

BACHELOR OF ENGINEERING (FOUR YEARS DEGREE COURSE)
FACULTY OF SCIENCE & TECHNOLOGY
TEACHING AND EXAMINATION SCHEME WITH CHOICE BASED CREDIT SYSTEM
I - SEMESTER B.E.(COMMON TO ALL BRANCHES)

Course Code	Course Title	Teaching Scheme				Examination Scheme									
		Hours per week L T P			No. of Credits	Theory						Practical			
						Duration of Paper (Hrs.)	Max. Marks	Max. Marks		Total	Min. Passing Marks	Max. Marks	Max. Marks	Total	Min. Passing Marks
		ESE	MS E	IE				TW	POE						
1BEABO1	Applied Mathematics – I	4	1	0	4	3	80	10	10	100	40	-	-	-	-
1BEABO2	Applied Physics – I	2	1	-	2	2	40	05	05	50	20	-	-	-	-
1BEABO3	Applied Chemistry –I	2	1	-	2	2	40	05	05	50	20	-	-	-	-
1BEABO4	Basic Electrical Engineering	3	1	-	4	3	80	10	10	100	40	-	-	-	-
1BEABO5	Engineering Graphics	3	1	-	4	3	80	10	10	100	40	-	-	-	-
1BEABO6	Communication Skills	2	0	0	2	2	40	05	05	50	20	-	-	-	-
1BEABO7	Applied Physics - I Lab	0	0	2	1	-	-	-	-	-	-	10	15	25	13
1BEABO8	Applied Chemistry – I Lab	0	0	2	1	-	-	-	-	-	-	10	15	25	13
1BEABO9	Basic Electrical Engineering	0	0	3	2	-	-	-	-	-	-	25	25	50	25

	Lab														
1BEAB10	Engineering Graphics Lab	0	0	3	2	-	-	-	-	-	-	25	25	50	25
		16	4	10	24	-									
		31			24	-	-			450	-	-	-	150	-
						600									

BACHELOR OF ENGINEERING (FOUR YEARS DEGREE COURSE)
FACULTY OF SCIENCE & TECHNOLOGY
TEACHING AND EXAMINATION SCHEME WITH CHOICE BASED CREDIT SYSTEM

II - SEMESTER B.E.(COMMON TO ALL BRANCHES)

Course Code	Course Title	Teaching Scheme				Examination Scheme									
		Hours per week			No. of Credits	Theory						Practical			
						Duration of Paper (Hrs.)	Max. Marks	Max. Marks		Total	Min. Passing Marks	Max. Marks	Max. Marks	Total	Min. Passing Marks
		L	T	P				Sessional	ESE						
2BEAB01	Applied Mathematics – II	4	1	0	4		3	80	10	10	100	40	-	-	-
2BEAB02	Applied Physics – II	2	1	-	2	2	40	05	05	50	20	-	-	-	-
2BEAB03	Applied Chemistry –II	2	1	-	2	2	40	05	05	50	20	-	-	-	-
2BEAB04	Programming in ‘C’	2	1	-	3	3	80	10	10	100	40	-	-	-	-
2BEAB05	Engineering Mechanics	3	1	-	4	3	80	10	10	100	40	-	-	-	-
2BEAB06	Environmental Studies	-	-	0	-	2	-	40	10	50	20	Compulsory Audit Course			
2BEAB07	Applied Physics - I Lab	0	0	2	1	-	-	-	-	-	-	10	15	25	13
2BEAB08	Applied Chemistry – I Lab	0	0	2	1	-	-	-	-	-	-	10	15	25	13
2BEAB09	Programming in ‘C’ Lab	0	0	3	2	-	-	-	-	-	-	25	25	50	25

2BEAB10	Engineering Mechanics Lab	0	0	3	2	-	-	-	-	-	-	25	25	50	25
2BEAB11	Mechanical Workshop Lab	0	0	3	2							25	25	50	25
		13	4	13	23	-									
		31			23	-	-			450	-	-	-	200	-
						650									

Gondwana University CBCS 2017 Pattern for B.E./Year w.e.f 2017-18

GONDWANA UNIVERSITY, GADCHIROLI

SYLLABUS FIRST SEMESTER BACHELOR OF ENGINEERING

(common for all branches)

Subject-Applied Mathematics-I

1BEAB01	Applied Mathematics-I	L=4	T=1	P=0	CREDITS = 4(T)
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Evaluation Scheme	MSE	IE	ESE	Total	ESE Duration
	10	10	80	100	3 Hrs

Course Objective

The main objective of the course is

- To equip students with adequate knowledge of mathematics that will enable them in formulating problems and solving problems analytically.
- To develop an ability to apply knowledge of mathematics, science and engineering.
- To develop the basic mathematical skills of engineering students that is essential for effective understanding of engineering subjects.
- To teach mathematical methodologies and models, to develop mathematical skill and enhance thinking and decision making power of the student.

Unit	Contents	Course objective	Hours	Marks
I	Differential calculus Successive differentiation, Leibnitz's theorem on the n^{th} derivative of a product, Expansion of a function by using Taylor's and Maclaurian's theorem, Indeterminate forms.	To introduce successive differentiation and its application in the field of Engineering, to determine the limits of indeterminate functions.	12	16
II	Partial Differentiation -I Partial Derivatives, Euler's theorem on homogeneous functions, Transformation of independent variables (Chain rule) and total differential coefficient.	To introduce the concept of function having more than one independent variable, Euler's theorem to develop ability to solve problems related to partial derivatives.	12	16

III	Partial Differentiation - II Jacobians, Properties of Jacobians, Maxima and Minima of functions of two variables, Lagrange's method of undetermined multipliers	To introduce the concepts and applications of Partial Differentiation in the field of Engineering.	12	16
IV	Integral calculus Gamma and Beta functions, Properties of gamma, beta functions, Differentiation of definite integrals under integral sign, (Leibnitz's Rule) , Mean and R.M.S value.	To learn the evaluation policy of some special function like gamma & Beta function & their relation to evaluate some definite integral arising in various branch of Engineering.	12	16
V	Statistics Fitting of straight line, second degree parabola & exponential curves, Coefficient of correlation, Regression lines, Rank coefficient of correlation.	To introduce the statistical methodology which is useful in various branches of Engineering.	12	16
Total			60	80

Course Outcomes:

After successful completion of this course, the student shall be able :

- 1) To identify algebraic problems from practical areas and obtain the solutions in engineering problems.
- 2) To solve engineering problems using partial differentiation and its applications.
- 3) To understand maxima and minima concept arising in optimization process.
- 4) . To evaluate integrals by using advanced techniques.
- 5) To understand the concept of statistics and use it to formulate various engineering problems.

Text Book:

1. A text book of Engineering Mathematics, Volume I and II by D.T. Deshmukh.

Reference Books:

1. A text book of Applied Mathematics Volume I and II by J.N. Wartikar and P.N. Wartikar
2. Higher Engineering Mathematics by Dr. B. S. Grewal
3. Advanced Engineering Mathematics by H. K. Dass
4. Advanced Engineering Mathematics by Erwins Kreyszig

Question Paper Pattern (Sub.-Applied Mathematics-I)
for B.E.I Yr. Sem. –I from 2017-18 onwards for CBCS 2017.

INSTRUCTIONSTO PAPER SETTERS: Theory Examination: MAXIMUM MARKS: 80

1. Duration of paper shall be **THREE**hours.
2. Maximum marks allotted should be **EIGHTY(80)**.
3. Question Number 1 & 2 will be based on Unit 1. Any **ONE** out of these TWO questions is to be solved.
4. Question Number 3 & 4 will be based on Unit 2. Any **ONE** out of these TWO questions to be solved.
5. Question Number 5 & 6 will be based on Unit 3. Any **ONE** out of these TWO questions to be solved.
6. Question Number 7 & 8 will be based on Unit 4. Any **ONE** out of these TWO questions to be solved.
7. Question Number 9 & 10 will be based on Unit 5. Any **ONE** out of these TWO questions to be solved.
8. Question paper will comprise of total **FIVE (5)** questions. All questions will carry equal marks.
9. Total **FIVE** questions to be solved to score maximum marks.

