTS)								
SN	Subject Code	Subject Name	Teaching		Practical			ESE Duration (Hrs)
			Pract.	Credits	Cont. Assessment	Ext	Total	
1	BCHP103	Engineering Chemistry	2	1	25	25	50	2
2	BCEP105	Basic Electronics Engg.	2	1	25	25	50	2
3	BEEP106	Basic Electrical Engg.	2	1	25	25	50	2
4	BMEP111	Workshop	2	1	50	–	50	2
5	BFYP112	Mini Modeling	2	1	50	–	50	2
Total			10	5	175	75	250	10

Total Credits (Theory + Practical) = 17 + 5 = 22

Total Marks (Theory + Practical) = 400 + 250 = 650

First Year B.Tech Structure & Evaluation Scheme

Semester - II GROUP - B (THEORY SUBJECTS)											
SN	Subject Code	Subject Name	Teaching			Credits	Evaluation Scheme (Marks)				ESE Duration (Hrs)
			Lect.	Tut.	Total		Theory			Total	
							TAE	CAE	ESE		
1	BEML110	Engineering Mathematics-II	3	1	4	4	20	20	60	100	3
2	BPHL102	Engineering Physics	4	1	5	5	20	20	60	100	3
3	BITL104	Programming in C	2	–	2	2	10	10	30	50	2
4	BCEL107	Engineering Mechanics	3	1	4	4	20	20	60	100	3
5	BMEL108	Basic Mechanical and Engineering Graphics	2	–	2	2	20	20	60	100	3
6	BHUL109	Environmental Studies and Professional Ethics	2	–	2	Audit Course	–	–	–	–	–
Total			16	3	19	17	90	90	270	450	14

Semester - II GROUP - B (PRACTICAL SUBJECTS)								
SN	Subject Code	Subject Name	Teaching		Practical			ESE Duration (Hrs)
			Pract.	Credits	Cont. Assessment	Ext	Total	
1	BPHP102	Engineering Physics	2	1	25	25	50	2
2	BITP104	Programming in C	2	1	25	25	50	2
3	BCEP107	Engineering Mechanics	2	1	25	25	50	2
4	BMEP108	Basic Mechanical and Engineering Graphics	2	1	25	25	50	2
Total			8	4	100	100	200	8

Total Credits (Theory + Practical) = 17 + 4 = 21

Total Marks (Theory + Practical) = 450 + 200 = 650

BEML101: Engineering Mathematics - I

Teaching Scheme	Examination Scheme (Theory)	Examination Scheme (Laboratory)
Lectures: 3 Hrs/Week	Teachers Assessment Examination: 20 Marks	Internal(TW): ---
Tutorials: 1 Hr/Week	Class Assessment Examination: 20 Marks	External(PR) : Nil
	End Semester Examination: 60 Marks	External(OR) : Nil
Credit	4	----

Prerequisite: 12th Science Basics

Course Objective :After completing this course student will able

1. To understand system of linear equations arising in all engineering fields using matrix methods where knowledge of Eigen values and Eigen vectors are essential.
2. To introduce Successive Differentiation and its application in the field of Engineering.
3. To understand concept of convergence of sequences and series with applications to modeling of realistic problems
4. To understand concept of sphere, Cone and Cylinder that arise in vector calculus, electro-magnetic field theory, CAD-CAM, computer graphics etc.

Course Outcome:

1. It will be possible to express the physical problems in to mathematical formulation and to find the proper solutions and apply concepts of matrices and its application for solving engineering problems.
2. Able to find solution of linear algebraic equations with consistency and inconsistency.
3. Able to find the limits and continuity of functions of multiple variables and finding nth derivative by various methods.
4. Able to find the convergence, divergence and range of convergence of various series.
5. Able to find Reduction formulae of various functions and its applications.
6. Able to calculate Cartesian, spherical, polar co-ordinate system as well as equation of sphere, cone, cylinder with guiding curve.

Course Contents

Hrs

Unit – I : Matrices

6

Basics of Matrix, Rank of Matrix, Reduction methods Normal form, Row Echelon form and PAQ form, System of Linear algebraic equations , homogeneous and Non-homogeneous equations with consistency and inconsistency.

Unit – II : Linear Algebra

6

Linear dependence and independence of vectors, Linear and Orthogonal Transformation, Eigen values, Eigen vectors (Symmetric and Non Symmetric Matrices), Cayley-Hamilton theorem.

Unit –III: Differential Calculus and Expansion of Functions

8

Successive Differentiation, Finding Nth Derivative by standard function, trigonometrical transformation, Partial fraction method. Leibnitz's Theorem. Indeterminate Forms, L' Hospital's Rule, Taylor's Series

and Maclaurine's series with standard expansion, differentiation and Integration, use of substitution.

Unit – IV : Infinite Series

6

Infinite Sequences, Infinite Series, Alternating Series, Tests for Convergence by Cauchy's nth root test, p test, comparison test, D'Alemberts Ratio test, Raabe's test, Leibnitz test, Absolute and Conditional Convergence, Range of Convergence.

Unit – V : Integral Calculus

8

Reduction Formulae, Beta and Gamma functions, Differentiation Under Integral Sign, Error Functions.

Unit – VI : Solid Geometry

8

Cartesian, Spherical, Polar and Cylindrical Co-ordinate Systems. Sphere, Cone and Cylinder

Tutorials

1. Basics & Problem solving of rank, LD & LI, Normal form.
2. Problem solving of Eigen values, Eigen vectors, Cayley-Hamilton theorem.
3. Leibnitz Theorem, Indeterminate forms.
4. Infinite Series, Taylor's & Maclaurine's Series.
5. Examples on Reduction Formulae, Beta & Gamma functions.
6. Examples on Right Circular Cone & Cylinder.

Text Books:

1. "Higher Engineering Mathematics", B.S. Grewal, Khanna Publishers.
2. Applied Mathematics (Volumes I and II) by P. N. Wartikar & J. N. Wartikar (Pune Vidyarthi Griha Prakashan, Pune)
3. Higher Engineering Mathematics by B.V. Ramana (Tata McGraw-Hill).

Reference Books:

1. Advanced Engineering Mathematics, 7e, by Peter V. O'Neil (Thomson Learning).
2. *Advance Engineering Mathematics* Erwin Kreyszig, Wiley India Pvt. Ltd New Delhi.
3. Advanced Engineering Mathematics, 2e, by M. D. Greenberg (Pearson Education).

Web Links:

- **Matrices:**
<https://www.youtube.com/watch?v=mYVbYBZZdW0>
<https://www.youtube.com/watch?v=hbk01uhgsos>
- ***Eigen value & Eigen Vectors***
<https://www.youtube.com/watch?v=XM4GU8hPoZs>
<https://www.youtube.com/watch?v=P2pL5VThrzQ>
- **Successive differentiation**
<https://www.youtube.com/watch?v=zWURS768QrA>
- ***Leibnitz thm:***

<https://www.youtube.com/watch?v=67uJGwsZz-Q>

- **Indeterminate forms:**

<https://www.youtube.com/watch?v=PNTnmH6jsRI>

- **Infinite Series**

<http://ocw.mit.edu/courses/mathematics/18-01-single-variable-calculus-fall-2006/>

video- lectures/lecture-37-infinite-series/

<https://www.youtube.com/watch?v=qNZxf0j41tw>

- **Gamma function:**

www.youtube.com/watch?v=Vc8dlykQRhy

www.youtube.com/watch?v=SYfLj-koGJO

- **DUIS:**

www.youtube.com/watch?v=NpXWv2jR4nC

BEML110: Engineering Mathematics – II

Teaching Scheme	Examination Scheme (Theory)	Examination Scheme (Laboratory)
Lectures: 3 Hrs/Week	Teachers Assessment Examination: 20 Marks	Internal(TW): Nil
Tutorials: 1 Hr/Week	Class Assessment Examination: 20 Marks	External(PR) : Nil
	End Semester Examination: 60 Marks	External(OR) : Nil
Credit	4	-----

Course Objective : After completing this course student will able

1. To analyze and solve first order differential equations
2. To aware of the applications of first order differential equations and modeling of various physical systems such as Newton's Law of cooling and simple electrical circuits.
3. To design and analysis of continuous and discrete system where the knowledge of Fourier series and Harmonic analysis required.
4. To understand multiple integration.
5. To understand concept of Partial Differential Equation in Engineering Applications such as Electric circuit, Heat transfer etc.
6. To understand Stationary Values of functions (Maxima and Minima), arising in optimization problems.

Course Outcome:

1. To compute solutions for first order ordinary differential equations using different analytic techniques and able to model and solve various simple real world phenomenon governed by ordinary differential equations of first order.
2. Able to understand application of differential equation.
3. Able to trace the curve and use multiple integral to formulate various engineering problems and find its area and volume.
4. Students are able to find maxima & minima, critical points, points of inflection, Errors and Approximations.
5. It will help to develop analytical skills to provide solution to the simple engineering problems.
6. Apply the fundamentals of mathematics in various branches of engineering.

