

Study & Evaluation Scheme

Of

Bachelor of Science (Hons.) (Physics)

[Applicable w.e.f. Academic Year 2012-13]

(With amendments in BEC 401 approved on 5th November, 2012 & BEC501 on 26-10-2013)



TEERTHANKER MAHAVEER UNIVERSITY

N.H.-24, Delhi Road, Moradabad, Uttar Pradesh-244001

Website: www.tmu.ac.in



Study & Evaluation Scheme of Bachelor of Science (Hons)-Physics SUMMARY

Programme	:	B.Sc.(Hons)- Physics
Duration	:	Three year full time (Six Semesters)
Medium	:	English
Minimum Required Attendance	:	75 percent
Credit	:	
Maximum Credit	:	166
Minimum credit required for the degree	:	162
Assessment	:	

Internal	External	Total
30	70	100

Internal Evaluation (Theory Papers)

Class Test I	Class Test II	Assignment(s)	Other Activity (including attendance)	Total
10 Marks	10 Marks	5 Marks	5 Marks	30 Marks

Evaluation of Practical

Internal	External	Total
50	50	100

Evaluation of Seminar/Viva

Internal	External	Total
100	-	100

Duration of Examination

External	Internal
3 hrs.	1 ½ hrs

To qualify the course a student is required to secure a minimum of 40 % marks in aggregate including the semester end examination and teachers continuous evaluation.(i.e. both internal and external).

A candidate who secures less than of 40% of marks in a course shall be deemed to have failed in that course. The student should have at least 50% marks in aggregate to clear the semester. In case a student has more than 40% in each course, but less than 50% overall in a semester, he/she shall re-appear in courses where the marks are less than 50% to achieve the required aggregate percentage of 50% in the semester.

Question Paper Structure

- The question paper shall consist of eight questions. Out of which first question shall be of short answer type (not exceeding 50 words) and will be compulsory. Question No. 1 shall contain 8 parts representing all units of the syllabus and students shall have to answer any five (weightage 4 marks each).
- Out of the rest seven questions, students shall be required to attempt any five questions. There will be minimum one and maximum two questions from each unit of the syllabus. The weightage of Question No. 2 to 8 shall be 10 marks each.

Study and Evaluation Scheme

Course: B.Sc. (Hons) Physics

Semester I

S. N.	Subject Code	Subject	Periods			Credits	Evaluation Scheme		
			L	T	P		Internal	External	Total
1	BAS101	Basic Physics-I	3	2	0	4	30	70	100
2	BAS104	Algebra & Matrices	3	2	0	4	30	70	100
3	BAS105	Trigonometry & Differential Calculus	3	2	0	4	30	70	100
4	BAS106	Fundamentals of Physical Chemistry	3	2	0	4	30	70	100
5	BHM101	Foundation English-I	2	0	2	3	30	70	100
6	BAS151	Basic Physics-I Lab	0	0	4	2	50	50	100
7	BAS156	Physical Chemistry Lab	0	0	4	2	50	50	100
		Total	14	8	10	23	250	450	700

Semester II

S. N.	Subject Code	Subject	Periods			Credits	Evaluation Scheme		
			L	T	P		Internal	External	Total
1.	BAS205	Integral Calculus	3	2	0	4	30	70	100
2.	BAS207	Fundamental of Inorganic Chemistry	3	2	0	4	30	70	100
3.	BAS 208	Electricity and Magnetism	3	2	0	4	30	70	100
4.	BAS 209	Optics	3	2	0	4	30	70	100
5	BHM201	Foundation English-II	2	0	2	3	30	70	100
6.	BAS 258	Electricity & Magnetism Lab	0	0	4	2	50	50	100
7.	BAS259	Optics Lab	0	0	4	2	50	50	100
8.	BAS257	Chemistry Lab	0	0	4	2	50	50	100
		Total	14	8	14	25	300	500	800

Semester III

S. N.	Subject Code	Subject	Periods			Credits	Evaluation Scheme		
			L	T	P		Internal	External	Total
1	BAS301	Numerical Analysis	3	2	0	4	30	70	100
2	BAS304	Fundamentals of Organic Chemistry	3	2	0	4	30	70	100
3	BAS305	Thermal & Low Temperature Physics	3	2	0	4	30	70	100
4	BAS306	Classical Physics	3	2	0	4	30	70	100
5	BCS301	Fundamentals of Computers	3	2	0	4	30	70	100
	BAS309	Environmental Science							
6	BHM301	Professional Writing	2	0	2	3	30	70	100
7	BAS354	Organic Chemistry Lab	0	0	4	2	50	50	100
8	BAS355	Thermal Physics Lab	0	0	4	2	50	50	100
9	BCS351	Fundamentals of Computers Lab	0	0	4	2	50	50	100
	BAS359	Environmental Science Lab							
		Total	17	10	14	29	330	570	900

