.E. /B.Tech in : Computer Science & Business System

Year 1

Sem 1			Teaching Scheme				Examination Scheme-Marks							Credit		
							End Semester Examination	Continuous Assessment			TW & Practical	TW & Oral	Total	Theory	Term Work	Total
ID	Cluster	Course	Lecture	Tutorial	Practical	tact Hours per w		Unit Test	Attendance	Assignments						
1. 1	SH	Mathematics I	3	1	0	4	60	20	10	10	-	-	100	4	0	4
1.2	SH	Statistics I	3	1	0	4	60	20	10	10	-	-	100	4	0	4
1.3	SH	Principles of Electrical Engineering	3	0	2	5	60	20	10	10	-	50	150	3	1	4
1.4	CS	Fundamentals of Computer Science	3	1	2	6	60	20	10	10	50	-	150	4	1	5
1.5	SH	Fundamentals of Physics	3	0	2	5	60	20	10	10	-	50	150	3	1	4
1.6	SH	Business Communication & Value Science - I	2	1	2	5	50	-	-	-	-	50	100	3	1	4
		Total	17	4	8	29	350	100	50	50	50	150	750	21	4	25

Sem 2			Teaching Scheme				Examination Scheme-Marks							Credit		
							End Semester Examination	Continuous Assessment			TW & Practical	TW & Oral	Total	Theory	Term Work	Total
ID	Cluster	Course	Lecture	Tutorial	Practical	tact Hours per w		Unit Test	Attendance	Assignments						
1. 7	SH	Mathematics II	3	1	0	4	60	20	10	10	-	-	100	4	0	4
1.8	SH	Statistics II	3	1	0	4	60	20	10	10	-	-	100	4	0	4
1. 9	CS	Data Structures & Problem Solving	3	1	2	6	60	20	10	10	50	-	150	4	1	5
1.10	SH	Fundamentals of Economics	3	0	0	3	60	20	10	10	-	-	100	3	0	3
1.11	SH	Principles of Electronics	3	0	2	5	60	20	10	10		50	150	3	1	4
1.12	SH	Business Communication & Value Science - II	2	1	2	5	50	-	-	-	-	50	100	3	1	4
1. 13	SH	Self Learning Module	0	0	2	2	-	-	-	-	-	50	50	0	1	1
		Total	17	4	8	29	350	100	50		50	150	750	21	4	25

B.E. /B.Tech in : Computer Science & Business Systems

Year 2

Sem 3			Teaching Scheme				Examination Scheme-Marks							Credit		
							End Semester	Continuous Assessment			TW & Practical	TW & Oral	Total			
ID	Cluster	Course	Lecture	Tutorial	Practical	ct Hours per	Examinatio	Unit Test	Attendance	Assignments				Theory	Term Work	Total
2.1	CS	Computational Mathematics	3	1	0	4	60	20	10	10	-	-	100	4	0	4
2.2	CS	Advanced Data Structures	3	0	2	5	60	20	10	10	50	-	150	3	1	4
2.3	CS	Computer Organization & Architecture	3	0	0	3	60	20	10	10	-	-	100	3	0	3
2.4	CS	Introduction to Concepts of Object Oriented Programming through C++ / Java - I	3	0	2	5	60	20	10	10	50	-	150	3	1	4
2.5	CS	Computational Statistics	3	0	0	3	60	20	10	10	-	-	100	3	0	3
2.6	CS	Software Engineering	3	1	0	4	60	20	10	10	-	-	100	4	0	4
2.7	SH	Business Communication & Value Science - III	2	0	2	4	50	-	-	-	-	50	100	2	1	3
		Total	20	2	6	28	410	120	60	60	100	50	800	22	3	25