Course Contents	Hrs
Unit – I :Differential Equations	6
Definition, Order and Degree of DE, Formation of DE. Solutions of Variable separable, Homogeneous DE, Exact DE (without Integrating Factor method), Linear DE and reducible to these types.	
Unit – II :Applications of Differential Equations	6
Applications of DE to orthogonal trajectories, Rate of decay of radioactive materials, Newton's	

Law of Cooling, Kirchhoff's Law of Electrical Circuits, Simple harmonic motion, One-Dimensional Conduction of Heat.

Unit – III : Fourier series 8

Definition, Dirichlet's conditions, Full Range Fourier Series, Half Range Fourier Series, Harmonic Analysis and Applications to Problems in Engineering.

Unit – IV : Multiple Integral & Applications 8

Basics of Curve Tracing, Double Integration, triple integration, Applications to Area , Volume.

Unit – V : Partial Differential Equation 8

Partial derivatives of composite function, variable to be treated as constants, Euler's theorem on homogeneous functions of two & three variables, Implicit functions, Total Derivatives.

Unit – VI : Application of Partial Differential Equation 6

Jacobians and their applications, Errors and Approximations, Maxima and Minima of Functions of two variables, Lagrange's Method of undetermined multipliers.

Tutorials

1. Basics & Problem solving of Differential Equations.
2. Problem solving of Newton's Law of Cooling, Electrical Circuits, Conduction of Heat.
3. Examples on Fourier series.
4. Examples on Multiple Integral & Applications
5. Examples on Partial differential equations.
6. Examples on Error & Approximations, Maxima & Minima.

Text Books:

- 1) Higher Engineering Mathematics by B. S. Grewal (Khanna Publication, Delhi).
- 2) Higher Engineering Mathematics by B.V. Ramana (Tata McGraw-Hill).
- 3) Applied Mathematics (Volumes I and II) by P. N. Wartikar & J. N. Wartikar (Pune Vidyarthi Griha Prakashan, Pune)

Reference Books:

- 1) Advanced Engineering Mathematics by Erwin Kreyszig, Volume I & II (Wiley Eastern Ltd)
- 2) Advanced Engineering Mathematics, 7e, by Peter V. O'Neil (Thomson Learning).
- 3) Advanced Engineering Mathematics, Wylie C.R. & Barrett L.C. (McGraw-Hill, Inc.)

Weblink:

- **Ordinary Differential Equations:**
www.youtube.com/watch?v=P7gVp333B6M
- **Linear Differential Equations:**
www.youtube.com/watch?v=1FnBPmEWpus

- **Fourier series:**

www.youtube.com/watch?v=3bXH7AkIV6C

www.imperial.ac.uk/worksspace/mathematics/Public

- **Multiple Integral:**

<http://freevideolectures.com/Course/2267/Mathematics-I/28#>

<http://www.learnerstv.com/video/Free-video-Lecture-1823-Maths.htm>

- **Partial Differential Equations:**

<http://nptel.ac.in/courses/111103021/>

<https://www.youtube.com/watch?v=PTvvoVLzVCE>

BPHL102: Engineering Physics

Teaching Scheme	Examination Scheme (Theory)	Examination Scheme (Laboratory)
Lectures: 4 Hrs/Week	Teachers Assessment Examination: 20 Marks	Internal(TW): 25 Marks
Tutorials: 1 Hr/Week	Class Assessment Examination: 20 Marks	External(PR) : 25 Marks
Practical: 2 Hrs/Week	End Semester Examination: 60 Marks	External(OR) : Nil
Credit	5	1

Prerequisite : Class XII Knowledge on the course

Course Objective:

1. To understand fundamental principles of Engineering physics specifically concern to electron optics and quantum physics and their engineering applications.
2. To use various techniques for measurement, calculation, control and analysis of engineering problems based on the principles of Electron Optics, Ultrasonic, Acoustics, Laser, Band theory of solids, Quantum Mechanics, Superconductivity, and Nanophysics
3. To provides the basic ideas and gives the solution for developing mathematical and analytical abilities with higher precision.

Course Outcome: At the end of the course student will be able to

1. Solve the problems related to the applications of uniform & non uniform electric and magnetic fields and its use related devices for engineering applications.
2. Understand the nature and characterization of acoustics and its applications.
3. Demonstrate the knowledge of semiconductors and their applications.
4. Apply the concepts of light in optical fibers, light wave communication systems, and holography and for sensing physical parameters
5. Apply knowledge of physics in mechanics, wave properties, properties of matter and to solve simple qualitative and quantitative problems
6. Apply the concepts of physics in various branches of engineering

Course Contents

	Hrs
Unit – I : Electron Ballistics	
Motion of charges in uniform electric and magnetic fields; Electron optics: Bethe's law; Electrostatic and magneto static focusing; Devices: CRT, CRO and Cyclotron	8
Unit – II : Ultrasonics & Acoustics of Building	
Ultrasonics: Introduction, Production of ultrasonics waves, Magnetostriction and Piezo electric method, Detection of ultrasonics waves, Applications	8
Acoustics of Building: Basic requirement of acoustically good hall, Reverberation, Sabine formula for reverberation, factors affecting the architectural acoustics and their remedy.	
Unit – III : Lasers and Holography	
Introduction, Absorption and Emission of Radiation, Characteristics of Laser light, Pumping	8

Scheme, Population Inversion, metastable state, Types of Laser i) two level – semiconductor laser, ii) three level – Ruby laser, iii) four level – He:Ne laser Applications of Lasers – Holography, Recording and Reconstruction of Image, Applications of Holography, Optical Fiber communication system

Unit – IV : Band Theory of Solids

Introduction, Distinction between Insulators, Semiconductors and Conductors, Intrinsic Semiconductor, Extrinsic Semiconductor, Hall Effect, Fermi Distribution Function, Fermi level in Intrinsic and Extrinsic Semiconductors, band structure of PN junction diode under i) zero bias, ii) forward bias, iii) reverse bias, Working of transistor (NPN only) on the basis of band diagram, photovoltaic effect, working of solar cell on the basis of band diagram and its applications.

9

Unit – V : Quantum Mechanics

Introduction, Wave particle duality, de Broglie waves, Phase and Group velocities, Heisenberg Uncertainty Principle, Wave function and its Physical Significance, Time Independent and Time dependent Schrodinger Equation, Applications of Schrodinger Equation (infinite potential well – with derivation of energy and wave function), Tunneling through potential barrier, Applications of Tunnel Effect.

9

Unit – VI : Advanced Trends in Physics

X - rays and its practical applications in engineering, and in industry.

6

BPHL102: Engineering Physics

Part A: List of Practical (Any Six)

1. Application of Velocity filter using CRT: To determine e/m by Thomson's method.
2. Study of Lissajou's Figure using CRO
3. Ultrasonic interferometer for the determination of compressibility of liquid
4. Determination of band gap of a given semiconductor
5. Characteristics of Solar cell and Calculation of fill factor
6. Determination of thickness of wire using LASER.
7. Determination wavelength of Laser using Diffraction Grating.
8. Determination of electrical resistivity of semiconductor by using four probe method.

Part B: Mini Project Modeling

Every Students has to performed mini project in a group based on curriculum courses

Instructions to Student:

1. Maximum Three Students are permissible in each group
2. Project must be based on the contents of syllabus of subject.
3. Project report has to be prepared and attach in practical file individually.

Text Books:

1. Engineering Physics, Hitendra K. Malik & A. K. Singh, Tata McGraw Hill, New Delhi, 2010
2. Engineering Physics, Avadhanulu, Kshirsagar, S. Chand Publications
3. Engineering Physics, Guar, Gupta, Dhanpat Rai and Sons Publications

Reference Books:

1. Fundamentals of Physics, Resnick and Halliday, John Wiley and Sons.
2. Lectures on Physics, Volume 1, 2 and 3 by Richard P. Feynman, Narosa Publishers /
3. Pearson Education.
4. Laser and Non-Linear Optics, B. B. Laud (Oscar publication)

Web Links:

1. <https://www.youtube.com/watch?v=Lcy3f3QkTlw> (Electron Ballistics)
2. <http://www.nptel.ac.in/courses/122107035/6> (Acoustics)
3. <https://www.youtube.com/watch?v=HFvPzXr7rxU> (Nanophysics)
4. <https://www.youtube.com/watch?v=knVD1AfiozA> (Fermi energy & Fermi level)
5. <https://www.youtube.com/watch?v=T8WCr5axQXM> (Energy Bands)
6. <https://www.youtube.com/watch?v=GglT1RoBPzg> (Superconductivity)

BCHP103: Engineering Chemistry

Teaching Scheme:	Examination Scheme (Theory)	Examination Scheme (Laboratory)
Lectures: 4Hrs/Week	Teachers Assessment Examination: 20 Marks	Internal(TW): 25 Marks
Tutorials: 1 Hr/Week	Class Assessment Examination : 20 Marks	External(PR) : 25 Marks
Practical: 2Hrs/Week	End Semester Examination: 60 Marks	External(OR) : Nil
Credit	5	1

Prerequisite : 12th Standard Curriculum

Course Objective:

1. Technology involved in improving quality of water for its industrial use.
2. The basic concept of Electro analytical techniques that facilitate rapid and reliable measurements.
3. Chemical structure of Polymers and its effect on various properties when used as engineering materials.
4. Study of Fossil fuel and derived fuels with its properties and applications.
5. The principles of chemical and electrochemical reactions causing corrosion and methods used for minimizing.
6. An insight in to Nano materials and advance materials aspect of modern chemistry.