Semester IV

S.N .	Subject Code	Subject	Periods			Credits	Evaluation Scheme		
			L	T	P		Internal	External	Total
1	BAS405	Quantum Physics	3	2	0	4	30	70	100
2	BAS406	Mathematical Physics	3	2	0	4	30	70	100
3	BAS407	Atomic and Molecular Physics	3	2	0	4	30	70	100
4	BEC 401	Semiconductor/ Solid State Devices	3	2	0	4	30	70	100
5	BCS401	Basic Computer	3	2	0	4	30	70	100
	BAS409	Environmental Science							
6	BHM401	Professional Communication	2	0	2	3	30	70	100
7	BAS457	Atomic and Molecular Physics (lab)	0	0	4	2	50	50	100
8	BEC 451	Semiconductor / Solid State Devices (Lab)	0	0	4	2	50	50	100
9	BCS451	Basic Computer Lab	0	0	4	2	50	50	100
	BAS459	Environmental Science Lab							
		Total	17	10	14	29	330	570	900

Semester V

S. N.	Subject Code	Subject	Periods			Credits	Evaluation Scheme		
			L	T	P		Internal	External	Total
1	BAS 506	Oscillations & Wave	3	2	0	4	30	70	100
2	BAS 507	Statistical Physics	3	2	0	4	30	70	100
3	BAS 508	Nuclear & Particle Physics	3	2	0	4	30	70	100
4	BEC 512	Electronics Devices & Circuit Theory	3	2	0	4	30	70	100
5	BME 501	Material Science	3	2	0	4	30	70	100
6	BCS 501	C Programming	2	1	0	2	30	70	100
7	BHM 501	Technical Writing	2	0	2	3	30	70	100
8	BAS 556	Oscillations & Wave Lab	0	0	4	2	50	50	100
9	BME 551	Material Science Lab	0	0	4	2	50	50	100
10	BCS 551	C Programming Lab	0	0	4	2	50	50	100
		Total	19	11	14	31	360	640	1000

Semester VI

S. N.	Subject Code	Subject	Periods			Credits	Evaluation Scheme		
			L	T	P		Internal	External	Total
1	BAS 606	Laser & Microscopic Techniques	3	2	0	4	30	70	100
2	BAS 607	Condense Matter Physics	3	2	0	4	30	70	100
3	BAS 608	Introduction to Nano Science & Technology	3	2	0	4	30	70	100
4	BEC 601	Microprocessor & Computer Programming	3	2	0	4	30	70	100
5	BEC 602	Electromagnetic Field Theory	3	2	0	4	30	70	100
6	BHM 601	Communication Technique	2	0	2	3	30	70	100
7	BAS 656	Laser & Microscopic Techniques (Lab)	0	0	4	2	50	50	100
8	BEC 651	Microprocessor & Computer Programming (Lab)	0	0	4	2	50	50	100
9	BAS699	Seminar/Viva-voce	0	0	4	2	50	50	100
		Total	17	10	14	29	330	570	900

L – Lecture
1L = 1Hr

T- Tutorial
1T= 1 Hr

P- Practical
1P=1Hr

C-Credits
1C=1Hr of theory
1C= 2 Hr of Practical

B.Sc. Physics (Hons) - Semester I
BASIC PHYSICS-I

Course Code: BAS-101

L	T	P	C
3	2	0	4

Unit I

(Lectures 08)

Conservation of Energy and Linear Momentum:

Mechanics of a particle, work-energy theorem. Conservative and non-conservative forces and their examples. Conservation force as negative gradient of potential energy. Center of mass of a system of particles. Conservation of linear momentum and energy. Systems of variable mass, single and multistage rockets. Elastic and inelastic collisions.

Unit II

(Lectures 08)

Rotational Dynamics:

Rigid body motion. Rotation motion, torque and angular momentum. Moment of inertia and its calculations for disc, cylinder, spherical shell and solid sphere, Body rolling down on an inclined plane. Fly wheel, Motion of Top.

Unit III

(Lectures 08)

Motion under Central Forces:

Concept of central force. Kepler's laws of planetary motion. Gravitational law, Gravitational Potential and fields due to spherical shell and solid sphere. Gravitational potential energy and escape velocity. Two particle central force problem and reduced mass. Motion of planets and satellites.