Sem 4			Teaching Scheme				Examination Scheme-Marks							Credit		
							End Semester	Continuous Assessment			TW & Practical	TW & Oral	Total			
ID	Cluster	Course	Lecture	Tutorial	Practical	ct Hours per	Examinatio	Unit Test	Attendance	Assignments				Theory	Term Work	Total
2.8	CS	Introduction to Concepts of Object Oriented Programming through C++ / Java - II	3	0	0	3	60	20	10	10	-	-	100	3	0	3
2.9	CS	Software Design with UML	3	0	0	3	60	20	10	10	-	-	100	3	0	3
2.10	CS	Database Management Systems & Data Warehousing	3	0	2	5	60	20	10	10	50	-	150	3	1	4
2.11	CS	Operating Systems	3	0	2	5	60	20	10	10	-	50	150	3	1	4
2.12	MS	Operations Research	2	0	0	2	60	20	10	10	-	-	100	2	0	2
2.13	DTS	Data Communication and Networking	3	0	0	3	60	20	10	10	-	-	100	3	0	3
2.14	MS	Fundamentals of Management	3	0	0	3	60	20	10	10	-	-	100	3	0	3
2.15	SH	Business Communication & Value Science - IV	2	0	2	4	50	-	-	-	-	50	100	2	1	3
		Total	20	0	4	28	470	140	70	70	50	100	900	22	3	25

BE/B.Tech in : Computer Science & Business Systems

4 Weeks - Industry Exposure

Year 3

Sem 5			Teaching Scheme				Examination Scheme - Marks							Credit		
							End Semester Examinat	Continuous Assessment			TW & Practical	TW & Oral	Total	Theory	Term Work	Total
ID	Cluster	Course	Lecture	Tutorial	Practical	ıct Hours per		Unit Test	Attendance	Assignments						
3.1	DS	Data Mining and Analytics	3	1	2	6	60	20	10	10	50	-	150	4	1	5
3.2	DS	Introduction to Statistical Softwares (MATLAB, SPSS)	3	0	2	5	60	20	10	10	50	-	150	3	1	4
3.3	IIE	Introduction to Innovation, IP Management & Entrepreneurship	3	0	0	3	60	20	10	10	-	-	100	3	0	3
3.4	MS	Behavioral Sciences	3	1	0	4	60	20	10	10	-	-	100	4	0	4
3.5	SH	Business Communication & Value Science - V	2	0	2	4	50	-	-	-	-	50	100	2	1	3
3.6		Mini Project	0	0	2	2	-	-	-	-	-	50	50	0	1	1
3.7		Elective I	3	1	2	6	60	20	10	10	50	-	150	4	1	5
		Total	17	3	10	30	350	100	50	50	100	100	800	20	5	25
Elective I	CS	**Infrastructure Design**														
	DTS	**Cloud Computing**														
	DS	**Machine Learning**														

Sem 6			Teaching Scheme				Examination Scheme-Marks							Credit		
							End Semester Examinat	Continuous Assessment			TW & Practical	TW & Oral	Total	Theory	Term Work	Total
ID	Cluster	Course	Lecture	Tutorial	Practical	ıct Hours per		Unit Test	Attendance	Assignments						
3.8	DS	Artificial Intelligence	3	0	4	7	60	20	10	10	50	-	150	3	2	5
3.9	MS	Financial & Cost Accounting	3	1	0	4	60	20	10	10	-	-	100	4	0	4
3.10	SH	Business Communication & Value Science - VI	2	0	2	4	50	-	-	-	-	50	100	2	1	3
3.11	CS	Information Security	3	1	0	4	60	20	10	10	-	-	100	4	0	4
3.12	IIE	Design Thinking	2	0	4	6	60	20	10	10	-	50	150	2	2	4
3.13		Elective II	3	1	2	6	60	20	10	10	-	50	150	4	1	5
		Total	16	3	12	31	350	100	50	50	50	150	750	19	6	25
Elective II	DTS	**Robotics and Embedded Systems**														
	DTS	**Modern Web Applications**														
	CS	**Enterprise Systems**														

BE/B.Tech in : Computer Science & Business Systems

Year 4

			Teaching Scheme				Examination Scheme-Marks							Credit		
							End Semester Examination	Continuous Assessment			TW & Practical	TW & Oral	Total	Theory	Term Work	Total
			Lecture	Tutorial	Practical	Contact Hours per week		Unit Test	Attendance	Assignments						
Industrial Project (8 weeks)			0	0	0	0	-	-	-	-		50	50		3	3
Sem VII																
ID	Cluster	Course														
4.1	MS	Services Science & Service Ops Management	2	0	0	2	60	20	10	10	-	-	100	2	0	2
4.2	DTS	Usability Design of Software Applications	3	0	0	3	60	20	10	10	-	-	100	3	0	3
4.3	MS	Financial Management	3	0	0	3	60	20	10	10	-	-	100	3	0	3
4.4	MS	Human Resource Management	3	0	0	3	60	20	10	10	-	-	100	3	0	3
4.5		Project Evaluation I	0	0	2	2	-	-	-	-	-	50	50	0	1	1
4.6		Elective III	3	1	2	6	60	20	10	10	-	50	150	4	1	5
4.7		Elective IV	3	1	2	6	60	20	10	10	-	50	150	4	1	5
		Total	17	2	6	25	360	120	60	60	0	200	800	19	6	25