Syllabus for Gondwana University CBCS 2017 Pattern for B.E.I Year w.e.f 2017-18

I Semester B. E. (Common for all branches)

Subject Code: 1BEAB002

Title of the Course: Applied Physics-I Course Scheme				Evaluation Scheme (Theory)				
Lecture	Tutorial	Periods/ week	Credits	Duration of paper, hrs	MSE(5)	IE(5)	ESE	Total
2	1	3	2	2	CA (10)		UA (40)	50

Course Objectives:

1. To introduce more engineering physics concepts, which form the basis of modern engineering.
2. To develop skills for numerical problem solving in areas covered.
3. To develop the ability to apply concepts in elementary physics to understanding of engineering applications.

Unit I Quantum Physics

Dual nature of matter, De-Broglies concept of matter waves , Davisson and Germer"s experiment, Compton scattering (qualitative approach), Heisenberg"s uncertainty principle and its experimental illustrations, wave packet concept, wave function interpretation, Schrodinger"s wave equations, applications : Particle in infinite potential well, tunneling. **(10HRS)**

Unit II Semiconductor Physics

Formation of energy bands in solids, Classification of solids based on band theory, Energy band diagram of germanium & silicon, Probability distribution function Fermi energy-its dependence on temp and doping concentration, conductivity of solids. p-n junction diode, junction voltage equation, Hall effect-its derivation and application, transistor **(10HRS)**

Unit III Solid state physics

Introduction, Lattice, basis, space lattice, Unit cell, Bravais lattices, crystal system- SC,BCC & FCC, Crystal structure, Miller indices, Braggs law. Tetrahedral voids and Octahedral voids **(10HRS)**

Text Books:

1. Engineering Physics by Avadhanulu & Kshirsagar S. Chand Prakashan.

Reference Books:

1. Refresher Course in Physics by C.L. Arora S. Chand Publication
2. Fundamentals of Physics by David Halliday, Robert Resnik And Jerle Walker John Wiley & Sons 2002
3. Electronic Engineering Material & Devices by John Allison (TMH)
4. Applied Physics by P.K. Mittal, I.K. International
5. Applied Physics by K. C. Nandi, Tech. Max. Pune

Course Outcomes:

1. Develop ability to choose a physical approach to understanding of advanced areas in engineering.
2. Develop a better understanding of physics as a fundamental discipline
3. Gain an understanding of developing areas in physics and their possible Engineering Applications.
4. Be comfortable with fundamental ideas in areas like semiconductor, electronic devices, and quantum mechanics
5. Increase understanding of the type of questions addressed by theories in and methods of physics in different fields of engineering.

SCOPE OF SYLLABUS IN APPLIED PHYSICS –I

B.E.FIRST YEAR (SEM- I)

Unit I: Quantum Physics

Concept related to duality of matter waves and their properties, Debroglie wavelength of a particle & relationship to Bohrs model. Definition – Compton scattering, Compton's shift, Conservation principles(only equations) application, and failure of classical theory, direction and kinetic energy of recoil electron. Momentum-position and energy-time uncertainties, Thought expt (Electron diffraction by single slit) synthesis of a wave packet, its width and position uncertainty, and its applications, group and phase velocities, and its relation Schrodingers equation(qualitative approach) solution of Schrodinger's equation for one dimensional infinite potential well, tunneling.

Unit II: Semiconductor Physics

Fermi energy equation in intrinsic semiconductor ($E_F = E_g/2$), concept of extrinsic semiconductor. Conductivity of conductors, intrinsic & extrinsic semiconductors, drift velocity. Mechanism, current density. p-n junction diode energy band diagram- V-I characteristics , potential barrier equation, Types of transistor, its energy band diagrams, current gain definition w.r.to CB & CE configuration and their relations. application as an amplifier in CE mode. Hall effect-principle & definition , hall coeff. ,hall angle, and its applications.

Unit III: Solid state physics

General idea of periodic spatial arrangement of atoms and molecules, meaning of lattice and basis, Unit cell, primitive unit cell, Body and Face centering in cubic structure, simple cubic body centered cubic and face centered cubic unit cells, effective number of atoms per unit cell. Atomic radius, nearest neighbor distance, coordination number, atomic packing fraction, void space, density, crystal direction and crystal planes, Inter-planer distance between adjacent planes. Braggs law equation for X-ray diffraction. Tetrahedral & Octahedral voids.

Syllabus for Gondwana University CBCS 2017 Pattern w.e.f 2017-18

APPLIED PHYSICS-I – B.E. I YEAR SEMESTER I

LABORATORY-I

Subject Code:1BEAB007

Practical: 2 hrs/week

Examination Scheme

Credit: 1

University External Practical Exam: 15 marks

Term work (Internal Assessment) : 10 Marks.

Total Marks : 25

Duration : 2 hrs.

Course Objectives

- a. To understand and analyse the theoretical concepts in physics through experimentation
- b. To learn and use the proper methods while gathering experimental data.
- c. To get familiar with the proper use of basic instruments in physics laboratories.

Minimum SIX experiments to be performed from the list given below.

1. Determination of resistivity of a semiconductor by four probe method
2. A study of transistor characteristics in common base configuration.
3. A study of hall effect in semiconductors.
4. A study of the characteristics of a solar cell.
5. A study of the static characteristics of germanium and silicon diodes and their comparison.
6. A study of the V-I characteristics of LED
7. A study of the V-I characteristics of Zener Diode.
8. A study of transistor characteristics in common emitter configuration.
9. Determination of activation energy of a thermister.
10. A study of cubic space lattices and atomic packing in solids.

Course Outcomes by the end of the semester

Students will be able to do experiments based on syllabus using proper methodology and derive scientific conclusion based on experiments

Question Paper Pattern (Sub.-Applied Physics-I)
for B.E.I Yr. Sem –I from 2017-18 onwards for CBCS 2017.

1. Duration of paper should be **TWO** hours.
2. Maximum marks allotted should be **FORTY** .
3. Questions are to be set from **Units I,II,III for Sem -I**
4. **TWO** questions should be set from each unit with its alternative choice.
5. **THREE** questions should be attempted out of **SIX** questions.
6. Each question carries **THIRTEEN/ FOURTEEN** marks.

SYLLABUS FIRST SEMESTER BACHELOR OF ENGINEERING

(common for all branches)

Subject-APPLIED CHEMISTRY - I

1BEAB003	Applied Chemistry-I	L=2	T=1	P=2	CREDITS = 2 (T) 1 (P)
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Evaluation Scheme	MSE	IE	ESE	Total	ESE Duration
	05	05	40	50	2 Hrs

Rationale: A strong applied sciences program, that creates a bridge between the sciences and engineering, for first-year students, is a prerequisite for a good engineering program. This syllabus primarily focuses on the concepts needed for first year engineering students for their further technological studies. It is essential that one has to understand the fundamentals of basic sciences before trying to learn their application in various branches.

In framing the curriculum of chemistry, emphasis has been laid on the teaching of such topics, which have a bearing on the topics of various branches of engineering. With this object in view, some important fundamental topics of chemistry have been included in this syllabus.