Course Outcome:

1. To apply the knowledge of basic science in engineering and technology and also understand the concept of applied chemistry and analyze it with experiments.
2. The broad education necessary to understand the impact of engineering solutions in global, economic and in environmental context.
3. An ability to design and conduct experiments as well as to organize, analyze and interpret data.
4. An ability to use the techniques, skills and modern engineering tools necessary for engineering practice.
5. To apply the knowledge of advance engineering materials for varied engineering applications.
6. The significance of teaching the aforementioned course is realized in both research, and development of innovative technologies by the student's successful participation in various basic level research oriented programs, and competitions, both at the national and international levels..

Course Contents

Hrs

Unit – I : Water technology and Green chemistry

Impurities in water. Hardness of water & its determination by EDTA method. Alkalinity of water and its determination and Numerical on alkalinity and hardness. III effects of hard water in boilers. Boiler feed water treatment -1) Internal treatment-calgon and phosphate conditioning, 2) External treatment- a) Zeolite process & its numerical b) Ion exchange method. Desalination of brackish water/Purification of water by Reverse osmosis and Electro dialysis.

8

Green Chemistry: Introduction, Twelve Principles of green Chemistry Major uses- traditional and green path ways of synthesis of adipic acid, indigo dye.

Unit – II : Electro analytical techniques

Type of reference electrode (calomel electrode), indicator electrode (glass electrode), Ion selective electrode, Half-cell reaction and complete cell reaction.

Conductometry: Introduction, Kohlrausch's law, Conductivity cell, Measurement of conductance, applications-Conductometric titrations, Acid-Base Titrations, precipitation titration, Potentiometry: Introduction, Potentiometric titrations-differential plots. Applications- redox titrations $\text{Fe}^{2+}/\text{Ce}^{4+}$ titration. UV/Visible spectroscopy: Beer Lambert's law, chromophore and auxochrome, types of electronic transitions. Instrumentation and principle- block diagram of single and double beam spectrophotometer. Applications of uv-visible spectroscopy.

8

Unit – III : Synthetic Organic Polymers

Introduction, functionality of monomer, polymerization-Free radical mechanism & step growth polymerization, T_m and T_g , Thermoplastic and Thermosetting polymers. Compounding of plastics. Preparation, properties & engineering applications of: Polyethylene (LDPE & HDPE) and Bakelite. Elastomers- Natural rubber-processing & vulcanization by sulphur. Synthetic rubbers-SBR. Specialty polymers: Engineering thermoplastics- Polycarbonate, Biodegradable polymers- Poly (hydroxyl butarate-hydroxyvalanate), Conducting polymers- Polyacetylene, Liquid Crystal polymer-Kevlar.

8

Unit – IV : Fuel & Combustion

Fossil Fuels: Definition, Calorific values, Determination- Bomb calorimeter, Numerical Boy's gas calorimeter, Numerical Solid fuel-coal-Proximate analysis, Ultimate analysis & Numerical. Liquid fuels-Petroleum-composition and refining. Octane number of petrol, Cetane number of diesel, Power alcohol, Biodiesel. Gaseous fuel-Composition, properties and applications of NG, CNG & LPG, Combustion- Chemical reactions, Calculations for air required. Numerical.

8

Fuel cell: Introduction, applications.

Unit – V: Corrosion science

Introduction. Types of corrosion- Dry corrosion- mechanism, Pilling-bed worth rule. Wet corrosion- mechanism. Factors influencing corrosion- Nature of metal, Nature of environment, Cathodic and anodic protection, Use of corrosion Inhibitors Protective coatings: surface preparation

8

a) Metallic coatings:, Electroplating & Electro less plating.

b) Non-metallic coatings: chemical conversion coatings

Unit –VI : Advances in Engineering Chemistry

Nanomaterial: Graphite, Carbon nanotube (CNT) & Fullerenes- Structure, Properties, Applications, Lubricants: Introduction, classification of lubricants, (Liquid, semi- solid (Grease). Biomaterial: classification, Properties, Examples. Biosensor- Introduction, Classification, Applications. Smart Material: Introduction, Shape Memory Alloy and its Example, Advantages, Disadvantages, Applications.

8

Part A:List of Practical(Any Six)	Hrs.
1.Determination of hardness of water by EDTA method.	02
2.Determination of alkalinity of water.	0 2
3.To determine maximum wavelength of absorption of CuSO_4 / FeSO_4 , verify Beer's law and find unknown concentration in given sample	02
4.Titration of mixture of weak acids and strong acid with strong base using conductometer.	02
5. Preparation of Urea-formaldehyde resin and its characterization.	
6.Determination of molecular weight/radius of macromolecule polystyrene/polyvinylalcohol	02
7.Proximate analysis of coal	
8. Preparation of nickel coating on copper metal using electroplating & electroless plating	02
9.TO calculate the electrochemical equivalent of copper by electrolysis of copper sulphate solution using copper electrode.	02
10.Determination of acid value of given lubricating oil.	02

Part B:Mini Project Modeling

Every Student has to perform a mini project in a group based on curriculum courses

Instructions to Student:

1. Maximum Three Students are permissible in each group
2. Project must be based on the contents of syllabus.
3. Project report has to be prepared and attached in practical file individually.

Text Books:

1. Engineering chemistry by O.G. Palana, Tata Mcgraw Hill Education Pvt. Ltd.
2. Engineering chemistry by Dr. S.S. Dara Dr. S.S.Umare, S. Chand & company Ltd.

Reference Books:

1. Engineering chemistry by Wiley India Pvt. Ltd. First edition
2. Inorganic chemistry, 5e, by Shriver and Atkins, Oxford university press.
3. Shashi Chawala Text book of Engineering Chemistry Sudharani (Dhanpat Rai Publishing Company)

Laboratory Manual:

1. Vogel's text book of Quantitative Chemical analysis ,6e,by Mendham, R.C.denney, J.D. Barnes, M.J. K. Thomas, Pearson Education Ltd.
2. Applied Chemistry Theory and Practice ,2e, by O. P. Virmani and A.K. Narula , New age International (P) Ltd.
3. Laboratory manual Engineering Chemistry by Dr. Sudharani (Dhanpat Rai Publishing Company.)

Web Links:

1. www.nptel.ac.in/course/105/04/02-water technology
2. www.nptel.ac.in/syllabus/syllabus.php?subjectId=103/08/00 -electro analytical technique
3. www.nptel.ac.in/courses/113/05028 -polymer
4. www.nptel.ac.in/courses/103/05/10-fuel & combustion
5. www.nptel.ac.in/courses/113108051/ corrosion science
6. <http://nptel.ac.in/course.php?disciplineId=102> – advance materials

BITL104: Programming in C

Teaching Scheme	Examination Scheme (Theory)	Examination Scheme (Laboratory)
Lectures: 2Hrs/Week	Teachers Assessment Examination: 10 Marks	Internal (TW) : 25
Practical: 2Hr/Week	Class Assessment Examination: 10 Marks	External (PR) : 25
	End Semester Examination: 30 Marks	External (OR) : Nil
Credit	2	1

Prerequisite :

1. Basic Knowledge of Computer

Course Objective:

1. To make students aware of basics about computers, hardware, software & Operating system.
2. To understand the role of constants, variables, identifiers, operators, type conversion and other building blocks of C Language.
3. To understand the Use of conditional expressions and looping statements to solve problems associated with conditions and repetitions.
4. To understand concept of array and passing array through function
5. To understand the concept of structure and union
6. To develop programming skill in a student to write programs in C language.

Course Outcome:

1. Students are able to understand basic concepts of programming.
2. Students are able to understand the basic terminology used in 'C' programming.
3. Students are able to design programs involving decision structures and loops.
4. Students are able to use different data types in a computer program.
5. Students are able to apply functions and array in program.
6. Students are able to write, compile and debug programs in C language.

Course Contents

Hrs.

Unit – I :Basics of Programming

4

Basics of programming: approaches to Problem solving, concept of algorithm and flow charts with e.g., types of computer languages: Machine language, assembly language and high level language, concept of assembler, compiler, loader and linker.

Unit – II : C Programming fundamentals

4

Types of programming language , Introduction to C language, tokens, character set, constants, variables, data types, keywords, expressions, operators in C and its types, standard input- output statements in C, structure of C-program.