Elective III	DS	**Cognitive Science & Analytics**
	DTS	**Introduction to IoT**
	DTS	**Industry Offered Elective I**
Elective IV	DTS	**Cloud, Microservices & Appification**
	DS	**Advanced Social, Text and Media Analytics**
	DTS	**Mobile Computing**

Sem 8			Teaching Scheme				Examination Scheme-Marks							Credit		
							End Semester Examination	Continuous Assessment			TW & Practical	TW & Oral	Total	Theory	Term Work	Total
ID	Cluster	Course	Lecture	Tutorial	Practical	Contact Hours per week		Unit Test	Attendance	Assignments						
4.8	MS	Marketing Research & Marketing Management	3	0	0	3	60	20	10	10	-	-	100	3	0	3
4.9	MS	Business Strategy	3	0	0	3	60	20	10	10	-	-	100	3	0	3
4.10	MS	IT Project Management	2	0	2	4	60	20	10	10	-	50	150	2	1	3
4.11		Project Evaluation II	0	0	4	4	-	-	-	-	-	50	50		6	6
4.12		Elective V	3	1	2	6	60	20	10	10	-	50	150	4	1	5
4.13		Elective VI	3	1	2	6	60	20	10	10	-	50	150	4	1	5
		Total	14	2	10	26	300	100	50	50	0	200	700	16	9	25

Elective 5	MS	**Advanced HR**
	MS	**Advanced Finance**
	MS	**Industry Offered Elective 2**
Elective 6	DTS	**Financial Modeling**
	DS	**Psychology**
	MS	**Image Processing and Pattern Recognition**

BHARATI VIDYAPEETH (Deemed to be University)

COLLEGE OF ENGINEERING, PUNE-43

B. Tech. (Computer Science & Business Systems)

Syllabus of Semester 1

Mathematics I

TEACHING SCHEME:	EXAMINATION SCHEME:	CREDITS ALLOTTED:
Lectures: 3Hrs./Week	Semester Examination: 60 marks	4
Tutorials: 1Hr./Week	Continuous Assessment: 40 marks	
Lab: Nil	Term Work: Nil	

Course ID:

1.1 (Year 1 Semester 1)

Course Pre Requisite(s):

The students should have basic Knowledge of high school math, including trigonometry, geometry and calculus

Course Objective:

The course introduces fundamental concepts of Calculus and Discrete Mathematics.

Course Outcome(s):

Students will be able to understand and apply basic concepts of Calculus, Boolean algebra and Combinatorics.

Topics to Be Covered:

UNIT – I **[6 Hours]**

Calculus: Differential calculus and integral calculus, double and triple integral.

UNIT – II **[6 Hours]**

Application of double and triple integral.

UNIT – III **[6 Hours]**

Boolean algebra: Introduction of Boolean algebra, truth table.

UNIT – IV **[6 Hours]**

Basic logic gate, basic postulates of Boolean algebra, principle of duality, canonical form, Karnaugh map.

UNIT – V **[6 Hours]**

Abstract algebra: Set, relation, group, ring, field.

UNIT – VI **[6 Hours]**

Combinatorics: Basic counting, balls and bins problems, generating functions, recurrence relations. Proof techniques, principle of mathematical induction, strong form of induction, pigeonhole principle.

Home Assignments:

Assignments & tutorials covering the following: Successive differentiation, multiple integral, truth table, Karnaugh map, principle of mathematical induction, strong form of induction and pigeonhole principle.

Reference Books:

1. I. N. Herstein, “Topics in Algebra”, John Wiley and Sons.
2. M. Morris Mano, “Digital Logic & Computer Design”, Pearson
3. B. S. Grewal, “Higher Engineering Mathematics”, Khanna Publication, Delhi.