Course Objectives: To impart intensive and extensive knowledge of the subject enriching students to understand the role and concepts of Chemistry in the field of engineering & engineering applications. To develop analytical capabilities of students in characterizing, transforming and using materials in engineering. To inculcate habit of scientific reasoning to do the task rationally

Unit	Contents	Course objective	Hour
I	Water Conditioning Industrial: Types and units of hardness; Softening; (principle, reactions, advantage, limitation Comparison of) a) Lime-Soda (no methods), b) Zeolite c) de-mineralization process; Numericals based on lime-soda and zeolite process; Boiler Troubles (Causes, Effect on boiler operation & methods of prevention) Carry over- priming foaming; Scale sludge, caustic embrittlement, Boiler corrosion; Internal conditioning-(phosphate, carbonate, calgon). Domestic: Brief discussion and Chemistry involved in the process of coagulation & sterilization using UV, ozone, chlorine, Break point chlorination. Effect and	Significance of quality of water for industry and potable water; Knowledge of water analysis, boiler water chemistry enables students to overcome the difficulties, in field of (i) Civil, (ii) Public health and environmental engineering (iii) Ocean engineering (iv) Thermal and electrical power generation sectors and process engineering.	10

	permissible BIS limit of Total hardness as CaCO ₃ , pH, nitrate, fluoride, arsenic and lead in drinking water,		
II	Lubrication Lubricants: Introduction, mechanism ; Hydrodynamic, boundary & extreme pressure lubrication; Condition for use of: solid (Example: Graphite), semisolid & liquid lubricants. Properties of greases:- Drop test & consistency test; Properties of liquid lubricants (definition, significance) flash & fire point, viscosity & viscosity index, Cloud & Pour Point: Criteria for selection of lubricant- IC engine, refrigeration, gear, transformer, steam turbine, delicate mechanical system.	To apply the knowledge of 'Principles of Tribology' for reduction of friction and wear in the process engineering, manufacturing and production engineering and automotive engineering fields.	10
III	Cement: Portland cement: Raw material, manufacture, process parameters, role of microscopic constituents, Properties:- Setting & hardening; heat of hydration, soundness; Types (characteristics, application) High alumina, White, Rapid hardening, Ready Mix Concrete, flyash (properties, advantage, limitation, application) as additive in cement.	Impact of change in the physicochemical and mechanical properties of the concrete type composites due to variation in their chemical composition.	10
Total			30

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

- 1) Illustrate the basic parameters of water, different water softening processes and effect of hard water in industries.
- 2) Describe the basic properties and application of cement as an engineering material.
- 3) Demonstrate the mechanism, physical and chemical properties of lubricants and their applications.
- 4) Social awareness about conservation and proper utilization of natural resources like water.
- 5) To develop skills for numerical problem solving in areas covered.

List of book to be referred:

Text Books:

1. Text Book of Engineering Chemistry, S. S. Dara, S. Chand and Company Ltd., New Delhi.
2. Textbook of Engineering Chemistry, P. C. Jain and Monica Jain, Dhanpat Rai and Sons, New Delhi.
3. Textbook of Engineering Chemistry, S. N. Narkhede, R. T. Jadhav, A. B. Bhake, A. U. Zadgaonkar, Das Ganu Prakashan, Nagpur.
5. Applied Chemistry, A. V. Bharati and Walekar, Tech Max Publications, Pune.
6. Engineering Chemistry, Arty Dixit, Dr. Kirtiwardhan Dixit, Harivansh Prakashan, Chandrapur.

Reference Books:

1. A Text book of Engineering Chemistry : Shashi Chawla; Dhanpat Rai & Sons, New Delhi.
2. Applied Chemistry by N. Krishnamurthy; P. Vallinavagam. And K. Jeysubramanian TMH
3. Applied Chemistry for Engineers : T.S. Gyngeell.
4. Chemistry in Engineering : Lloyd a. Munro, Prentice-hall, IncNj
5. Chemistry of Advanced Materials : CNR Rao, Rsc Publication.

6. Chemistry of Cement, J. D. Lee, McGraw Hill Publishing Company, New Delhi.
7. Chemistry of Engineering Materials: Robert B Leighou Mc Graw – Hill Book Company, Inc New York
8. Chemistry, Raymond Chang. (Tata McGraw Hill).
9. Corrosion Engineering by Mars G. Fontana and Norbert D. Green Mc Graw Hill Book Co. Tokyo
10. Electrochemistry, Philip H. Rieger (Chapman and Hall)
11. Engineering Chemistry (Vol. I and II) by Rajaram and Kuriakose.
12. Engineering Chemistry B.K.Sharma Krishna Prakashan media private LTD.
13. Engineering Chemistry by Gyngeell, McGraw Hill Publishing Company, New Delhi.
14. Engineering chemistry by R.gopalan, and others, Vikas publications
15. Engineering Chemistry by R.V.Gadag, A.Nityananda Shetty ; I K International Publishing House, New Delhi
16. Engineering Chemistry(Vol. 1&2) by Rajaram and Kuriakose
17. Engineering Chemistry, B. S. Sivasankar, Tata McGraw Hill Publishing Company, New Delhi.
18. Engineering Chemistry, O. G. Palan, Tata McGraw Hill Publishing Company, New Delhi.
19. Engineering Chemistry, R. Shivakumar, Tata McGraw Hill Publishing Company, New Delhi.
20. Engineering Chemistry, Saraswat and Thakur, Vikas Publication, New Delhi.
21. Engineering Materials: Kenneth G Budinski (Prentice – Hall of India)
22. Fuels and Combustion by Amir Circar, Orient Longmans
23. Fundamentals of Corrosion : Michael Henthorne, Chemical Engineering.
24. Fundamentals of Engineering Chemistry (Theory and Practice) :S. K. Singh (New Age Materials
25. Materials science and engineering an introduction, William D. Callister, (Jr.,Wiley.publisher)
26. Text book of engineering chemistry, R.N. Goyal and Harmendra Goel, (Ane books India).
27. Water Treatment : F. I. Bilane, Mir publisher
28. Water treatment for industrial and other use by Eskel Nordell, Rein hold Publishing Corporation,New York

SYLLABUS FIRST SEMESTER BACHELOR OF ENGINEERING

(common for all branches)

Subject-APPLIED CHEMISTRY – I Lab

1BEAB008	Applied Chemistry-I Lab	L=0	T=0	P=2	CREDITS = 1 (P)
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Evaluation Scheme	MSE	IE	ESE	Total	ESE Duration
	05	05	15	25	2 Hrs

Course Objectives

To apply the knowledge of basic science in engineering and technology and also understand the concept of applied chemistry and analyze it with experiments.

To learn the proper methods and techniques utilized in gathering experimental data. To become familiar with the proper use of some basic measuring instruments commonly found in laboratories. To learn how effectively communicate experimental results in standard scientific way.

List of practical/ experiments:

List of Experiments-Any Six experiments should be performed out of the following :

1. Estimation of free chlorine in the water by iodometry.
2. Estimation of hardness of water due to calcium and magnesium ions separately.
3. Estimation of temporary & permanent hardness of water by complexometry method.
4. Consistency and Penetration test of grease
5. Determination of COD in waste water.
6. Determination of acid Value of lubricating Oil
7. Determination of capacity of anion exchange resin.
8. Determination of capacity of cation exchange resin.
9. Determination of carbon residue of lubricating oil by Conradsons Apparatus.
10. Determination of dissolved oxygen in a water sample.
11. Determination of flash point of lubricating oil by Abel's apparatus closed cup.
12. Determination of flash point of lubricating oil by Cleveland's apparatus open cup.
13. Determination of flash point of lubricating oil by Pensky Martin's apparatus close cup.
14. Determination of Viscosity of lubricating oil at different temp by Redwood Viscometer No. 1 or No.2
15. Saponification number of animal/vegetable oil.
16. Project on water analysis

Course Outcomes: By the end of the course students should be able to carry out chemical analysis of water, assess the quality of water and to carry out the estimation of various properties on lubricating oil. Budding engineers should be able to understand and perform experiments based on syllabus adopting the proper methodology. Derive a scientific conclusion on the basis of experimental data.

Laboratory Manual:

1. Applied Chemistry theory and practical O.P. Virmani and A.K.Narular (New Age International).
2. Laboratory Manual on Engineering Chemistry by Dr. Subdharani (Dhanpat Rai Publishing)
3. A Textbook on experiment and calculation in engineering chemistry by S.S. Dara S.Chand
4. Inorganic quantitative analysis, Vogel. (Prentice Hall).