Unit –III Conditional Program Execution	4
Conditional Program Execution: Applying if and switch statements, nesting if and else, restrictions on switch values, use of break and default with switch, Uses of while, do and for loops, multiple loop variables, assignment operators, using break and continue.	
Unit – IV : Introduction to function and Arrays	4
Standard library functions and user defined functions, function declaration, function definition and function call - call by value and call by reference, return statement, recursion, Introduction to array , One and Two Dimensional Arrays, Initialization, Operations on one & two dimensional arrays.	
Unit –V Introduction to String	4
Definition of string, Declaration of string, Reading, Writing, String handling operations using and without using library functions, Examples of strings.	
Unit – VI : Structure	4
Introduction to Structure definition. Initializing, Assigning values, passing of structure as arguments, Unions, Programming Examples. Standard C preprocessors , defining and calling macros, Storage Classes with types.	
Practical/Assignments	Hrs.
1. Study of Operating Systems – Window & Linux with their Commands	2
2. Write programs to implement simple/basic concepts of C.	2
3. Write programs to implement decision making and control statements in C – if-else, nested if else, if-else-if and switch-case statement.	2
4. Write programs to implement loops in C – while, do-while.	2
5. Write programs to implement for loop in C.	2
6. Write programs to implement string operations in C – strlen(), strcpy(), strcat(), strrev() etc.	2
7. Write programs to implement string operations in C without using library functions.	2
8. Write programs to implement functions in C.	2
9. Write programs to implement of concept call by value & call by reference in C.	2
10. Write programs to implement of Array concept (One dimensional)	2
11. Write programs to implement of Array concept (Two dimensional)	2
12. Write programs to implement structures in C.	2
13. Write a programs to implement union in C.	2

Text Books:

1. E.Balagurusamy, "Programming in ANSI C" , Tata McGraw Hill
2. B.W. Kernighan, D.M. Ritchie, "The C Programming Language", Prentice Hall of India.
3. Yeshwant Kanetkar, "Let Us C", BPB Publication.

Reference Books:

1. R.G. Dromey, "How to Solve It By Computer", Pearson Education
2. K. R. Venugopal, Sudeep R. Prasad, "Programming with C", Tata McGraw Hill.
3. E.Balagurusamy, "Fundamentals of Computers", Tata McGraw Hill

Web Links

1. www.w3schools.com
2. www.cprogramming.com
3. www.eskimo.com/~scs/cclass/notes/top.html
4. www.cprogrammingexpert.com/

BECL105: Basic Electronics Engineering

Teaching Scheme:	Examination Scheme	Examination Scheme
	(Theory)	(Laboratory)
Lectures: 2Hrs/Week	Teachers Assessment Examination: 10 Marks	Internal(TW): 25 Marks
Practical: 2 Hrs/Week	Class Assessment Examination : 10 Marks	External(PR) : 25Marks
	End Semester Examination: 30 Marks	External(OR) : Nil
Credit	2	1
Prerequisite : 12 th Physics		

Course Objective:

1. To give the basic knowledge of basic components & circuit.
2. To study logic gates and their usages in digital circuits
3. To expose the student to working of power electronic devices and transducers
4. To introduce basic aspect of electronic communication system

Course Outcome ; After completion of this course student will be able to

1. Student can acquire the basic knowledge of electronic components and circuits.
2. To gain the concepts of Semiconductor physics
3. Students will be able to effectively employ basic knowledge for new application
4. To design and analyze basic electronic circuits
5. Students will be able to effectively employ technology for their use.
6. To measure the performance parameters of electronic circuits

Course Contents

Hrs

Unit – I : Diode Circuits

Half wave rectifier, Full wave rectifier, D.C Regulated Power supply, Diode application: clipper, Clamper. LED Diodes and Photodiode. 4

Unit – II : BJT circuits

BJT structure and its operation with normal biasing, DC operating point, DC load line analysis in various operating region of BJT. Transistor as an amplifier in CE mode and as a switch. 6

Unit – III : Linear Integrated Circuit

Introduction to Op-Amp, Op-amp input modes and parameters, Op-Amp with negative feedback: summing amplifier, integrator, and differentiator, IC555 as a astable multivibrator. 6

Unit – IV: Basic Digital Electronics

Introduction to logic gates with their truth table, Boolean algebra, D Morgan's Law, Simplification of logical expressions, Sum of product & product of sum, Implementation of 6

SOP (using 3 variable)on Karnaugh map and solving technique. Implementation of expression with basic gates.

Unit – V : Digital Electronics Fundamental

Number system: Binary, Gray, octal, Hex, Half adder, Full Adder, Mux, Demux, Flip-flop, Registers, Mod Counter, Sequential and combinational circuits. 4

Unit – VI : Power devices and Transducers

SCR, DIAC, Triac, Transducer like Thermocouple, RTD, thermister, load cell and its application like Digital thermometer, weighing machine. 6

BECPE105: Basic Electronics Engineering

Part A :List of Practical(Any Ten)

1. Study of different electronics components.
2. Study of different electronics measuring devices.
3. Study of regulated DC power supply.
4. Study of V-I characteristics of Diode.
5. Study of Clipper circuits.
6. Study of Clamper circuits.
7. Study of single stage BJT common emitter amplifier circuit.
8. Study of Op-Amp circuits as i) Adder ii) Integrator
9. Study of i) MUX ii) Demux
10. Study of IC555 as a timer
11. Study of Half Adder
12. Study of Full Adder
13. Verify the truth tables of different digital ICs like: AND, OR, NAND, NOR.
14. Study of design of AND,OR by universal gate
15. Study of synchronous counter.
16. Study of asynchronous counter.
17. Study of V-I characteristics of SCR.
18. To design electronic circuit for given application
19. Use of PCB for making circuits.
20. Study of function generator to generate various signals like sinusoidal, triangular, ramp observe the waveform on CRO.

Part B-Mini Project Modeling

Every Students has to performed mini project in a group based on curriculum courses

Instructions to Student:

- 1)Maximum Three Students are permissible in each group
- 2) Project must be based on the contents of syllabus.
- 3) Project report has to be prepared and attach in practical file individuallyProject report has to be prepared and attach in practical file individually.

Text Books:

1. Electronic Devices & circuits – Floyd (Pearson Education India)
2. Modern digital Electronics- R.P. Jain(TMh Publication)
3. Electronics Instrumentation- H.S. Kalsi(Tata McGraw Hill)
4. Communication Electronics principle & Application-Frenzel ((Tata McGraw Hill)
5. Electronic Devices & circuits – salivahanan Tata McGraw Hill

Reference Books:

1. Jacob Miliman, C CHalkias, Chetan Parikh- Integrated Electronics.(Tata McGraw Hill)
2. Debashish De, Kamakhya Prasad Ghatak- Basic Electronics(Pearson Education)
3. J R Cogdell- foundation of Electronics(Pearson Education)

Web Links:**Unit I : PN junction diode & Rectifier**

- 1.http://www.electronics-tutorials.ws/diode/diode_1.html
- 2.<http://www.allaboutcircuits.com/textbook/semiconductors/chpt-3/introduction-to-diodes-and-rectifiers/>

Clipper & Clamper

<http://www.daenotes.com/electronics/devices-circuits/clipper-clamper>

Unit II: BJT

1. Applicationhttp://www.electronics-tutorials.ws/transistor/tran_1.html
2. BJT CE Amplifier:http://www.electronics-tutorials.ws/amplifier/amp_2.html
3. BJT as a switch:http://www.electronics-tutorials.ws/transistor/tran_4.html

Unit III: Linear Integrated Circuit

- 1.Op amp Application:http://www.electronics-tutorials.ws/opamp/opamp_7.html
- 2.http://www.electronics-tutorials.ws/opamp/opamp_4.html

IC 555:

3. <https://electrosome.com/astable-multivibrator-555-timer/>

Unit IV: Basic Digital Electronic

http://www.electronics-tutorials.ws/counter/count_3.html

1. Unit V:: Digital Electronics Fundamental

2. Half & Full adder<http://www.circuitstoday.com/half-adder-and-full-adder>
3. <http://www.radio-electronics.com/info/data/semicond/thyristor/structure-fabrication.php>

Unit VI: Power Devices and Transducers

http://www.radio-electronics.com/info/cellulartelecomms/cellular_concepts/mobile-basics-Transducers:http://www.electronics-tutorials.ws/io/io_1.html

BEEL106: Basic Electrical Engineering

Teaching Scheme	Examination Scheme (Theory)	Examination Scheme (Laboratory)
Lectures: 3 Hrs/Week	Teachers Assessment Examination: 20 Marks	Continuous
Tutorials: 1 Hr/Week	Class Assessment Examination: 20 Marks	Assessment: 25 Marks
Practical: 2 Hrs/Week	End Semester Examination: 60 Marks	External(PR) : 25 Marks
Credit	4	1

Course Objective:

1. To expose the undergraduate first-year engineering students to the fundamental laws of electricity and their applications in day-to-day life.
2. To lay a course foundation for the students who would be trained in the related core subjects like electrical, electronics, instrumentation and control, tele-communications etc.
3. Demonstrate the awareness on social issues like conservation of electrical energy, electrical safety etc.
4. Develop abilities to analyze circuits quantitatively.