Unit IV

(Lectures 08)

Properties of Matter:

Elasticity, small deformations, Hooke's law, Elastic constants and relation among them. Beam supported at the ends, cantilever.

Streamline and turbulent flow, equation of continuity, viscosity, Poiseuille's law critical velocity, Reynolds's number.

Surface tension and surface energy, pressure on a curved liquid surface

Unit V

(Lectures 08)

Nuclear Physics

Nuclear Forces, Binding Energy, Liquid Drop Model, Fission, Nuclear Reactors, Fusion and Energy Processes in Stars, Controlled Thermonuclear Reactions.

Text Books:

1. "Mechanics", D S Mathur; Khanna Publications
2. "Mechanics", Goldstein; New Age Publications.

Semester I
ALGEBRA AND MATRICES

Course Code: BAS-104

L	T	P	C
3	2	0	4

Unit I

(Lectures 08)

Matrices and determinants, Elementary row and column transformation, Linear transformations, Rank of matrix.

Unit II

(Lectures 08)

Consistency of linear system of equations, Linear dependence and independence, Hermitian and skew Hermitian matrices, general form of matrices.

Unit III

(Lectures 08)

Inverse of matrix by elementary operations, Solutions of simultaneous equations, Characteristic equation, Caley-Hamilton theorem (without proof), Eigen values and eigen vectors, Diagonalization.

Unit IV

(Lectures 08)

Sets, Relations, Functions, Binary operations, permutation, Groups and subgroup its elementary properties.

Unit V

(Lectures 08)

Isomorphism and Homomorphism of Groups, Caley's theorem, Order of an element, Rings, Fields and integral domains.

Text Books:

1. "Matrices" by Dr. J.K.Goel and K.P.Gupta, Students Friends & Co.
2. "Modern Algebra" by A. R. Vashisth, Krishana Prakshan Mandir

Reference Books:

1. "Matrices" by Shanti Narain, S Chand &Co.
2. "Matrices" by N. Saran and J. K. Goyal, Pragati Prakashan
3. "Modern algebra" by I N Herstein, Wiley Eastern Ltd.
4. "Modern algebra" by Surjeet Singh and Qazi Zameesuddin, Vikash Publishing House Pvt Ltd.
5. "Modern algebra" by D. C. Agarwal and H. N Nigam, Shiksha Sahitya Prakashan
6. "Modern algebra" by Harsh Swaroop Sharma and H. S. Seth, Ram Prashad & Sons
7. "Elements of Matrices" by Dr. M. Ray and S.S. Sethi Ram Prasad & Sons.
8. "Matrices" by A.R. Vashistha, Krishna Prakashan Mandir.

Semester I
TRIGONOMETRY & DIFFERENTIAL CALCULUS

Course Code: BAS-105

L	T	P	C
3	2	0	4

Unit I (Lectures 08)
Circular and hyperbolic functions of complex quantities, Separation of real and imaginary parts of Trigonometric, logarithmic, and exponential functions.

Unit II (Lectures 08)
Gregory's series, summation of series, Expansion of Functions.

Unit III (Lectures 08)
Successive differentiation, Leibnitz theorem (without proof), Euler's theorem, Mean value theorems, tangent and normal, maxima and minima, limit and its properties.

Unit IV (Lectures 08)
Mac Laurin's and Taylor's expansion of functions, errors and approximation, Asymptotes and curvature of curves in Cartesian and polar coordinates, Partial differentiation.

Unit V (Lectures 08)
Tracing of curves in Cartesian, parametric and polar coordinates (conics, asteroid, hypocycloid, Folium of Descartes, Cycloid, Circle, Cardioids, Lemniscates, equiangular spiral), Jacobian, Indeterminate forms, Envelop and Evolutes.

Text Books:

1. "Differential Calculus" by Gorakh Prasad, Pothishala Pvt Ltd.
2. "Trigonometry" by A. K. Saxena, Aeykay Prakashan. Bareilly

Reference Books:

1. "Trigonometry" by J. C. Sharma, P. H. Sharma, Students Friends & Co.
2. "Trigonometry" by A.R. Vashistha and R. K. Gupta, Krishna Prakashan Mandir.
3. "Differential Calculus" by N. Pishkunor, Peace Publishers Moscow
4. "Differential Calculus" by M. Ray, Shiv Lal Agarwal & Co Agra.
5. "Differential Calculus" by Khalil Ahmed, Anamya Publication, New Delhi
6. "Differential Calculus" by A. K. Saxena, Aeykay Publication

Semester I
FUNDAMENTALS OF PHYSICAL CHEMISTRY

Course Code: BAS-106

L	T	P	C
3	2	0	4

Unit I **(Lectures 08)**

Gaseous state: Deviation of real gases from the equation of state for an ideal gas, Vander Waals and Virile equation of state, critical phenomena, principle of corresponding states, equation for reduced state, Liquifaction of gases, distribution of molecular speed, collisions between molecules in a gas, mean free path, specific heat of gases.