I/II Sem B.E. (Common for all branches)

Course code:1BEAB04

Title of Course:Basic Electrical Engineering

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/week	Credits	Duration of paper, hrs	MSE	IE	ESE	Total
3	1	0	4	4	3	10	10	80	100

Unit	Contents	Hours
UNIT I	DC circuits: Concept of Electrical Circuit, Active & Passive elements, Voltage & Current Sources, R,L and C as Elements, Kirchoff's Law, Superposition Theorem, Star- Delta Transformation.	04
	AC Circuits:- Periodic Function, Average & R.M.S., Values, Steady State Behaviour With Sinusoidal Excitation, Phasor Representation, Reactance & Impedance, Series & Parallel Circuit, Power Factor.	04
	Principle of Generation of Single Phase & Three Phase Power, Power in Balanced Three Phase AC System, Star & Delta Connections, Line & phase voltage/current relations.	04
UNIT II	Magnetic Circuit Concept of Magnetic Circuit, Analogy between Electric & magnetic Circuit, magnetic circuits with DC and Ac excitations, B-H Curve, Hysteresis & Eddy current losses, Series & Parallel Magnetic circuits.	04
	Single Phase Transformer Principle of operation & construction of Transformer, EMF Equation, Phasor Diagram under no load & loaded conditions, Equivalent Circuit, O.C. & S.C. Tests, Power Losses, Efficiency & Regulation.	05
UNIT III	Electrical Machines Principles of Electromechanical energy conversion, Fleming's Right & Left Hand rule DC Generator: Construction, working, EMF Equation, types and applications DC Motor: Construction, working, types and applications Condition for maximum efficiency,Torque equation of motor, Characteristics, Applications of DC motor.	06
	Three Phase Induction Motor: Principle of Operation, types, Slip-Torque Characteristic, Applications.	03
	Construction, Principle of operation & working of Single phase Induction Motor, types, Methods of Starting, Applications.	03
UNIT IV	Measuring Instruments Types of Instruments, Construction & working Principle of PMMC & moving iron type Voltmeters & Ammeters, Single phase dynamometer wattmeter, Digital Energy meter.	03
	Introduction to Power System Power Systems: - Elementary Idea about Power Generation, Transmission and Distribution. Protection & Safety : Overloads, short circuits & earth leakage, Study of basic protective devices like fuse, HRC Fuse, MCB, ELCB, Importance of earthing and its types: Pipe & plate earthing.	03

	Basic issues involved in electrical hazard and electrical safety.	03
UNIT V	Basic Electronics Semiconductor Devices, PN Junction Diode, Half Wave & full wave Rectifiers, Zener Diode, Introduction to BJT & its CE characteristic, BJT as an amplifier & switch. Introduction to number systems & Logic Gates, Boolean Algebra & DeMorgan's Theorem.	08
	Total	50

Text Books:

1. V. Del Toro "Principles of Electrical Engineering", Prentice Hall
2. I.J. Nagrath "Basic Electrical Engineering", Tata McGraw Hill
3. D.F. Fitzgerald, A. Grabel Higginbotham "Basic Electrical Engineering", McGraw Hill
4. Mittal & Mittal "Basic Electrical Engineering", Tata McGraw Hill
5. B.L. Theraja and A.K. Theraja "A Text Book of Electrical Technology", Volume - I & II
6. J. Millman & Halkias "Electronic Devices & Circuits", Tata McGraw Hill

Reference Books:

1. Edward Hughes "Electrical Technology", Pearson Education
2. T.K. Naagaskar & M.S. Sukhija "Basic Electrical Engineering", Oxford University Press
3. Joseph A. Edminister "Electrical Circuits : Schaums Outline Series", Tata McGraw Hill
4. P.S. Bhimra "Electrical Machines", Khanna Publishers
5. H. Cotton "Advanced Electrical Technology", Wheeler Publications
6. R.P. Jain "Modern Digital Electronics", Tata McGraw Hill

SYLLABUS FIRST SEMESTER BACHELOR OF ENGINEERING

(common for all branches)

Subject-Basic Electrical Engineering – I Lab

Minimum Eight experiments based on theory syllabus should be conducted.

I - Semester B. E. (Common for all branches)

Course Code: 1BEAB05

Title of the Course: Engineering Graphics Theory :-

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/week	Credits	Duration of paper, hrs	MSE	IE	ESE	Total
3	1	0	4	4	3	10	10	80	100

Unit	Unit	Hours
Note: Only First Angle Method of Projections Should be Used		
I	Introduction to Engineering Drawing Use of various drawing instruments, Conventions in Drawing, Lettering, BIS conventions. Layout of drawing sheet, sizes of drawing sheets. Different types of lines used in drawing practice, Dimensioning. Introduction to computer aided drafting package, Introduction to scales and representative factor (RF). Curves used in Engineering Practice Conic sections- Ellipse (excluding focus directrix method), Parabola, Hyperbola & involute, Cycloid curves- only Cycloid. Basics of Orthographic Projections Principle of projection, orthographic projection, reference planes, concepts of four quadrants, methods of orthographic projections, difference between first and third angle projection, first angle projections, conventions used to represent methods of orthographic projection. Projections of Points and Lines Projections of points in all possible positions w. r. to reference planes, projections of line parallel to both reference planes, perpendicular to one of the reference planes, inclined to one & parallel to other reference plane, inclined to both reference planes. (Lines in First Quadrant Only), simple problems on straight lines (excluding applications of straight lines.)	09
II	Projections of Planes Projection of planes when it is parallel to one & perpendicular to other reference plane, lying in reference plane, inclined to one & perpendicular to other reference plane, inclined to both reference planes. Auxiliary planes ± Auxiliary Inclined Plane (AIP) and Auxiliary Vertical Plane (AVP), Use of Auxiliary Plane method for solving the problems. Projections of Solids Solids: cube, tetrahedron, prism, pyramid, cylinder and cone, projections of above solids when axis perpendicular to one of the reference planes, axis inclined to one & parallel to other reference plane, axis inclined to both the reference planes.	09

III	Sections of Solids Section planes, sectional views, to project sectional views of above solids cut by different section planes (when solid is in simple position, when axis is parallel to one & inclined to other reference plane). Development of Surfaces of Solids Applications of development of surfaces, methods of development, development of surfaces of above solids, development of surfaces of cut solids. (No reverse development)	09
IV	Orthographic Projections Conversion of pictorial view into orthographic views.	09
V	Isometric Projection Isometric view and projection, Isometric scale, conventions, isometric views of lines, plane figures, simple and compound figures, construction of Isometric view/projection from given orthographic views of blocks	09
	Total	45

Text Books:

1. N. D. Bhatt, Elementary Engineering Drawing, Charotar Publishing house, Anand, India.
2. D.N. Johle, Engineering Drawing, Tata McGraw-hill publishing Co. Ltd.
3. M. B. Shah, B. C. Rana, Engineering Drawing, Pearson.
4. Pakhatkar, Engg. Drawing, Nirali Prakashan.
5. P. J. Shah, Text Book of Engineering Drawing, S. Chand & Publications.

Reference Book.

1. P.S. Gill Engineering Graphics.
2. Luzzadder Warren J. Duff John, Fundamentals of Engineering Drawing, PHI Publications.

I - Semester B. E. (Common for all branches)

Course Code: 1BEAB10

Title of the Course: Engineering Graphics Laboratory

A2 (594X420mm) (Half imperial) size drawing sheets:

Sr. No.	Title Of Sheet	No.of sheets (To be Submit)
1	Engineering Curves (Minimum four problems)	01
2	Projection of Points And Lines(Minimum four problems)	01
3	Projection of Plane (Minimum four problems)	01
4	Projection of Solid(Minimum four problems)	01
5	Section of Solid(Minimum four problems)	01
6	Section of Solid and Development Of Surface(Minimum four problems)	01
7	Orthographic Projection (Minimum four problems)	01
8	Isometric View (Minimum four problems)	01

Total = 08

Text Books:

1. N.D. Bhatt, Elementary Engineering Drawing, Charotar Publishing house, Anand, India.
2. D. N. Johle, Engineering Drawing, Tata Mcgraw-hill Publishing Co. Ltd.
3. M.B. Shah, B.C. Rana, Engineering Drawing, Pearson.
4. Pakhatkar, Engg. Drawing, Nirali Prakashan.
5. P J. Shah, Text Book of Engineering Drawing, S Chand & Publications.
6. Engineering Graphics- K.R. Gopalkrishna, 32nd Edition, 2005-Subhash Publishers Bangalore.