Course Outcome:

1. Apply basic electric circuit laws to solve electric circuit problems and design basic D.C. electric circuit using circuit analysis techniques.
2. Apply basic A.C. electric circuit laws in solving A.C. circuit problems and able to perform A.C. power calculation.
3. Learner should understand and grasp the analytical treatment of electrical quantities with the help of phasor-algebra.
4. To understand the difference between DC and AC Systems and between Single-phase and three phase utility AC Source.
5. To understand functioning of basic electrical circuits, useful in domestic and industrial power supplies.
6. To train the learner in adequate experimentation related to high power electricity and in measurements of electrical quantities such as voltage, current and power

Course Contents	Hrs
Unit – I : D.C. Circuits	
Ohm's law, Simplification of networks using series - parallel combinations, Current and Voltage sources, Kirchhoff's laws, Superposition theorem, Thevenin's theorem, Maximum Power Transfer theorem.	07
Unit – II : Single Phase A.C. Circuits	
Concept of AC quantities, Concepts of cycle, Period, Frequency, Generation of alternating voltage and currents, RMS and Average value, Form factor, Crest factor, Phase and Phasor diagrams, AC through Pure resistance, Inductance & Capacitance, R-L , R-C and R-L-C series circuits, Power and Power factors.	07
Unit – III : Three Phase A.C. Circuits	
Three Phase Circuits:- Concept of three phase supply, Phase sequence, Concepts of line, Phase, Neutral etc., Power relations in a Three phase balanced Star and Delta connections, Three phase phasor diagrams.	06
Unit – IV : Fundamentals of Transformer	
Construction, Working Principle, EMF equation, Rating of transformer, Transformer on no load and on Full load, Transformer losses, Calculation of Efficiency and Regulation.	06
Unit – V : Work , Power and Energy	
Energy conversions from one form to another such as Electrical, Thermal and Mechanical, and Numerical problems based on different energy conversions in real life cases.	04
Unit – VI : Electrical Machines	
Fundamentals of DC and AC Machines, DC Series and Shunt Motor, AC Single Phase Induction Motor ,Stepper Motor, Servo Motor.	06

BEEP106: Basic Electrical Engineering

Part A:List of Practical/Assignments (Any Six)

1. Study of :
 - a) Different wiring components, switches, holders, cables, tube circuit, CFL, Megger.
 - b) Energy conservation and safety precautions.
2. Study of :
 - a) Control of lamp from two switches.
 - b) Study of staircase wiring.
3. Verification of Kirchhoff's laws.
4. Verification of Superposition theorem.
5. Verification of Thevenin's theorem.
6. Study of R. L. C. series circuits.
7. Verification of current relations in three phase balanced star and delta connected loads.
8. Single phase transformer:
 - a) Voltage and Current ratio
 - b) Efficiency and regulation by direct loading method.
9. Load test on DC series motor.

Part B-Mini Project Modeling

Every Student has to perform mini project in a group based on curriculum courses.

Instructions to Student:

- 1) Maximum Three Students are permissible in each group
- 2) Project must be based on the contents of syllabus of subject.
- 3) Project report has to be prepared and attach in practical file individually .

Text Books:

1. **Electrical Technology** Volume-I–B.L. Theraja, S.Chand and Company Ltd.,New Delhi.
2. **Basic Electrical Engineering**, V. K. Mehta , S. Chand and Company Ltd., New Delhi.
3. **Theory and problems of Basic Electrical Engineering-** I. J. Nagrath and Kothari, Prentice-Hall of India Pvt. Ltd.

Reference Books:

1. **Electrical Technology-** Edward Hughes, Seventh Edition, Pearson Education
2. **Elements of Electrical Technology-** H. Cotton, C.B.S. Publications
3. **Electric Machines** by AshfaqHussain - Dhanpatrai

Web Links:

Unit1: correlation on effect of temperature:

1. <http://arxiv.org/ftp/arxiv/papers/0903/0903.1334.pdf>

Unit-2: Single phase AC Circuit:

2. <http://elearning.vtu.ac.in/13/ENotes/BEE/BasicElectricalNotes.pdf>

Unit-3: Three Phase AC Circuit:

3. <http://www.allaboutcircuits.com/textbook/alternating-current/chpt-10/three-phase-y-delta-configurations/>

Unit4: Core construction of Transformer:

4. wapyoutub.com/download/video/How...Transformer.../vh_aCAHThTQ

Problems on Transformer:

5. <https://www.youtube.com/watch?v=zg0piCo5ZTA>
6. <https://www.youtube.com/watch?v=9TTxUY0vNb8>

Unit-5: Work , Power , Energy:

7. <http://www.efm.leeds.ac.uk/CIVE/CIVE1140/>
8. [docs/mechanics_sec03_full_notes02.pdf](#)

Unit-6: Electrical Machines:

9. <https://www.rockwellautomation.com/resources/downloads/rockwellautomation/che/pdf/>
10. [Application_basics_operation_three_phase_induction_motors.pdf](#)
11. <http://www.solarbotics.net/library/pdflib/pdf/motorbas.pdf>
12. <http://www.baldor.com/Shared/manuals/1205-394.pdf>
<http://uotechnology.edu.iq/dep-ee/lectures/3rd/Communication/machine/PART%203.pdf>

BCEL107: Engineering Mechanics

Teaching Scheme:	Examination Scheme (Theory)	Examination Scheme (Laboratory)
Lectures: 3 Hrs/Week	Teachers Assessment Examination: 20 Marks	Internal(TW): 25 Marks
Tutorials: 1 Hrs/Week	Class Assessment Examination: 20 Marks	External(PR) : 25 Marks
Practical: 2 Hrs/Week	End Semester Examination: 60 Marks	External(OR) :- Nil
Credit	4	1
Prerequisite: Knowledge of basic physics and geometry of XII th standard		

Course Objective:

1. Basic concepts of Mechanics for Static and Dynamics have to be implanted into the student.
2. To describe and be able to predict the conditions of rest or motion of the bodies under the action of forces
3. To understand the basic concepts of forces moments, couples in two dimensional force syst

Course Outcomes: After Completion of this course student will be able to

1. Understand the principle of work and energy
2. Comprehend the effect of friction on equilibrium.
3. Understand the laws of motion, the kinematics of motion and the interrelationship.

Course Content	Hrs
Unit – I : Coplanar Force System	
1.1 System of Coplanar forces:- Resultant of Concurrent forces, Parallel forces, Non Concurrent Non Parallel system of forces, Moment of force about a point, Couples, Lami’s Theorem, Varignon’s Theorem. Distributed Forces in plane, Resultant of general force system	6
1.2 Center of Gravity and Centroid for plane Laminas	
Unit – II :Equilibrium of Force System	
2.1 Equilibrium of system of coplanar forces:- Condition of equilibrium for concurrent forces, parallel forces and Non concurrent Non Parallel general forces and Couples.	6
2.2 Analysis of plane trusses by using Method of joints and Method of sections.	
Unit – III : Analysis of Beams, Frames & Cables	
3.1 Beams: Types of beams, Types of supports, Types of loading.	6
3.2 Frames : Analysis of Trusses &Frames	
Unit – IV : Friction	
4.1 Friction: Dry Friction, Laws of friction, angle of friction & resultant reaction, wedge friction, ladder friction, belt friction.	6

4.2 Kinematics- Basic concepts, equation of motion for constant acceleration and motion under gravity. Variable acceleration and motion curves.

Unit – V : Dynamics

A] Kinematics of Particle: - Velocity & acceleration in terms of rectangular co-ordinate system, Rectilinear motion, Motion along plane curved path, Tangential & Normal component of acceleration, Motion curves (a-t, v-t, s-t curves), Projectile motion. 6

B] Kinetics of a Particle: Force and Acceleration:-Introduction to basic concepts, Newton's Second law of motion. D'Alemberts Principle.

Unit – VI : Principle of Work Energy & Impulse Momentum

A] Work energy principle for particle: Work, Power, Energy, conservative forces & Potential Energy, Conservation of Energy, Work energy principle for motion of particle. 6

B] Impulse momentum principle for particle: Linear Impulse & Momentum, Conservation of momentum, Direct central impact & coefficient of restitution, Impulse momentum principle

Assignments :

Analytical solution of at least four problems / question on each unit based on above syllabus

BCEP107: Engineering Mechanics

Part A :List of Experiments (Any Six)

1. Study of law of parallelogram of forces
2. To Determine the Reaction at The Supports of Simply Supported Beam
3. To determine coefficient of Friction using Belt Friction
4. Verification of law of polygon of forces by graphical method.
5. Study of Lami's Theorem
6. To Determine the Moment of Inertia of Fly-Wheel.
7. To study kinematics of curvilinear motion of a particle
8. To find coefficient of restitution

Text Books:

1. F. L. Singer, Engineering Mechanics, Third Edition, Harper Publication, 2012
2. Engineering Mechanics – Statics and Dynamics by A Nelson, Tata McGraw Hill Education private Ltd, New Delhi 2009.