Syllabus for Unit Test:	
Unit Test -1	UNIT – I, UNIT – II, UNIT - III
Unit Test -2	UNIT – IV, UNIT – V, UNIT - VI

Statistics I

TEACHING SCHEME:	EXAMINATION SCHEME:	CREDITS ALLOTTED:
Lectures: 3Hrs/Week	Semester Examination: 60 marks	4
Tutorials: 1Hr/Week	Continuous Assessment: 40 marks	
Lab: Nil	Term Work: Nil	

Course ID:

1.2 (Year 1 Semester 1)

Course Pre Requisite(s):

The students should have basic Knowledge of high school math and calculus

Course Objective:

The course introduces fundamental concepts of statistics and probability

Course Outcome(s):

The students completing this course will learn and understand the basic concepts of probability theory, types of data and graphical representation, descriptive statistics, probability distribution and sampling techniques.

Topics to Be Covered:

UNIT – I **[6 Hours]**

Introduction to Statistics: Definition of Statistics. Basic objectives. Applications in various branches of science with examples

Collection of Data: Internal and external data, Primary and secondary Data. Population and sample, Representative sample.

UNIT – II **[6 Hours]**

Descriptive Statistics: Classification and tabulation of univariate data, graphical representation, Frequency curves. Descriptive measures - central tendency and dispersion. Bivariate data. Summarization, marginal and conditional frequency distribution. Scatter diagram. Linear regression and correlation. Least squares method. Rank correlation.

UNIT III **[6 Hours]**

Sampling Techniques: Random sampling. Sampling from finite and infinite populations. Estimates and standard error (sampling with replacement and sampling without replacement), Sampling distribution of sample mean, stratified random sampling

UNIT – IV **[6 Hours]**

Expected values & moments: mathematical expectation & its properties, Moments (including variance) & their properties, interpretation, Moment generating function

UNIT – V **[6 Hours]**

Probability Theory: concept of experiments, sample space, event. Definition of Combinatorial Probability. Conditional Probability, Bayes Theorem

UNIT – VI **[6 Hours]**

Probability distributions: discrete & continuous distributions, Binomial, Poisson & Geometric distributions, Uniform, Exponential, Normal, Chi-square, t, F distributions

Home Assignments:

Problem sets to be shared by faculty covering the following topics:

Graphical representation of data, Histograms, Descriptive measures - central tendency and dispersion Estimating moments, Distribution parameters, Simulation

Text Books:

1. Introduction of Probability Models, S.M. Ross, Academic Press, N.Y.
2. Fundamentals of Statistics (vol. I and vol. II) - A. Goon, M. Gupta and B. Dasgupta.

Reference Books:

1. A first course in Probability, S.M. Ross.
2. Probability and Statistics for Engineers (4th Edition) - I.R. Miller, J.E. Freund and R. Johnson.
3. Statistical Concepts & Methods - G.K. Bhattacharyya and R.A. Johnson.
4. Introduction to the Theory of Statistics - A.M. Mood, F.A. Graybill & D.C. Boes.

Syllabus for Unit Test:	
Unit Test -1	UNIT – I, UNIT – II, UNIT - III
Unit Test -2	UNIT – IV, UNIT – V, UNIT - VI

Principles of Electrical Engineering

TEACHING SCHEME:	EXAMINATION SCHEME:	CREDITS ALLOTTED:
Theory: 04 Hours / Week	End Semester Examination: 60 Marks	03 Credits
Practical: 02 Hours / Week	Continuous Assessment: 40 Marks	
	Term Work and Oral: 50 Marks	01 Credit

Course ID:

1.3 (Year 1 Semester 1)

Course Pre-requisites:

The Students should have knowledge of Mathematics, physics

Course Objectives:

The course introduces fundamental concepts of DC and AC circuits, Electrostatics electromagnetism, transformer, electrical wiring.

Course Outcomes: After learning this course the students will be able to

1. Apply knowledge of basic concepts of work, power, energy for electrical, mechanical and thermal systems
2. Calculate current in electrical network using Kirchoff's laws and network theorems.
3. Describe construction, principle of operation, specifications and applications of capacitors and batteries
4. Define basic terms of single phase and three phase ac circuits and supply systems.
5. Describe and apply fundamental concepts of magnetic and electromagnetic circuits for operation of single phase transformer.
6. Describe types of wiring and earthing system.