Note: During external practical examination of **25 marks**, Students are expected to solve **One/ Two** Problems on drawing sheet (or using the soft ware on the system) **OR Objective type Questions. + Oral** (15+ 10 =25 marks). The Total duration: 60 Minutes.

Suggestion for Discussion:

All sheets are to be drawn on the system by using AUTOCAD/ SOLID WORKS

SYLLABUS FIRST SEMESTER BACHELOR OF ENGINEERING

(common for all branches)

Subject-Communication Skills

1BEAB06	Communication Skills	L=2	T=0	P=0	CREDITS = 2 (T)
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Evaluation Scheme	MSE	IE	ESE	Total	ESE Duration
	05	05	40	50	2 Hrs

Course Objective

- A text with focus on skills approach: intended to develop the language skills of Listening, Speaking, Reading and Writing.
- To develop communication competence in prospective engineers.
- To enable them to convey thoughts and ideas with clarity and focus.
- To build confidence for communicating in English and create interest for the life long learning of English language.
- To prepare the student for campus interview.

Unit	Contents	Course objective	Hours	Marks
I	Letter Writing: Business,Job.	- To improve Writing skills. - To teach writing business letter and resume writing	5	8
II	Technical Report Writing.	- To develop Report Writing skills	5	8
III	Practice Exercises on Remedial Grammar and Vocabulary Covering 1] Sentence structure 2] Correction of Errors 3] Transformation of Sentences 4] Correct Use of Confusing Words 5] Pairs of Words 6] One Word Substitute	- To make student use correct grammar - To improve Vocabulary - To enable them to use proper words to express .	10	14

	7] Synonyms and Antonyms			
	8] Prefixes and Suffixes			
IV	1] Professional Communication Skills - Meaning, significance, Types, barriers 2] Group Discussion and Personal Interview - importance of GD. How to prepare for Group Discussion (GD). 3] Meaning, types and techniques of Personal Interview (PI). How to prepare for PI	- To help students understand the process of Communication in link with non verbal communication - The curriculum also targets the understanding of different barriers that creep into communication process - To equip them to face interview and group discussion	10	10
Total			30	40

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

- 1) Write a letter regarding business deals or be able to write an application for job describing his/her own strengths and skills.
- 2) Write a detailed technical report of the analysis carried out in his/her technical domain.
- 3) Write proper grammatically sentences. Identify the grammatical mistakes in any given note or write up. Choose proper word to express his views.
- 4) Participate in a group discussion activity on any subject ranging from technical domain to socio economic situations and trends with accomplished level of fluency in spoken english.
- 5) Develop courage and comfort in spoken English so as to converse ably in personal interview..

List of book to be referred:

Text Books:

- 1- Technical communication by Raman and Sharma
- 2 - Developing communication skills by Krishna Mohan and Meera Banerji
- 3 - High School English Grammar And Composition by wren and Martin
- 4 - Professional Communication Skills by Sheikh And Bhatia

Question Paper Pattern (Sub.-Communication Skills)
for B.E.I Yr. Sem –I from 2017-18 onwards for CBCS 2017.

INSTRUCTIONSTO PAPER SETTERS: Theory Examination:**MAXIMUM MARKS: 40**

1. Duration of paper shall be **TWO** hours.
2. Maximum marks allotted should be **FORTY (40)**.
3. Question Number 1 & 2 will be based on Unit 1. Any **ONE** out of these **TWO** questions is to be solved.
4. Question Number 3 & 4 will be based on Unit 2. Any **ONE** out of these **TWO** questions to be solved.
5. Question Number 5 & 6 will be based on Unit 3. Any **ONE** out of these **TWO** questions to be solved.
6. Question Number 7 & 8 will be based on Unit 4. Any **ONE** out of these **TWO** questions to be solved.
7. Question paper will comprise of total 8 questions. Question Number 1 & 2 will be of 8 marks each.
Question Number 3 & 4 will be of 8 marks each. Question Number 5 & 6 will be of 14 marks each
and Question Number 7 & 8 will be of 10 marks each.
8. Total **FOUR** questions to be solved to score maximum marks.

Gondwana University CBCS 2017 Pattern for B.E./Year w.e.f 2017-18

GONDWANA UNIVERSITY, GADCHIROLI.

SYLLABUS FIRST SEMESTER BACHELOR OF ENGINEERING

(common for all branches)

Subject-Applied Mathematics-II

1BEAB01	Applied Mathematics-II	L=4	T=1	P=0	CREDITS = 4(T)
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Evaluation Scheme	MSE	IE	ESE	Total	ESE Duration
	10	10	80	100	3 Hrs

Course Objective

The main objective of the course is

- To equip students with adequate knowledge of mathematics that will enable them in formulating problems and solving problems analytically.
- To develop an ability to apply knowledge of mathematics, science and engineering.
- To develop the basic mathematical skills of engineering students that is essential for effective understanding of engineering subjects.
- To teach mathematical methodologies and models, to develop mathematical skill and enhance thinking and decision making power of the student.

Unit	Contents	Course objective	Hours	Marks
I	Ordinary Differential Equations- I Solution of ordinary differential equations of first order and first degree in (Linear, Exact and reducible to Linear form), solution of higher order linear differential equations with constant coefficients, and method of variation of parameters.	To gain the knowledge to solve ordinary differential equation arising in different Engineering branch .	12	16
II	Ordinary Differential Equations -II Cauchy's and Legendre's differential equations, Simultaneous differential equations, Differential equation of the form $\frac{d^2y}{dx^2} = f(y)$, Application of differential equation to electrical circuits & Kinematics (upto second order)	To develop the skills of using ordinary D.E and its application in the field of Engineering and able to form mathematical & physical interpretation of its solution which place important role in all	12	16

		branches of Engineering.		
III	Multiple Integrals and their Applications : Elementary double integral. Change of order of integration (Cartesian form), Triple Integrals, Applications of Double integrals to Area, Volume & Centre of gravity.	To develop the skills to apply Double & Triple Integration and enable them to handle integrals of higher orders.	12	16
IV	Vector calculus -I Scalars and Vectors, Velocity and Acceleration, Tangential and Normal acceleration, Gradient of scalar point function, Directional Derivatives.	To introduce the basics of vector calculus comprising of scalar, vector and gradient in the field of Engineering.	12	16
V	Vector calculus -II (Vector Integration) Vector point function, Divergence and Curl, Solenoidal and Irrotational vector fields. Scalar potential, Work done .Line, Surface and Volume Integrals. Statements & problems of Gauss Divergence , Green's , Stoke's theorem (without proof)	To introduce vector calculus and its application in the field of Engineering.	12	16
Total			60	80

Course Outcomes:

After successful completion of this course, the student shall be able :

- 1) To find out the solution of Differential equations of certain types and to solve higher order differential Equations.
- 2) To solve engineering problems using differential equations and develop mathematical models for varied engineering applications.
- 3) To use multiple integration for calculating mass, volume, area in various engineering problems.
- 4) . To calculate the gradient and directional derivatives of functions.
- 5) To use Green's theorem to evaluate line integrals along simple closed contours on the plane, Stoke's theorem to give a physical interpretation of the curl of a vector field and the Divergence theorem to give a physical interpretation of the divergence of a vector field.

Text Book:

2. A text book of Engineering Mathematics, Volume I and II by D.T. Deshmukh.

Reference Books:

1. A text book of Applied Mathematics Volume I and II by J.N. Wartikar and P.N. Wartikar
2. Higher Engineering Mathematics by Dr. B. S. Grewal
3. Advanced Engineering Mathematics by H. K. Dass
4. Advanced Engineering Mathematics by Erwins Kreyszig

Question Paper Pattern (Sub.-Applied Mathematics-II)
for B.E.I Yr. Sem –II from 2017-18 onwards for CBCS 2017.