Reference Books:

1. Vector Mechanics for Engineers, Tata McGraw Hill Company Beer & Johnston, 2012, 9th Edition.
2. Engineering Mechanics, Pearson Education Asia Pvt. Ltd., Irving K. Shames, 2009, 4th Edition.
3. Engineering Mechanics, Prentice Hall, R.C.Hibbler, 2003, Tenth Edition
4. Engineering Mechanics, DhanpatRai Publishing Company, S. Ramamrutham, 2009, 9th Edition.
5. Engineering Mechanics, DhanpatRai Publishing Company, R. K. Rajput, 2011, 3rd Edition
6. Engineering Mechanics, S. Chand Publication , R.S. Khurmi& Gupta,30july 2015.

Web Links:

Unit I : Resultant of concurrent force System

1. http://www.ae.msstate.edu/vlsm/forcesys/concurrent_force_systems/resultant.html
2. <http://www.brainchamp.net/parallelogram-law-of-coplanar-concurrent-forces/>
3. <http://www.slideshare.net/guestb54490/concurrent-forces>

Lamis theorem

1. <http://me-mechanicalengineering.com/lamis-theorem/>
2. <http://www.tutorvista.com/content/physics/physics-iii/motion-laws/lamis-theorem.php>
3. <http://encyclopedia2.thefreedictionary.com/Lami's+theorem>

Varignons theorem

1. nptel.ac.in/courses/Webcourse-contents/IIT-%20Guwahati/.../lec1.htm
2. me-mechanicalengineering.com/varignons-theorem
3. fsinet.fsid.cvut.cz/en/u2052/node40.htm

Moment & couple

1. www.mathalino.com/reviewer/engineering-mechanics/moment-force
2. web.mit.edu/4.441/1_lectures/1_lecture5/1_lecture5.html
3. physicsnet.co.uk/a-level-physics-as-a2/mechanics/moments/

Unit II : Analysis of structure (join method & section method)

1. www.mathalino.com › Engineering Mechanics › Analysis of Structures
2. www.thelearningpoint.net/home/...mechanics/analysis-of-structure
3. www.ce.memphis.edu/3121/notes/notes_03b.pdf
4. https://en.wikipedia.org/wiki/Structural_analysis

Unit III : Beam & types of beam & FBD

1. [https://en.wikipedia.org/wiki/Beam_\(structure\)](https://en.wikipedia.org/wiki/Beam_(structure))
2. www.ecourses.ou.edu/cgi-bin/ebook.cgi?topic=me&chap_sec..
3. <https://www.quora.com/What-are-the-types-of-beams>

Unit IV : Friction

1. study.com/academy/.../what-is-friction-definition-formula-forces.html
2. www.physicsclassroom.com › Physics Tutorial › Newton's Laws

Unit V : Dynamics

1. <http://www.real-world-physics-problems.com/curvilinear-motion.html>
2. http://nptel.ac.in/courses/122103010/md07_experiment/module2/lectures/lect4/slides/slide1.htm
3. www.iitg.ac.in/kd/Lecture%20Notes/ME101-Lecture27-KD.pdf
4. study.com/academy/lesson/projectile-motion-definition-and-examples.html
5. <https://www.khanacademy.org/...newtons-laws/newtons-laws.../ne...>
6. www.crackthehack.com/bnd/epress/2012/.../d-alemberts-principle-and-its-applications...

Unit VI : Principle of Work-Energy & Impulse

1. <https://www.khanacademy.org/.../work...energy/work...energy.../...>
2. www.spumone.org/courses/dynamics-notes/impulse_momentum/

3. <https://www.coursera.org/.../module-12-define-coefficient-of-restitution-solve-an-imp...>

BMEL108 : Basic Mechanical & Engineering Graphics

Teaching Scheme:	Examination Scheme (Theory)	Examination Scheme (Laboratory)
Lectures: 2 Hrs/Week	Teachers Assessment Examination: 20 Marks	Internal(TW): 25 Marks
Practical: 2 Hrs/Week	Class Assessment Examination:20 Marks End Semester Examination: 60 Marks	External(PR) : 25Marks External (OR) : Nil
Credit	2	1

Prerequisite:

1. XIIth Physics and its principles.
2. Basic Geometry and concepts.

Course Objective:

1. To describe the scope of mechanical engineering in multidisciplinary industries.
2. To understand and identify common machine elements with their functions and power transmission devices.
3. To learn conventional machine tools , manufacturing processes and understand the design in mechanical engineering.
4. To develop imagination power of student of physical objects to be represented on paper for engineering communication in technical field.
5. To develop the manual drawing skill, drawing interpretation skill.
6. To develop the physical realization of the dimension of the objects.

Course Outcomes:

1. The students will understand the mechanical engineering in general; they will get information of power transmission shafts, keys, coupling, bush, ball bearing, friction clutches, and brakes.
2. The Students will get information of Individual & group drives, gear train, gear drive etc.
3. The Student will get information of basic Manufacturing processes as well as working principle and types of operations with block diagram of Lathe Machine, Drilling Machine, Grinding Machine.
4. The student will get idea of first & third angle method of projection, projection of lines which are inclined to both planes i.e. H.P & V.P. by first angle method of projection.
5. The student will able to draw Engineering Curves, Projection of Solids, Section of Solids, Development of Solids on sheets with their imagination power; they acquire knowledge of method of drawings adapted all over the world and able to read sheets in engineering field, their dimensioning.
6. The students will get idea of Auto-CAD software which is user friendly to draw 2D and 3D object with uniform dimensioning.

Course Contents

Hrs

Unit – I : Basic Mechanical Devices

4

A] Machine Elements : Power transmission shafts, coupling, bush and ball bearing and friction

clutches, brakes (Types & application only)

B] Drives : Individual and group drives, belt drive, chain drive, rope drive, gear drive and Spur Gear Drive arrangement with gear train (Types & application only)

Unit – II: Manufacturing Processes & Machine Tools

A] Manufacturing Processes

Basic Manufacturing Processes overviews, Sheet metal forming processes : drawing and bending, Sheet metal Cutting processes : Blanking, Piercing ,Metal Joining Processes : Welding , Soldering , Brazing methods and application 6

B] Machine Tools& Operations: Basic Elements, Working Principle, Types of Operations with Block Diagram: Lathe Machine, Drilling Machine.

Unit – III : Projection of Lines, Projection of Solids, Development of Solid & Orthographic Projection

A] Introduction to lines and Engineering Curves -Ellipse, Parabola, Hyperbola by Focus Directrix and Rectangle Method 8

B] Introduction to projection of solids and section of solids and Development of Solid(Prism and Pyramid Maximum with six sides)

C] Orthographic projections of given pictorial view by First Angle Method of Projections.

Unit – IV : Isometric Projection & Auto-CAD

A] Introduction to Isometric View with the example of Cube Isometric axes, scale, Isometric Projection and Isometric Views. Drawing isometric views of simple solids and objects dimensioning-only Length, width and height of Isometric views. 6

B] Introduction to AutoCAD, Commands, AutoCAD drawing of simple 2D objects

BMEP 108: Elements of Mechanical & Engineering Graphics

Part A- List of Practical/Assignments (Any Eight Out of which 9 & 10 compulsory) Hrs.

- | | |
|-----------------------------------------------------------------------------|---|
| 1. Study of power transmitting Elements – Gears, Couplings, Bearings | 2 |
| 2. Study of Automobile Clutches. | 1 |
| 3. Study of Mechanical Brakes. | 1 |
| 4. Study, demonstration & working of Lathe Machine | 2 |
| 5. Study ,demonstration & working of Drilling Machine | 2 |
| 6. Four problems on Projection of lines | 4 |
| 7. Two problems on Projection of Solids | 4 |
| 8. Four problems on Engineering Curves and Development of Lateral Surfaces. | 4 |
| 9. AutoCAD Drawing- 2 Problem on orthographic | 4 |
| 10. AutoCAD Drawing- 2 Problem on Isometric Projection | 4 |

Part B-Mini Project Modeling

Every Students has to performed mini project in a group based on curriculum courses

Instructions to Student:

1. Maximum Three Students are permissible in each group
2. Project must be based on the contents of syllabus.

3. Project report has to be prepared and attach in practical file individually.

Text Books:

1. N. D. Bhatt and V. M. Panchal, Engineering Drawing, Plane and Solid Geometry , Charotor Publication House, Anand , Gujrat, India.
2. Dhananjay A. Jolhe, Engineering Drawing with an Introduction to Auto CAD, Tata Mcgraw- hill Publishing Co. Ltd. , New Delhi , India.
3. G. Shanmugam S. Ravindran “ Basic Mechanical Engineering” , Tata McGraw- Hill Publisher Co. Ltd.
4. R. K. Purohit “ Foundation of Mechanical Engineering” , Scientific Publishers.