Unit II **(Lectures 08)**

Phase rule and its application: Equilibrium between liquid, solid and vapours of a pure substance, Clausius-Clapeyron equation and its applications. Number of components, phases and degrees of freedom, phase rule and its applications simple systems with one (water and sulphur) and two components (lead-silver, salt hydrates), Distribution law, its modifications, limitations and application.

Unit III **(Lectures 08)**

First law of thermodynamics and their applications, thermodynamic system, states and processes work, heat and internal energy, zeroth law of thermodynamics, various types of work done on a system in reversible and irreversible process, Calorimetry and thermodynamistry, enthalpy, changes in various physical and chemical process, second law of thermodynamics and its applications.

Unit IV **(Lectures 08)**

Absorption of light, laws of photochemistry quantum yield, the excited state and its decay by radiative, nonradiative and chemical pathways, simple photochemical reactions.

Unit V **(Lectures 08)**

Colloids, the colloidal state, preparation and purification of colloids and their characteristic properties, lyophilic and lyophobic colloids and coagulation, protection of colloids, gels, emulsions, surfactants and micelles.

Text Books:

“Physical Chemistry” by Puri Sharma and Pathania.

Reference Books:

“Physical Chemistry” by Borrow

Semester I
FOUNDATION ENGLISH - I

Course code: BHM101

(Common with EHM101/BPH105/BED105/BAL101/AR107/BFS106/BCA106/BBA106/ BCH106/ BFA103)

L	T	P	C
2	0	2	3

Unit I

Functional Grammar: Patterns & Parts of speech Subject, Predicate, Noun, Pronoun, Adjective, Adverb, Verb, Verb phrases, Conjunction, Interjection. **(10 Hours)**

Unit II

Vocabulary: Word formation, Prefix, Suffix, Compound words, Conversion, Synonyms, Antonyms, Homophones and Homonyms, How to look up a dictionary. **(10 Hours)**

Unit III

Communication: Meaning & importance of communication, Barriers to effective communication, Channels of communication, Language as a tool of communication. **(10 Hours)**

Unit IV

Requisites of Sentence writing: Fragmented sentences, A good sentence, expletives, Garbled sentences, Rambling sentences, Loaded sentences, Parallel Comparison, Squinting construction, Loose & periodic sentences. **(10 Hours)**

Text Books:

1. Martin & Wren - *High School English Grammar & Composition*, S.Chand & Co. Delhi.
2. Lewis Norman - *Word Power made easy*, W.R.Goyal. Publication & Distributors Delhi.
3. Better Your English- A Workbook for 1st year Students- Macmillan India, New Delhi.

Reference Books:

1. Raman Meenakshi & Sharma Sangeeta, *Technical Communication-Principles & Practice* – O.U.P. New Delhi. 2007.
2. Mohan Krishna & Banerji Meera, *Developing Communication Skills* – Macmillan India Ltd. Delhi.
3. Rosen Blum M., *How to Build Better Vocabulary* – Bloomsbury Publication. London.

NOTE:

This syllabus has been designed to improve the oral and written communication skills of students. The faculty members should put emphasis on practical (oral) activities for generating students' interest in language learning.

*** Latest editions of all the suggested books are recommended.**

Semester I
BASIC PHYSICS-I LAB

Course Code: BAS-151

L	T	P	C
0	0	4	2

LIST OF EXPERIMENTS

Note : Select any ten experiments from the following list:

1. To determine Ionisation potential of a gas (Soft valve)
2. To determine Plank's constant.
3. To determine the Ionization Potential of mercury .
4. To plot the V-I characteristic of the Solar cell by Characteristics apparatus
5. To determine Moment of inertia of a Flywheel.
6. To determine Young's Modulus in case of Uniform bending using Scale, telescope and optic lever.
7. To determine Young's Modulus in case of Cantilever using Pin and Microscope
8. To determine Modulus of Rigidity by using Torsion pendulum.
9. To determine Viscosity by the Capillary flow (Radius using Mercury pellet) .
10. To determine Surface tension by using Capillary rise (Radius using Vernier microscope).
11. To verify Bernoulli's theorem
12. To determine the frequency of A.C. mains by means of a sonometer.