INSTRUCTIONSTO PAPER SETTERS: Theory Examination: **MAXIMUM MARKS: 80**

1. Duration of paper shall be **THREE** hours.
2. Maximum marks allotted should be **EIGHTY(80)**.
3. Question Number 1 & 2 will be based on Unit 1. Any **ONE** out of these TWO questions is to be solved.
4. Question Number 3 & 4 will be based on Unit 2. Any **ONE** out of these TWO questions to be solved.
5. Question Number 5 & 6 will be based on Unit 3. Any **ONE** out of these TWO questions to be solved.
6. Question Number 7 & 8 will be based on Unit 4. Any **ONE** out of these TWO questions to be solved.
7. Question Number 9 & 10 will be based on Unit 5. Any **ONE** out of these TWO questions to be solved.
8. Question paper will comprise of total **FIVE (5)** questions. All questions will carry equal marks.
9. Total **FIVE** questions to be solved to score maximum marks.

Syllabus for Gondwana University CBCS 2017 Pattern for B.E.I Year w.e.f 2017-18

II Semester B. E. (Common for all branches)

Subject Code: 2BEAB002

Title of the Course: Applied Physics-II Course Scheme				Evaluation Scheme (Theory)				
Lecture	Tutorial	Periods/ week	Credits	Duration of paper, hrs	MSE(5)	IE(5)	ESE	Total
2	1	3	2	2	CA (10)		UA(40)	50

Course Objectives:

1. To introduce more engineering physics concepts, which form the basis of modern engineering.
2. To develop skills for numerical problem solving in areas covered.
3. To develop the ability to apply concepts in elementary physics to understanding of engineering applications.
4. To elaborate the general nature of concepts learnt and of possibility of their cross-disciplinary application;
5. To provide a sound foundation in mathematical formulation of concepts learnt and their applications

Unit IV Wave optics

Interference due to thin films of uniform and non uniform thickness, Newtons ring, Antireflection coating applications, Polarization, types of polarization, linear, circular and elliptical polarizations. Polarization by reflection, polarization by scattering, optics axis, ordinary and extra ordinary waves, positive and negative crystals. Double refraction in quartz prism, polarizer, analyzer. Malu's law, quarter and half wave plates. **(10HRS)**

Unit V Electron Ballistics

Motion of electron in uniform electric and magnetic fields, Concept of crossed fields, Electron refraction, electric and magnetic focusing devices-CRT, CRO and its applications, Bainbridge Mass spectrograph. **(10HRS)**

Unit VI Lasers and Fibre Optics

Introduction, Principle of laser, laser characteristics, Spatial and temporal coherence of light waves, types of laser, and its application. Introduction to optical fibre structure, principle, modes of propagation, acceptance angle, Numerical aperture, fractional refractive index, types and classifications of optical fibre, V – number, attenuation & its different mechanisms, distortion, applications as sensors and detectors advantages of optical fibre in communication. **(10HRS)**

Text Books:

1. Engineering Physics by Avadhanulu & Kshirsagar S. Chand Prakashan.

Reference Books:

1. Concept of modern Physics by A. Beiser TMH Edition
2. Concept of modern Physics by S. L. Gupta & S. Gupta
3. Optics by Ajay Ghatak
4. Lasers and Non Linear Optics by B.B. Laud, New Age Publications
5. Lasers Theory & Application by Avadhanulu, S. Chand and Company

Course Outcomes:

1. Develop ability to choose a physical approach to understanding of advanced areas in engineering
2. Develop a better understanding of physics as a fundamental discipline
3. Gain an understanding of developing areas in physics and their possible engineering applications
4. Be comfortable with fundamental ideas in areas like semiconductor, electronic devices, and quantum mechanics.
5. Increase understanding of the type of questions addressed by theories in and methods of physics in different fields of Engineering.
6. Develop a deeper appreciation of the notion of applying knowledge of physical laws

SCOPE OF SYLLABUS IN APPLIED PHYSICS-II

B.E.FIRST YEAR (SEM- II)

Unit IV : Wave Optics.

Concept of thin film, path difference for maxima & minima, its derivation for uniform thickness. application of wedge shape film as surface testing & thickness or diameter of wire/foil. equation for fringe width, Newton's ring and its applications,

Polarization: Linear, circular, elliptical polarizations, polarization by reflection, polarization by scattering, Optic axis, ordinary and extraordinary waves, positive & negative crystals, Double refraction in quartz prism, polarizer and analyzer , Malus law, quarter and half wave plates.

Unit V : Electron Ballestics

Application of electric and magnetic fields along parallel, perpendicular and inclined direction, concept of Lorentz force, Non uniform electric and magnetic field, Bethes law, electrostatic & magnetostatic lenses, CRO- block diagram and functions of various parts, concept of velocity selector. mass isotope and derivation of linear separation.

Unit VI : Laser and fibre optics

Interaction of radiation with matter(energy concept approach), Absorption, spontaneous and stimulated emission, components as pumping, population inversion, metastable state three and four level laser system, resonant cavity, lasing medium, coherence time, coherence length, types- Ruby, He-Ne and Semiconductor. Propagation of light through an optical fibre, critical angle of propagation, acceptance cone, classification of optical fibre based on refractive index profile, modes of light propagation and materials, Different mechanism of attenuation i.e intrinsic losses and extrinsic losses, different dispersion mechanism, intramodel dispersion, intermodel dispersion, Sensors- temperature sensor, displacement sensor, force sensor, detectors- liquid level detector, pollution detector.

Syllabus for Gondwana University CBCS 2017 Pattern w.e.f 2017-18

APPLIED PHYSICS-II – B.E. I YEAR SEMESTER II

LABORATORY-II

Subject code: 2BEAB007

Practical: 2 hrs/week

Examination Scheme

Credit: 1

University External Practical Exam: 15 marks

Internal Assessment: 10 Marks.

Total Marks : 25

Duration : 2 hrs.

Course Objectives

- a. To understand and analyse the theoretical concepts in physics through experimentation.
- b. To learn and use the proper methods while gathering experimental data.
- c. To get familiar with the proper use of basic instruments in physics laboratories.

Minimum SIX experiments to be performed from the list given below.

1. Determination of the radius of curvature of a plano-convex lens using Newton's rings.
2. Determination of thickness of a thin foil using air wedge.
3. Cathode ray oscilloscope applications (Frequency & Phase)
4. Determination of wavelength of Laser light using planetransmission grating.
5. To measure the divergence of laser beam.
6. Determination of numerical aperture and acceptance angle, attenuationin optical fibre.
7. e/m by Thomson's method.
8. Determination of R.I of prism.
9. Determination of R.I. of liquid using Newton's Ring.
10. Determination of R.I. of Ordinary and Extra-Ordinary Rays.

Course Outcomes by the end of the semester

Students will be able to do experiments based on syllabus using proper methodology and derive scientific conclusion based on experiments

Question Paper Pattern (Sub.-Applied Physics-II)
for B.E.I Yr. Sem –II from 2017-18 onwards for CBCS 2017.

1. Duration of paper should be **TWO** hours.
2. Maximum marks allotted should be **FORTY** .
3. Questions are to be set from **UNITS IV,V, VI for SEM-II.**
4. **TWO** questions should be set from each unit with its alternative choice.
5. **THREE** questions should be attempted out of **SIX** questions.
6. Each question carry **THIRTEEN/FOURTEEN** marks.

SYLLABUS SECOND SEMESTER BACHELOR OF ENGINEERING

(common for all branches)

Subject-APPLIED CHEMISTRY - II

2BEAB003	Applied Chemistry-II	L=2	T=1	P=2	CREDITS = 2 (T) 1 (P)
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Evaluation Scheme	MSE	IE	ESE	Total	ESE Duration
	05	05	40	50	2 Hrs

Rationale: Applied Chemistry deals with industrial applications, engineering & technologies which are related with the basic need of an individual, society & environment so the students should be aware of the basic fundamental as well as relevant up-dates. Chemistry is considered as one of the core subjects for students in engineering and technology for developing in them scientific temper and appreciation of chemical properties of materials, which they have to handle in their professional career.