Topics to Be Covered:

UNIT – I **[4 Hours]**

Basic Concepts: Concept of EMF, Potential Difference, current, resistance, Ohms law, resistance temperature coefficient, SI units of Work, power, energy. Conversion of energy from one form to another in electrical, mechanical and thermal systems

UNIT – II **[8 Hours]**

Network Theorems: Voltage source and current sources, ideal and practical, Kirchoff's laws and applications to network solutions using mesh analysis, Simplifications of networks using series-

parallel, Star/Delta transformation. Superposition theorem, Thevenin's theorem, Max Power Transfer theorem.

UNIT III **[4 Hours]**

Electrostatics: Electrostatic field, electric field intensity, electric field strength, absolute permittivity, relative permittivity, capacitor composite, dielectric capacitors, capacitors in series& parallel, energy stored in capacitors, charging and discharging of capacitors, Batteries-Types, Construction& working.

UNIT – IV **[6 Hours]**

AC Fundamentals & AC Circuits: AC waveform definitions, form factor, peak factor, study of R-L, R-C, RLC series circuit, R-L-C parallel circuit, phasor representation in polar & rectangular form, concept of impedance, admittance, active, reactive, apparent and complex power, power factor, 3-ph balanced AC Circuits.

UNIT – V **[8 Hours]**

Magnetic Circuits & Transformer: Magnetic effect of electric current, cross and dot convention, right hand thumb rule, concept of flux, flux linkages, Flux Density, Magnetic field, magnetic field strength, magnetic field intensity, absolute permeability, relative permeability, Ampere's law, B-H curve, hysteresis loop, series-parallel magnetic circuit, composite magnetic circuit, Comparison of electrical and magnetic circuit

Faraday's law of electromagnetic induction, statically and dynamically induced emf, self-inductance, mutual inductance, coefficient of coupling,

Single phase transformer construction, principle of operation, EMF equation, voltage ratio, current ratio, kVA rating, losses in transformer, Determination of Efficiency & Regulation by direct load test.

UNIT – VI **[6 Hours]**

Electrical Wiring and Illumination system: Basic layout of distribution system, Types of Wiring System & Wiring Accessories, Necessity of earthing, Types of earthing, Different types of lamps (Incandescent, Fluorescent, Sodium Vapour, Mercury Vapour, Metal Halide, CFL, LED), Introduction to measuring devices/sensors and transducers related to electrical signals, Elementary methods for the measurement of electrical quantities in DC and AC systems and their practical application.

Term Work: The term work shall consist of record of minimum eight exercises / experiments.

1. Determination of resistance temperature coefficient
2. Verification of Superposition Theorem
3. Verification of Thevenin's Theorem
4. Verification of Kirchoff's Laws
5. Verification of Maximum power transfer Theorem
6. Time response of RC circuit
7. Study of R-L-C series circuits for $X_L > X_C$, $X_L < X_C$ & $X_L = X_C$
8. Verification of current relations in three phase balanced star and delta connected loads.
9. Direct loading test on Single phase transformer
   a) Voltage and current ratios.
   b) Efficiency and regulations.
10. Study of a Residential (L.T.) Bill

Text Books:

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

Reference Books:

1. Edward Hughes – "Electrical Technology"- Seventh Edition, Pearson Education Publication
2. H. Cotton – "Elements of Electrical Technology", C.B.S. Publications
3. John Omalley Shawn – "Basic circuits analysis" Mc Graw Hill Publications
4. Vincent Del Toro – "Principles of Electrical Engineering", PHI Publications

Syllabus for Unit Test:	
Unit Test -1	UNIT – I, UNIT – II, UNIT - III
Unit Test -2	UNIT – IV, UNIT – V, UNIT - VI

Fundamentals of Computer Science

TEACHING SCHEME:	EXAMINATION SCHEME:	CREDITS ALLOTTED:
Lectures: 3Hrs./Week	Semester Examination: 60 marks	5
Tutorials: 1Hr/Week	Continuous Assessment: 40 marks	
Lab: 2Hrs./Week	Term work & Practical: 50 Marks	

Course ID:

1.4 (Year 1 Semester 1)

Course Pre Requisite(s):

Knowledge of Class XII level computers will be helpful, but not mandatory.