Evaluation of Practical Examination:

Internal Evaluation (50 marks)

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 5 point scale (two for experiment, two for file work and one for viva) which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation scheme:

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (30 MARKS)			ATTENDANCE (5 MARKS)	QUIZ (5 MARKS)	VIVA (10 MARKS)	TOTAL INTERNAL (50 MARKS)
EXPERIMENT (10 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)				

External Evaluation (50 marks)

The external evaluation would be done by the external faculty based on the experiment conducted during the examination.

Semester I
PHYSICAL CHEMISTRY LAB

Course Code: BAS-156

L	T	P	C
0	0	4	2

LIST OF EXPERIMENTS

1. To determine the surface tension of the given liquid by drop number method.
2. To determine the viscosity of a given liquid at room temperature by using Oswald's viscometer (Densities to be determined).
3. To study partition of iodine between carbon tetra chloride and water.
4. To study the adsorption of acetic acid on dispersed charcoal.
5. To determine the integral enthalpy of solution of $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$.
6. To determine the reaction rate constant of acid catalyzed hydrolysis of ester- titrimetry.
7. To find out the rate constant for the inversion of cane sugar in acid medium and to show that inversion follows the first order kinetics.
8. To study the kinetics of acetone-iodine reaction.
9. To determine the rate of reaction of iodine with hydrogen peroxide (H_2O_2) at room temperature (clock reaction).
10. To determine the enthalpy of neutralization of hydrochloric acid with sodium hydroxide.

Evaluation of Practical Examination:

Internal Evaluation (50 marks)

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 5 point scale (two for experiment, two for file work and one for viva) which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation scheme:

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (30 MARKS)			ATTENDANCE (5 MARKS)	QUIZ (5 MARKS)	VIVA (10 MARKS)	TOTAL INTERNAL (50 MARKS)
EXPERIMENT (10 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)				

External Evaluation (50 marks)

The external evaluation would be done by the external faculty based on the experiment conducted during the examination.

Semester I/II/III/IV/V/VI
DISCIPLINE & GENERAL PROFICIENCY

Course Code: BGP101/BGP201/BGP301/BGP401/BGP501/BGP601

L	T	P	C
0	0	0	1

There shall be continuous evaluation of the student on the following broad parameters:

1. Observance of dress code.
2. Participation in Conferences /Workshops / Seminars.
3. Attendance in guest lectures, talks by invitees and special technical sessions organized from time to time.
4. Participation in community projects including NCC and NSS.
5. Exhibiting team spirit in different activities of the University and College organized from time to time.
6. Observance of rule & regulations in the College/University.
7. Behaviour in hostel mess and hostel.
8. Performance and awards received in different events (sports/ co-curricular activities) organized at College / University and other level.
9. General behavior.

The above mentioned is an indicative list of parameters on which the students shall be continuously evaluated. The college may evaluate the student on the specific parameters by informing them through a notice displayed on the notice board before evaluation. There shall be no external examination for this course; however the marks shall be included for calculation of cumulative Performance Index (CPI)

Semester II
INTEGRAL CALCULUS

Course Code: BAS-205

L	T	P	C
3	2	0	3

Unit I (Lectures 08)
Definite integration (Miscellaneous Examples), integration as the limit of sum, Reduction Formula.

Unit II (Lectures 08)
Multiple integration, Beta and gamma functions and applications, length of curves, Areas bounded by the curves.

Unit III (Lectures 08)
Dirichlet's integral, Volume and surfaces of revolutions

Unit IV (Lectures 08)
Differential equation of first order and first degree, Differential equation of first order but not of first degree. Miscellaneous differential equations.

Unit V (Lectures 08)
Linear differential equation of second order with constant coefficient, Linear differential equation of other types.