Course Objectives: Applied Chemistry includes the study of a large number of diverse topics all related to things in the world around us. It aims to give an understanding of this world both by observation and prediction of the way in which objects will behave. Concrete uses of principles and analysis in various fields are given prominence in course content. Effort should be made to teach this subject through demonstration and with active involvement of students.

Unit	Contents	Course objective	Hour
IV	Fuels and Energy Calorific value, HCV & LCV; Determination C.V.by Bomb & Boy's calorimeter; Dulong's formula & numericals for calculation of Gross & Net C.V. Analysis of coal - significance of (i) Proximate Analysis &(ii) Ultimate Analysis. Liquid and Gaseous fuels:- Bubble tower fractional distillation of crude oil (boiling point wise separation with diagram & composition table); Knocking in IC & Compression engine; Octane & Cetane number, Doping agents (Anti-knocking,Anti oxidants) Fisher-Tropsch process of manufacture of synthetic gasoline; catalytic cracking (Only Principal, Definition, reactions, catalysts used, Advantage. Method of fixed bed & fluid bed not required).	Application of knowledge of conventional sources of energy used in thermal, electrical, nuclear power, generations; significance of quality of fuel for industry; social awareness about conservation and proper utilization of natural resource	10

	Comparison of CNG & Diesel .	fuel and use of cleaner technology.	
V	Corrosion. Introduction : Cause and Consequences of corrosion Factors influencing the rate of corrosion : a) Nature of metal, position in galvanic series, potential difference, relative area of the anodic and cathodic parts, purity of metal, nature of the corrosion product, b) Nature of environment, temperature, moisture, influence of pH, concentrations of electrolytes. Types of Corrosion: (I) Dry or Chemical Corrosion (i) Due to oxygen (ii) due to other gases. Pilling-Bedworth rule (II) Wet or Electrochemical Corrosion: Mechanism (i) Evolution of hydrogen type (ii) Absorption of oxygen. Types of Electro-Chemical Corrosion - Galvanic cell corrosion, Concentration cell corrosion. Differential aeration theory of corrosion, pitting corrosion, Intergranular corrosion, Stress Corrosion, Waterline Corrosion. Methods to Decrease the rate of Corrosion :- a) Design & material selection using pure metal, using metal alloys, b) Cathodic protection - (i) Sacrificial anodic protection, (ii) Impressed current method, c) Anodic protection method, d) protective surface coating-(only principle No Method)- tinning, galvanizing & powder coating, electroplating.	Knowledge for proper selection and design of engineering materials having better corrosion resistance and to implement effective measures to minimize corrosion.	10
VI	<u>ADVANCED CHEMISTRY AND COMBUSTION CALCULATIONS</u> Green Chemistry: Introduction, Twelve principles of Green Chemistry, concept of carbon credits. Properties and uses of Carbon Nano Tubes (CNTs). Battery: -Nickel-cadmium, Alkaline Fuel Cell. Combustion: calculations for given solid, liquid & gaseous fuels.	fascinating developments in CNT, green chemistry & battery technology which has opened new vistas in engineering field applications of engineering materials	10
Total			30

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

- 1) Illustrate the type of corrosion and its mechanism which will help to develop the corrosion control methods.
- 2) Classify the various types of fuel and their analysis by bomb calorimeter and other techniques.
- 3) Have basic knowledge of clean technologies green chemistry.
- 4) Develop numerical problem solving skills in areas covered..

List of book to be referred:

Text Books:

1. Text Book of Engineering Chemistry, S. S. Dara, S. Chand and Company Ltd., New Delhi.
2. Textbook of Engineering Chemistry, P. C. Jain and Monica Jain, Dhanpat Rai and Sons, New Delhi.
3. Textbook of Engineering Chemistry, S. N. Narkhede, R. T. Jadhav, A. B. Bhake, A. U. Zadgaonkar, Das Ganu Prakashan, Nagpur.
5. Applied Chemistry, A. V. Bharati and Walekar, Tech Max Publications, Pune.
6. Engineering Chemistry, Arty Dixit, Dr. Kirtiwardhan Dixit, Harivansh Prakashan, Chandrapur.

Reference Books:

1. A Text book of Engineering Chemistry : Shashi Chawla; Dhanpat Rai & Sons, New Delhi.
2. Applied Chemistry by N. Krishnamurthy:P. Vallinavagam. And K. Jeysubramanian TMH
3. Applied Chemistry for Engineers : T.S. Gyngeell.
4. Chemistry in Engineering : Lloyd a. Munro, Prentice-hall, IncNj
5. Chemistry of Advanced Materials : CNR Rao, Rsc Publication.
6. Chemistry of Cement, J. D. Lee, Mcgraw Hill Publishing Company, New Delhi.
7. Chemistry of Engineering Materials: Robert B Leighou Mc Graw – Hill Book Company, Inc New York
8. Chemistry, Raymond Chang. (Tata McGraw Hill).
9. Corrosion Engineering by Mars G. Fontana and Norbert D. Green Mc Graw Hill Book Co. Tokyo
10. Electrochemistry, Philip H. Rieger (Chapman and Hail)
11. Engineering Chemistry (Vol. I and II) by Rajaram and Kuriakose.
12. Engineering Chemistry B.K.Sharma Krishna Prakashan media private LTD.
13. Engineering Chemistry by Gyngeell, McGraw Hill Publishing Company, New Delhi.
14. Engineering chemistry by R.gopalan, and others, Vikas publications
15. Engineering Chemistry by R.V.Gadag, A.Nityananda Shetty ; I K International Publishing House, New Delhi
16. Engineering Chemistry(Vol. 1&2) by Rajaram and Kuriakose
17. Engineering Chemistry, B. S. Sivasankar, Tata Mcgraw Hill Publishing Company, New Delhi.
18. Engineering Chemistry, O. G. Palan, Tata Mcgraw Hill Publishing Company, New Delhi.
19. Engineering Chemistry, R. Shivakumar, Tata Mcgraw Hill Publishing Company, New Delhi.
20. Engineering Chemistry, Saraswat and Thakur, Vikas Publication, New Delhi.
21. Engineering Materials: Kenneth G Budinski (Prentice – Hall of India)
22. Fuels and Combustion by Amir Circar, Orient Longmans
23. Fundamentals of Corrosion : Michael Henthorne, Chemical Engineering.
24. Fundamentals of Engineering Chemistry (Theory and Practice) :S. K. Singh (New Age Materials
25. Materials science and engineering an introduction, William D. Callister, (Jr.,Wiley.publisher)
26. Text book of engineering chemistry, R.N. Goyal and Harrmendra Goel, (Ane books India).
27. Water Treatment : F. I. Bilane, Mir publisher
28. Water treatment for industrial and other use by Eskel Nordell, Rein hold Publishing Corporation,New York

SYLLABUS SECOND SEMESTER BACHELOR OF ENGINEERING

(common for all branches)

Subject-APPLIED CHEMISTRY – II Lab

2BEAB008	Applied Chemistry-II Lab	L=0	T=0	P=2	CREDITS = 1 (P)
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Evaluation Scheme	MSE	IE	ESE	Total	ESE Duration
	05	05	15	25	2 Hrs

Course Objectives

To apply the knowledge of basic science in engineering and technology and also understand the concept of applied chemistry and analyze it with experiments.

To learn the proper methods and techniques utilized in gathering experimental data. To become familiar with the proper use of some basic measuring instruments commonly found in laboratories. To learn how effectively communicate experimental results in standard scientific way.