Course Objective:

The course introduces fundamental concepts of computer science

Course Outcome(s):

Students will learn the basics of computer science and programming a computer. They will learn about the process of moving from a problem statement to a computational formulation of a method for solving the problem.

Topics to Be Covered:

UNIT – I **[6 Hours]**

General problem Solving concepts and Imperative languages:: Algorithm, and Flowchart for problem solving with Sequential Logic Structure, Decisions and Loops.
Imperative languages: Introduction to imperative language; syntax and constructs of a specific language (ANSI C) .**Types Operator and Expressions with discussion of variable naming and Hungarian Notation**: Variable Names, Data Type and Sizes (Little Endian Big Endian), Constants, Declarations, Arithmetic Operators, Relational Operators, Logical Operators, Type Conversion, Increment Decrement Operators, Bitwise Operators, Assignment Operators and Expressions, Precedence and Order of Evaluation, proper variable naming and Hungarian Notation

UNIT – II **[6 Hours]**

Control Flow with discussion on structured and unstructured programming: Statements and Blocks, If-Else-If, Switch, Loops – while, do, for, break and continue, Goto Labels, structured and un- structured programming

UNIT – III **[6 Hours]**

Functions and Program Structure with discussion on standard library: Basics of functions, parameter passing and returning type, C main return as integer, External, Auto, Local, Static, Register Variables, Scope Rules, Block structure, Initialization, Recursion, Preprocessor, Standard Library Functions and return types

UNIT – IV **[6 Hours]**

Pointers and Arrays: Pointers and address, Pointers and Function Arguments, Pointers and Arrays, Address Arithmetic, character Pointers and Functions, Pointer Arrays, Pointer to Pointer, Multi-dimensional array and Row/column major formats, Initialisation of Pointer Arrays, Command line arguments, Pointer to functions, complicated declarations and how they are evaluated.

.

UNIT – V **[6 Hours]**

Structures: Basic Structures, Structures and Functions, Array of structures, Pointer of structures, Self-referral Structures, Table look up, Typedef, Unions, Bit-fields
Input and Output: Standard I/O, Formatted Output – printf, Formated Input – scanf, Variable length argument list, file access including FILE structure, fopen, stdin, sdtout and stderr, Error Handling including exit, perror and error.h, Line I/O, related miscellaneous functions

UNIT – VI **[6 Hours]**

Unix system Interface: File Descriptor, Low level I/O – read and write, Open, create, close and unlink, Random access – lseek, Discussions on Listing Directory, Storage allocator
Programming Method: Debugging, Macro, User Defined Header, User Defined Library Function, makefile utility.

Home Assignments:

1. Algorithm and flowcharts of small problems like GCD
2. Structured code writing with:
    i. Small but tricky codes
    ii. Proper parameter passing
    iii. Command line Arguments
    iv. Variable parameter
    v. Pointer to functions
    vi. User defined header
    vii. Make file utility
    viii. Multi file program and user defined libraries
    ix. Interesting substring matching / searching programs
    x. Parsing related assignments

Text Books:

1. B. W. Kernighan and D. M. Ritchi, “The C Programming Language”, Second Edition, PHI.
2. B. Gottfried, “Programming in C”, Second Edition, Schaum Outline Series.

Reference Books:

1. Herbert Schildt, “C: The Complete Reference”, Fourth Edition, McGraw Hill.
2. Yashavant Kanetkar, “Let Us C”, BPB Publications.

Syllabus for Unit Test:	
Unit Test -1	UNIT – I, UNIT – II, UNIT - III
Unit Test -2	UNIT – IV, UNIT – V, UNIT - VI

Fundamentals of Physics

TEACHING SCHEME:	EXAMINATION SCHEME:	CREDITS ALLOTTED:
Lectures: 3Hrs. /Week	Semester Examination: 60 marks	4
Tutorials: Nil	Continuous Assessment: 40 marks	
Lab: 2 Hrs. / Week	Term Work and Oral : 50 marks	

Course ID:

1.5 (Year 1 Semester 1)

Course Pre Requisite(s):

Knowledge of Class XII level Physics and Mathematics

Course Objective:

The course introduces fundamental concepts of physics

Course Outcome(s):

1. To understand the Importance of applications of Applied Physics in daily life
2. To provide students with a basic understanding of the Physics that may be required by engineers in the course of their careers
3. To impart knowledge related to the importance of EM waves and magnetic materials
4. To enhance knowledge related to lasers and its different components to make it suitable for various purposes
5. To introduce most important concepts of superconductivity, crystallography and fiber optics to the students
6. To introduce the learners to the basics of Special theory of relativity, X- rays, Quantum Mechanics

Topics to Be Covered:

UNIT – I **[6 Hours]**

Oscillations: Periodic motion-simple harmonic motion-characteristics of simple harmonic motion-vibration of simple springs mass system. Resonance-definition., damped harmonic oscillator – heavy, critical and light damping, energy decay in a damped harmonic oscillator, quality factor, forced mechanical and electrical oscillators

UNIT – II **[6 Hours]**

Classical Optics: Theory of interference fringes-types of interference-Fresnel's prism-Newton's rings, Diffraction-Two kinds of diffraction-Difference between interference and diffraction-Fresnel's half period zone and zone plate-Fraunhofer diffraction at single slit-plane diffraction

grating. Temporal and Spatial Coherence, Polarization - Concept of production of polarized beam of light from two SHM acting at right angle; plane, elliptical and circularly polarized light, Brewster's law, double refraction.

UNIT – III **[6 Hours]**

Quantum Physics: Introduction - Planck's quantum theory- Matter waves, de-Broglie wavelength, Heisenberg's Uncertainty principle, time independent and time dependent Schrödinger's wave equation, Physical significance of wave function, Particle in a one dimensional potential box, Heisenberg Picture.

UNIT – IV **[6 Hours]**

X-ray & Crystallography: Crystallography - Basic terms-types of crystal systems, Bravais lattices, miller indices, d spacing, Debye Scherrer powder method, laue method- Atomic packing factor for SC, BCC, FCC and HCP structures. Semiconductor Physics - conductor, semiconductor and Insulator; Basic concept of Band theory

UNIT – V **[6 Hours]**

Modern Optics: Einstein's theory of matter radiation interaction and A and B coefficients; amplification of light by population inversion, different types of lasers: Ruby Laser, CO2 and Neodymium lasers; Properties of laser beams: mono-chromaticity, coherence, directionality and brightness, laser speckles, applications of lasers in engineering. Fiber optics and Applications, Types of optical fibers

UNIT – VI **[6 Hours]**

Thermodynamics: Zeroth law of thermodynamics, first law of thermodynamics, determination of j by Joule's method, Applications of first law, heat engines, Carnot's cycle and Carnot's engine, second law of thermodynamics, entropy, change in entropy in reversible and irreversible processes, third law of thermodynamics. Basic Idea of Electromagnetisms.

Home Assignments:

Problems based on Newton rings, Michelson interference, young double slit

Text Books:

1. Halliday, Resnic and Walker, Fundamentals of Physics, 9th Ed.,John Wiley, 2011.
2. Beiser A, Concepts of Modern Physics, 5th Ed., McGraw Hill International, 2003.
3. Ajoy Ghatak, Optics, 5th Ed., Tata McGraw Hill, 2012
4. University Physics-Sears & Zemansky (Addison-Wesley)

Reference Books:

1. Basic Engineering Physics-Amal Chakraborty (Chaya Prakashani Pvt. Ltd.)
2. Basic Engineering Physics-I -Sujoy Bhattacharya, Saumen Paul (TMH)

Syllabus for Unit Test:	
Unit Test -1	UNIT – I, UNIT – II, UNIT - III
Unit Test -2	UNIT – IV, UNIT – V, UNIT - VI

Business Communication & Value Science – I

TEACHING SCHEME:	EXAMINATION SCHEME:	CREDITS ALLOTTED:
Lectures: 2Hr./Week	Semester Examination: 50 marks	4
Tutorials: 1 Hr. / Week	Continuous Assessment: Yes	
Lab: 2Hrs. / Week	Term Work and Oral: 50 marks	

Course ID:

1.6 (Year 1 Semester 1)

Course Pre-Requisite(s):

1. Basic communication in tenses (past, present, future).
2. Awareness of common words (adjectives used in daily verbal communication).
3. Basic idea of sentence formation and thereby paragraph building and writing.
4. Communication according to daily and varied contextual scenarios.
5. Basic communication model/channel (sender, receiver and feedback), Active and passive listening skills.
6. Basic social etiquettes and knowledge of group work and communication that will enhance their professional growth.