Reference Books :

1. K. Venugopal, Engineering Drawing and Graphics, New Age Publication.
2. N. B. Shaha and B. C. Rana, Engineering Drawing, Pearson Education.
3. C. Jensen, J. D. Helsel and D. R. Short, “Engineering Drawing and Design”, Tata McGraw- Hill Education Pvt. Ltd., New Delhi, 2012
4. Surinder kumar , “ Basics of Mechanical Engineering”. Ane Books Pvt. Ltd., New Delhi, 2011
5. T. J. Parbhu , V. Jaiganesh and S. Jebaraj, “ Basic Mechanical Engineering” , Scitech Publications (India) Pvt. Ltd. Chennai, 2010.

Weblinks :

Unit – I

- <https://www.google.co.in/webhp?sourceid=chrome-instant&ion=1&espv=2&ie=UTF-8#q=machine+Elements+Shaft+%2C+keys%2C+Coupling>
- http://www.codecogs.com/library/engineering/theory_of_machines/belt-and-rope-drives-brakes.php

Unit – II

- https://en.wikipedia.org/wiki/List_of_manufacturing_processes
- <http://www.egr.msu.edu/~pkwon/me478/operations.pdf>

Unit – III

- <http://nptel.ac.in/courses/112103019/20>
- <http://www.iitg.ernet.in/rkbc/ME111/Lecture4%20Engineering%20Curves%20and%20Theory%20of%20projections.pdf>
- <http://nptel.ac.in/courses/112103019/29>
- <http://www.iitg.ernet.in/rkbc/ME111/Lecture11%20Sections%20of%20solids.pdf>
- http://www.engineeringessentials.com/ege/ortho/ortho_page2.htm

Unit – IV

- http://home.iitk.ac.in/~cvrm/TA101_L12_IsometricProjections_Basics.pdf
- <http://cms.cerritos.edu/uploads/engt/autocad%20basics.pdf>

BHUL109: Environmental Studies and Professional Ethics

Teaching Scheme:	Examination Scheme (Theory)	Examination Scheme (Laboratory)
Lectures: 2 Hrs/Week	Teachers Assessment Examination: Nil	Internal(TW): Nil
Tutorial: Nil	Class Assessment Examination: Nil	External(PR) : Nil
	End Semester Examination: Nil	External(OR) : Nil
Credit	Audit Course	

Course Objective: After completing the course students will be able to

1. Understand fundamental concepts of Environmental systems
2. Understand fundamental concepts from the social sciences and humanities underlying environmental thought and governance.

Course Outcome: At the end of the course the student shall be able to:

1. Understand the concepts and methods and their applications in environmental problem-solving.
2. To get knowledge about impact of different types of pollutions.
3. To get knowledge about effect of water pollution on health and different energy recourses.
4. Demonstrate self confidence and self esteem.
5. Present appropriate etiquettes, style, manners and graceful personality.

Course Contents

Hrs

Unit – I : Environmental Science, Climate Change and need of public awareness

Definition, scope importance and objectives, guiding principle of Environmental studies, climate change and Need for public awareness. Concept of ecosystem biotic & abiotic components, types of ecosystems. Explain different ecosystems- forest, grassland, desert, aquatic.

4

Unit – II : Pollution and Waste Management

Air Pollution & Automobile Pollution: Definition, Effects – Global Warming, Acid rain & Ozone layer depletion, Animal husbandry, controlling measures.

4

Solid Waste Management - E-Waste Management & Biomedical Waste Management -Sources, Characteristics & Disposal methods.

Unit – III : Natural Resources, Material Cycles and Energy

Natural Resources - Water resources – Availability & Quality aspects, Water borne diseases & water induced diseases, Fluoride problem in drinking water.

4

Wealth Material Cycles – Phosphorous Cycle, Carbon Cycle, Nitrogen Cycle & Sulphur Cycle.

Energy – Different types of energy, Conventional sources & Non-Conventional sources of energy. with examples such as Solar energy and Hydro electric energy.

UNIT-IV: Ethics, Value System & Value Education

Ethics:

Behavioral Values, Code of Conduct in College Premises, Addiction, Patriotism – Building respect for the Country, National Anthem and National Flag, Ragging, Respect for Individuals & Environment, Peer – Pressure & Support, Moral Uprightness, Importance of Altruism, Living by the Rules.

4

Value System & Value Education:

Understanding how value system affects behavior and perception, Difference between Values, Moral & Ethics, Concept of Equality, Acceptance, Humility. Importance of Value education for College Student, Understanding the meaning of Vishwas : Differentiating between intention and competence, How to resolve ethical dilemma, “Right” and “Wrong” Action

UNIT-V: Copyrights, Corruption & Integrity and Goal Setting ,Self Improvement and Self Analysis

8

Introduction, Moral Obligations, Copyright Infringement, Patent Law, Case Study Analysis

Goal Setting:

- The importance and benefits of proper goal setting is explained to the students. The following topics are covered:S.M.A.R.T. Goals, Principles of Goal Setting, Steps for Goal Setting Activity. Grooming & Body Language:The students are trained on various aspects of self-grooming and body-language.
- Attitude Development:Types of Attitude, How society affects attitude, Importance of right attitude, Activity.
- Vocabulary Building, Public Speaking & Extempore:Vocabulary Building, Crosswords, Word & Meaning, Spellings, Conversation Practice, Extempore Practice, Intonation, Speech Anxiety.

Self Analysis:

- Self Awareness& Mindfulness: Being Self Aware, Self Awareness in relationships, SWOT, Developing Self Awareness, Self Mastery, JoHari Window.

Mini Project Modeling

Every Students has to performed mini project or a survey report in a group based on following topics.

- 1.Air pollution
- 2.Noise pollution
3. water treatment
- 4.Sewage treatment

5. Human Rights ACTs. (right to equality, education, own a private land, other constitutional rights)
6. Recent studies on minimization of solid waste. (electronic waste, biomedical waste, plastic waste etc)
7. Latest existing status regarding rural development. (sanitary, agricultural, lifestyle, use of technical knowledge for improving different perspectives of life, health awareness of both humans and animals)
8. Green building
9. Effects of Global warming
10. Impacts of climate change

Instructions to Students

1. Maximum Three Students are permissible in each group
2. Project must be based on the contents of syllabus.
3. Project report has to be prepared and attach in practical file individually.

Reference Books:

1. A textbook of Environment and Ecology – by Shashi Chawla
2. Textbook for Environmental Studies for Undergraduate Courses of all Branches of Higher Education by eran barucha.
3. Solid waste management- by chandrappa, Ramesh, Brown and Jeff.
4. A Textbook of Environmental Chemistry & Pollution Control: S SDara, S. Chand & Company, New Delhi (2002).
5. “Essentials of Ecology & Environment Science” by Rana. S.V.S.; EPI Publications.
6. Gleick, H.P.1993. Water in crisis, Pacific Institute for Studies in Dev., Environment & Security. Stockholm Env. Institute. Oxford Univ. Press.473p
7. Robert Schuller, Success Never Ends, Failure is Never Final, Revised Edition, Paperback, 1990
Page 14 of 323
8. Allen Pease, Body Language b, First Edition, Paperback, 2005

Weblink:

BMEP111: Workshop

Teaching Scheme:	Examination Scheme:	Examination Scheme:
	(Theory)	(Laboratory)
Lectures: Nil	Teachers Assessment Examination: Nil	Continuous Assessment: 50
Practical: 2Hr/Week	Class Assessment Examination: Nil	Marks
Tutorial: Nil	End Semester Examination: Nil	
Credit	–	1

Course Objective:

1. To introduce to names, uses and setting of hand tools for Fitting, Carpentry and Welding used in mechanical engineering workshop.
2. To introduce students to components and PCB making so as to be able to do work related to Mini-Model making in Electronics workshop.

Course Outcome: At the end of this course student are able to

1. Understand and demonstrate workshop safety regulations.
2. Use tools and processes in fitting, carpentry and welding operations.
3. Demonstrate knowledge of component identification and PCB making.

Course Contents

	Hrs
Unit – I : Utility Tools	
Carpentry – 1 Job	
Introduction to wood working, kinds of woods, hand tools and machines. Types of joints, wood turning. Pattern making, types of patterns, contraction, draft and machining allowances. Term work to include one job involving joint and woodturning.	4
Fitting – 1 Job	
Types of fits, concepts of interchangeability, datum selection, location layout, marking, cutting, shearing, chipping, sizing of metals, drilling and tapping. Term work to include one job involving fitting to size, male-female fitting with drilling and tapping.	4
Sheet Metal Practice – 1 Job	
Introduction to primary technology processes involving bending, punching and drawing various sheet metal joints, development of joints. Term work to include a utility job in sheet metal.	4
Joining – 1 Job	
Includes making temporary and permanent joints between similar and dissimilar material by processes of chemical bonding, mechanical fasteners and fusion technologies. Term work includes one job involving various joining processes like riveting. Joining of plastics, welding, brazing etc.	4
Unit – II : Demonstrations (Any Four)	
Assembly and Inspection	2
Assembly and Disassembly of some products, tools etc. Videos of advancement in manufacturing	

technology. Inspection of various components using different measuring instruments. Introduction to measuring equipment used in Quality Control.

Safety in Workshop

Fire hazards, electric short circuit- causes and remedies. Machine protection, Human protection, Accident prevention methods, developing ability to observe safe working habits.