List of practical/ experiments:

List of Experiments - Any Six experiments should be performed out of the following:

1. Estimation of NaOH and Na₂CO₃ Type and extent of alkalinity by Warders method.
2. Estimation of NaHCO₃ and Na₂CO₃ Type and extent of alkalinity by Warders method.
3. Estimation of Copper by Iodometry.
4. Estimation of the amount of ferrous and ferric ions present in the given solution or from ore.
5. Estimation of the amount of Ni⁺² ions in a given solution by complexometric method.
6. Estimation of percentage of iron in plain carbon steel.
7. Determination of moisture content of coal.
8. Determination of volatile matter content of coal.
9. Determination of ash content of coal.
10. Determination of calorific value of a solid fuel using Bomb Calorimeter.
11. Determination of pH.
12. Determination of conductivity.
13. Determination of rate of corrosion by weight loss by corrossometer.
14. Estimation of calcium in limestone by volumetric method.
15. Project on fuel analysis.

Course Outcomes: By the end of the course students should be able to carry out chemical analysis of water, assess the quality of water and to carry out the estimation of various properties on lubricating oil. Budding engineers should be able to understand and perform experiments based on syllabus adopting the proper methodology. Derive a scientific conclusion on the basis of experimental data.

Laboratory Manual:

1. Applied Chemistry theory and practical O.P. Virmani and A.K.Narular (New Age International).
2. Laboratory Manual on Engineering Chemistry by Dr. Subdharani (Dhanpat Rai Publishing)
3. A Textbook on experiment and calculation in engineering chemistry by S.S. Dara S.Chand
4. Inorganic quantitative analysis, Vogel. (Prentice Hall).

Question Paper Pattern (Sub.-Applied Chemistry-I &II)
for B.E.I Yr. Sem –I& II from 2016 -17 onwards for CBCS 2016.

INSTRUCTIONS TO PAPER SETTERS: Theory Examination: **MAXIMUM MARKS: 40**

1. Duration of paper should be **Two** hours.
2. Maximum marks allotted should be **FORTY (40)**.
3. Question paper will comprise of total 6 questions, FOUR of thirteen (13) marks and TWO of fourteen (14)marks
4. Total THREE questions need to be solved.
5. Questions are to be set from **Units I,II,III for Sem .I**
6. Questions are to be set from **Units IV, V, VI. for Sem .II**
7. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. ie (qu. 1 or qu. 2. Qu. 3 or qu. 4 ,Qu. 5 or qu. 6).

C Programming

Unit	Contents	Hours
1	What is C , History of C, Applications of C language, Structure of C Program, Execution of C Program, Advantage of Header File, Variables and Keywords :Character Set, Identifier, Variable, Keywords, Constants :Real Constant, Integer Constant, Character Constant, String Constant, Tokens in C, Programming Examples	6
2	Data types : Integer Data type, floating point data type, Derived data types, Enum, Typedef, Operators :Assignment Operator, Arithmetic Operators, Logical Operators, Relational Operators, Shorthand Operators, Unary , perators, Conditional / Ternary Operator, Biwise Operators, Operator , Precedence and Associativity, Control Statements : If Statement, If-Else Statement, Nested If-Else, Switch Case, Programming Examples	5
3	Loop: while, do while, for loop, Break Statement, Continue Statement, Functions : Function call by passing value, Function call by , returning value, Function call by passing and returning value, Recursion, Programming Examples	7
4	Storage Classes :Automatic Storage Class (auto), Register Storage Class (register), Static Storage Class (static), External Storage Class (extern), Array :Array, Single / One Dimensional Array, Two Dimensional Array, Structure : Array in Structures, Structure with Array, Difference between array and structure	7
5	Strings : Creating variable to store String, Handling Strings, strcpy, strcat, strlen, strcmp, strchr, strstr, command line argument , Programming Examples	5

BACHELOR OF ENGINEERING (FOUR YEARS DEGREE COURSE

IN FACULTY OF SCIENCE AND ENGINEERING

II - SEMESTER B.E.(COMMON TO ALL BRANCHES) with CBCS Scheme

Code	Subject	Teaching Scheme				Examination Scheme									
		Hours per week			No. of Credits	Theory						Practical			
		L	T	P		Duration of Paper (Hrs.)	Max. Marks	Max. Marks		Total	Min. Passing Marks	Max. Marks	Max. Marks	Total	Min. Passing Marks
								Sessional							
							ESE	MS E	I E			TW	POE		
2BEAB 005	Engineering Mechanics	3	1	-	4	3	80	10	10	100	40	-	-	-	-
2BEAB 010	Engineering Mechanics Lab	0	0	3	2	-	-	-	-	-	-	25	25	50	25

Subject: Engineering Mechanics (2BEAB005) Theory

Unit	Contents	Hrs
1	Basic Concepts: System of forces, Moment of forces and its Applications, Couples and Resultant of Force System. Equivalent Force System: Resultant of a 2 dimensional distributed loads and three dimensional general force system Equations of Equilibrium: Free body diagrams, Types of Supports, Equations of equilibrium, coplanar concurrent and non-concurrent systems, general spatial force system, Support reactions for determinate beams with different types of load – concentrated, uniformly distributed and uniformly varying load.	09
2	Analysis of perfect frames and simple trusses: Analysis of pin jointed simple and cantilever frames and trusses by method of joints, method of section and Graphical methods. Friction: Coulomb's laws of dry friction, problem involving Dry Friction, simple application like wedges, belt friction and band brakes. Simple Machine – Differential wheel and axle, single and double purchase Crab, it's Velocity Ratio, Mechanical advantage, efficiency, ideal machine etc.	09
3	Centroid and Moments of Inertia: Centroid location by first principle, centroid of composite areas, Second Moment and products of inertia of plane areas, Transfer theorems for moment of inertia and Product of inertia, Maximum and Minimum moment of inertia, Mohr's circle. Virtual work: Principles, theorem, Principle of Virtual work applied to equilibrium of Mechanisms, simple beam, Pin jointed frames.	09
4	Kinematics and Kinetics of Particles: Rectilinear motion of a particle with variable acceleration, Motion curves, Projectile motion, normal and tangential components of acceleration, kinetics of particle and several interconnected particles.	09
5	Collision of elastic bodies: Principle of conservation of momentum, Impulse momentum equation, work energy equation, coefficient of restitution, impact of elastic bodies. D'Alemberts Principles, problems on connected system of particles.	09
Total		45

Textbook and Reference Books:

1. Engineering Mechanics Statics and Dynamics: Ferdinand L. Singer, Harper International edition
2. Engineering Mechanics: S. Timoshenko & D H Young, McGraw-Hill Book Company, Inc., New York.
3. Engineering Mechanics: Bear and Johnston, Tata McGraw hill.
4. Engineering Mechanics: I. H. Shames, Prentice Hall
5. Engineering Mechanics, Schaum Series.

Subject: Engineering Mechanics Lab (2BEAB10)

List of Experiments:

Note: A student has to perform any 8 experiments out of the following list.

1. To determine the reactions at the supports of a simply supported beam.
2. To determine MA, VR and efficiency of a double purchase crab and to verify law of machine.
3. To determine the M.A., V.R. and efficiency of the differential wheel - axle and to verify law of machine.
4. To determine the forces in the members jib and tie of the jib crane apparatus.
5. To determine the coefficient of coil friction.
6. To determine the coefficient of friction between two surfaces by inclined plane.
7. To determine the moment of inertia of flywheel.
8. Verification of Newton's second law of motion by Fletcher's Trolley.
9. To determine the reactions at the supports of a given beam by graphical method.
10. To determine the reactions at the supports and the forces in members of a given truss by graphical method.

II Semester B. E. (Common for all branches)
Course Code: 2BEAB11
Title of the Course: Mechanical Workshop Lab

Sr. No.	Title Of Shop	No.of Jobs (To Submit)
1	Fitting Shop (Square fitting and V-fitting or other models)	02
2	Carpentry (Cross lap joint and Dovetail joint or other models)	02
3	Smithy (Flat Chisel and S-Hook or other models)	02
4	Welding (Corner joint and T-fillet joint or other models)	02

Total = 08

Text / Reference Books:

1. Elements of Workshop Technology (Volume – 1) by Hajra Choudhary
2. Workshop Manual by P.Kannaiah