Course Objective:

The course aims to augment student's overall communication and interpersonal skills by engaging them in group activities and thus aid in helping them to emerge as professionals. The English language topics for this semester focus on the development of basic fluency in English, usage of words and also introduce them to the concept and importance of interpersonal skills so as to effectively present their personalities.

Course Outcome(s):

1. Speak fluently in English without errors in tenses and hence present themselves as effective English communicators. They will be able to learn the 12 tenses and use them appropriately.
2. Differentiate between active and passive vocabulary and be able to use the 60 words discussed in class for their daily conversation and 40 words also given as assignments.
3. The ability to process their ideas and thoughts (verbal communication) into written communication in an effective, coherent and logical manner within a stipulated time and specific word limit of 100-150 words for paragraph writing.
4. Present them in a certain manner by using the 50-55 phrases discussed in class appropriately for group discussions, personal interviews during the campus recruitment process/competitive exams.

5. Enhance their communication skills by acquainting with the 2 important aspects of communication and helping them to overcome the 10 most common barriers of communication. Learn the 7 different types of listening skills; differentiate effective listening skills and understand the importance of it through 5 activities held in class and implement them in professional life.
6. Understand the importance of team work, team motivation and effective team communication for further implementation in the corporate life. They should also be able to identify concretely between team and group dynamics.

Topics to Be Covered:

UNIT – I **[6 Hours]**

Essential Grammar – I: Tenses: Basic forms and use, sentence formation (general & Technical), Common errors, Parts of speech through context, Direct and reported speech structures and voices.

UNIT – II **[6 Hours]**

Vocabulary Enrichment: Exposure to words from General Service List (GSL) by West, Academic word list (AWL) technical specific terms related to the field of technology, phrases, idioms, significant abbreviations formal business vocabulary

Phonetic: Pronunciation, Reduction of MTI in spoken English, Question formation with emphasis on common errors made during conversation

UNIT – III **[6 Hours]**

Written Communication – I: Letter Writing –Formal and Informal letter writing, Application letters, Report writing academic and business report, Job application letter

UNIT – IV **[6 Hours]**

Communication Skills: Importance of effective communication, types of communication- verbal and non - verbal, barriers of communication, effective communication, Listening Skills: Law of nature- Importance of listening skills, Difference between listening and hearing, Types of listening.

UNIT – V **[6 Hours]**

Self - Awareness & Self Development: Self - Assessment, Self - Appraisal, SWOT, Goal setting - Personal & career- Self-Assessment, Self-Awareness, Perceptions and Attitudes, Positive Attitude, Values and Belief Systems, Self-Esteem, Self - appraisal, Personal Goal setting, Career Planning, Personal success factors, Handling failure, Depression and Habit, relating SWOT analysis & goal setting, and prioritization

Socio-Cultural and Cross-Cultural Sensitivities at the Workplace: What is Inclusion? Women's contributions in Industry, work issues faced by women, what is sexual harassment, what is appropriate behavior for everyone at work

UNIT – VI **[6 Hours]**

Interpersonal Skills – I: Team work, Team effectiveness, Group discussion, Decision making - Team Communication. Team, Conflict Resolution, Team Goal Setting, Team Motivation Understanding Team Development, Team Problem Solving, Building the team dynamics. Multicultural team activity

Time Management: The Time management matrix, apply the Pareto Principle (80/20 Rule) to time management issues, to prioritize using decision matrices, to beat the most common time wasters, how to plan, how to handle interruptions, to maximize your personal effectiveness, how to say "no" to Time wasters

Values of a good manager: Understanding Corporate Values and behavior; Personal / Human Values; Pride and grace in Nationalist

Text Books:

1. Business Communication – Dr. Saroj Hire math
2. English vocabulary in use – Alan McCarthy and O'Dell

There will be handouts and reference links shared.

Reference Books

1. Strategic Writing by Charles Marsh
2. The Seven Basic Plots by Christopher Booker