Forging

Hot working, cold working processes, forging materials, hand tools and appliances, hand forging, power forging.

Moulding

Principles of moulding, methods, core & core boxes, preparation of foundry sand, casting, plastic moulding.

Plumbing

Types of pipe joints, threading dies, Pipe fitting.

PCB Making

Layout drawing, positive and negative film marking, PCB etching and drilling.

Machine Tools

Turning, Milling, Grinding, Planning – Machines, Tools and Accessories.

Note: All demonstrations to be engaged by teaching faculty and corresponding teaching load be shown in the time table for respective teaching faculty.

Submissions :

Two jobs as mentioned above.

Brief write-up with illustration / sketches on the demonstration (not more than 3 pages for each demonstration.)

Text Books:

Chaudhary, Hazra, "Elements of Workshop Technology,": Volume I & II Media Promoters and Publishers, Mumbai.

Course in Workshop Technology Volume-I, B. S. Raghuwanshi, Laxmi Publication-Revised Edition

BFYP112: MINI MODELING

Teaching Scheme	Examination Scheme: (Theory)	Examination Scheme: (Laboratory)
Lectures: Nil	Teachers Assessment Examination: Nil	Continuous Assessment:
Practicals: 2 Hrs./Week	Class Assessment Examination: Nil	50 Marks
Tutorials: Nil	End Semester Examination : Nil	

Credit ---- **1**

Prerequisite: 12th Science Basics

Course Objective :After completing this course student will able

1. To understand different phase of model development.
2. To learn various techniques of model development.

Course Outcome: student shall be able to:

1. Developing the skills of planning and designing to develop a working Mini Model.
2. Implement knowledge of concepts learnt and workshop practices to prepare a model.
3. Use innovative ideas and convert these into physical models.

Sr. Themes for Mini Modeling (value addition Venture)

No

- 1 Mechatronics
- 2 Modeling
 - a) AutoCAD/Autodesk
 - b) Nx4/Ansys/CATIA/Uni Graphics
 - c) Metro Rail/Automobiles
- 3 Transducers and sensors
 - a) Simulink
 - b) Lab view
- 4 Energy conversion and conservation
- 5 Renewable energy sources
- 6 Energy Audit
- 7 Alternate fuels
- 8 Environmental issues related projects
- 9 Environmental Audit
- 10 Designing application based projects PCB Fabrication
- 11 Agriculture Based Projects
- 12 Design of web page
- 13 Bio-Engineering

BHUL113 : Communication Skill

Teaching Scheme:	Examination Scheme (Theory)	Examination Scheme (Laboratory)
-------------------------	----------------------------------------------	--------------------------------------------------

Lectures: 2Hr/Week	Teachers Assessment Examination: 10 Marks	Internal(TW): Nil
Tutorials: Nil	Class Assessment Examination: 10 Marks	External(PR) : Nil
	End Semester Examination: 30 Marks	External(OR) : Nil
Credit	2	–

Course Objective:

1. To develop an understanding in the students regarding communication skills
2. To develop the four essential communication skills in the students i.e. reading, writing, listening and speaking
3. To develop the vocabulary and English proficiency of the students
4. Train students to common words, phrases relevant to the immediate communication tasks
5. Enable students to comprehend the concept of communication.
6. Teach students the four basic communication skills – Listening, Speaking, Reading and Writing

Course Outcome: At the end of the course the student shall be able to:

1. The students will develop an understanding regarding communication skills.
2. Development of the four essential communication skills in i.e. –reading, writing, Listening and speaking in students.
3. Enhancement of vocabulary and English proficiency of the students.

Course Contents

Unit – I : INTRODUCTION TO COMMUNICATION

Importance of Communication; Importance of Communicating effectively in English; Communication Process , Channels of communication; Barriers to effective communication, Need of communication skills for Engineers. **2**

Unit – II : TECHNICAL COMMUNICATION

Introduction to Technical Communication; differences between General and Technical Communication; importance of Technical Communication; Technical Communication Skills – Listening, Speaking, Reading, Writing **2**

Unit – III : LISTENING SKILLS

Listening Process; Hearing and Listening; Poor listening habits; Traits of a good listener; Types of Listening **4**
Principles of Communication – Communication as coding and decoding – signs and symbols – verbal and non –verbal symbols – Language AND communication; language VS communication – media/channels for communication.

Unit – IV : SPEAKING SKILLS

Phonetics and Diction – Theory and Practical; Body Language; Miscellaneous tips and techniques on speaking. Articles reading. **3**

Unit – V : READING SKILLS

Reading Comprehension Techniques for good comprehension, Interpreting charts and tables, Practical Exercises; Developing reading speed – Theory and Practical; Loud Reading – Practical Exercises in class **3**

Unit – VI : TECHNICAL WRITING

Characteristics of Technical Writing – introduction, characteristics, techniques; Choice of right words, phrases and sentences; Principles of paragraph writing **2**

Unit – VII : WRITING BUSINESS LETTERS AND EMAILS

Business Letters – The 7 Cs of Letter Writing, structure of business letters, writing business letters (applications, enquiry, quotations, complaints, cover letters); Writing professional emails **2**

Unit – VIII: OTHER WRITTEN COMMUNICATION

Writing reports, proposals, press release, articles, essays; drafting of Notices and Advertisements (for newspapers); note-making **2**

Unit – IX: VOCABULARY DEVELOPMENT

Effective use of dictionary; etymology; homophones and homonyms; synonyms and antonyms; words frequently confused or miss spelt, idioms and phrases **2**

Unit – X: BASICS OF FUNCTIONAL ENGLISH GRAMMAR

Parts of Speech – introduction, prepositions; articles; tenses; narration; punctuation; voice **2**

Text Books:

1. Mason, Margaret M. Examine Your English, Hyderabad: Orient Longman, 1980
2. Sharma, R.S. Technical Writing. Delhi: Radha Publication, 1999
3. Sudarsanam, R. Understanding Technical English. Delhi: Sterling Publishers Pvt. Ltd., 1992
4. Gannon, Robert, Edt. Best Science Writing: Readings and Insights. Hyderabad: University Press (India) Limited, 1991
5. M. Ashraf Rizvi, Effective Technical Communication, First Edition, Tata McGraw Hill, 2012
6. P C Wren and H Martin, High School English Grammar and Composition, Revised First Edition, S Chand, 2005
7. Meenakshi Raman & Sangeeta Sharma, Communication – Principles & Practice, First Edition, Oxford University Press, 2011

Web Reference Links:

- <http://www.youtube.com/watch?v=egeyiUpFsaw>
- <http://www.youtube.com/watch?v=8Oos1qoYe4o>
- <http://www.youtube.com/watch?v=9Y88Zw7eWZc>
- http://www.youtube.com/watch?v=_pFTsGzGuOk
- <http://www.youtube.com/watch?v=eB9Bq3YJGcA>
- <http://www.youtube.com/watch?v=UWBSIMapIT0>
- <http://www.youtube.com/watch?v=VFrp9ROB44c&feature=pyv&ad=4735114004&kw=success>
- http://www.youtube.com/watch?v=e4g0op2P_yY
- <http://www.youtube.com/watch?v=AFGNKJruxdg>

BIDL101: Bio Systems in Engineering

Teaching Scheme	Examination Scheme (Theory)	Examination Scheme (Laboratory)
Lectures:2Hrs/Week Tutorials: Nil	Teachers Assessment Examination :Nil Class Assessment Examination: Nil End Semester Examination :Nil	Continuous Assessment: Nil External(PR) :Nil
Credit	Audit Course	-----

Course Objective :

This course introduces general biological concepts

1. It helps students to understand importance of biological concepts in engineering fields.
2. To understand application of engineering concepts in medical instrumentation.

Course Outcome:

Upon successful completion of the course, students will be able to

1. Use bioinstrumentation, required in cellular or molecular biology investigations.
2. Apply the concepts of engineering in different streams of biomedical field.

Course Contents

Hrs

Basics of Biology: Introduction to Human Anatomy and Physiology, The Nervous System, Cardiovascular System. **Biomedical Instrumentation:** Bioelectric Signals, Biomedical Instrumentation System, Biomedical transducers, Electrodes and Their Characteristics. Bio-imaging techniques, ECG, Computer aided ECG, X-Ray, MRI, CT Scan, Blood pressure measurement instrument. **Applications of Biomedical Engineering.**

24

Text Books:

1. "Joseph J. Carr and John M. Brown, **"Introduction to Biomedical Equipment Technology"**, 4 th Edition, Prentice Hall, 2000.
2. R. Rangayan, **"Biomedical Signal Analysis"**, Wiley 2002.

Reference Books:

1. R.S.Khandpur, **"Handbook of Biomedical Instrumentation"**, Tata McGraw Hill, New Delhi, 2003, Edition-II.
2. Sörnmo, **"Bioelectrical Signal Processing in Cardiac & Neurological Applications"**, Elsevier.
3. **"Biomedical Instrumentation** Arumugam,Anuradha Publishers,2002,First Edition