Text Books:

1. "Integral Calculus" by Gorakh Prasad, Pothishala Pvt. Ltd.
2. "Integral Calculus" by M. Ray, Shiv Lal Agarwal & Co Agra
3. "Integral Calculus" by P. V. Pishkuno, Peace Publishers Moscow

Reference Books:

1. "Integral Calculus" by Shanti Narayan and P.K Mittal, S.Chand & Company Ltd
2. "Integral Calculus" by Brahmanand, B. S. Tyagi, and B. D. Sharma, Kedarnath Ram Nath.
3. "Integral Calculus by" Shani Narayan, S.Chand & Company Ltd

Semester II
FUNDAMENTALS OF INORGANIC CHEMISTRY

Course Code: BAS-207

L	T	P	C
3	2	0	4

Unit I

(Lectures 08)

Dual nature of matter and idea of De Broglie matter waves and equations, Wave mechanical model, Heisenberg uncertainty principal, Schrodinger wave equation, quantum numbers shapes of s, p, d orbitals, Aufbau and Pauli exclusion principles, Hund's multiplicity rule, electronic configuration of elements.

Unit II

(Lectures 08)

Atomic and ionic radii, ionization energy, electron affinity and electronegativity-definition, methods of determination or evaluation, trends in periodic table and applications in predicting and explaining the chemical behaviour, chemical bonding, ionic solids

Unit III

(Lectures 08)

Disintegration theory, group displacement law, rate of disintegration, half life period, average life period, disintegration series, Radioactive equilibrium, Artificial radioactivity, types of nuclear reactions, Nuclear fission and fusion, application of radioactivity.

Unit IV

(Lectures 08)

Arrhenius, Bronsted Lowry and Lewis and Usanovich concepts of acids and bases, Classification of acid and bases as hard and soft pearson's HSAB concept, acid-base strength and hardness and softness, Symboiosis, theoretical basis of hardness and softness, electronegativity and hardness and softness.

Unit V

(Lectures 08)

Definition of Organometallic chemistry, nomenclature and classification of organometallic compounds, Preparation properties bonding application of alkyls and aryls of Li, Al, Hg, Sn, and Pb, a brief account of metal-ethylenic complexes and homogeneous hydrogenation monocuclear carbonyls and the nature of bonding in metal carbonyls.

Text Books:

1. Inorganic Chemistry "Puri Sharma & Kalia"

Reference Books:

1. "Inorganic Chemistry" by J. D Lee.

Semester II
ELECTRICITY & MAGNETISM

Course Code: BAS-208

L	T	P	C
3	2	0	4

Course Contents

Unit I

(Lectures 08)

Electric Circuits AC Circuits: - Complex Reactance and Impedance. Series LCR Circuit: Resonance,

Power Dissipation, Quality Factor and Band Width; Parallel LCR Circuit ; Network Theorems: Thevenin theorem, Norton theorem, Superposition theorem, Reciprocity theorem, and Maximum Power Transfer theorem.

Unit II

(Lectures 08)

Electric Field: Electric Field and Lines. Electric Field E due to a Ring of Charge. Electric Flux. Gauss's law. Gauss's law in Differential form. Applications of Gauss's Law : E due to an Infinite Line of Charge, a Charged Cylindrical Conductor, an Infinite Sheet of Charge and Two Parallel Charged Sheets,

Electric Potential:- Line Integral of Electric Field. Electric Potential Difference and Electric Potential V

(Line integral). Conservative Nature of Electrostatic Field. Relation between E and V ; Potential and Electric Field of a Dipole, a Charged Disc. Conductors in an Electrostatic Field.

Unit III

(Lectures 08)

Dielectric Properties of Matter

Dielectrics:- Electric Field in Matter. Dielectric Constant. Parallel Plate Capacitor with a Dielectric.

Polarization, Polarization Charges and Polarization Vector. Electric Susceptibility. Gauss's law in Dielectrics. Displacement vector D . Relations between the three Electric Vectors.

Unit IV

(Lectures 08)

Magnetic Field Magnetic Effect of Currents :- Magnetic Field B . Magnetic Force between Current

Elements and Definition of B . Magnetic Flux. Biot-Savart's Law ,Magnetic Dipole and its Dipole

Moment Ampere's Circuital law Gauss's law of magnetism. Relative Permeability of a Material.

Magnetic Susceptibility. B - H Curve and Energy Loss in Hysteresis.

Unit V

(Lectures 08)

Electromagnetic induction :-Faraday's law (Differential and Integral forms). Lenz's Law. Self and Mutual Induction. Energy stored in a Magnetic Field Ballistic Galvanometer Potential Energy of a Current Loop. Ballistic Galvanometer: Current and Charge sensitivity & Damping.

Text Books:

1. Electricity and Magnetism By Edward M. Purcell (McGraw-Hill Education, 1986)
2. Fundamentals of Electricity and Magnetism By Arthur F. Kip (McGraw-Hill, 1968)
3. Electricity and Magnetism by J.H.Fewkes & John Yarwood. Vol. I (Oxford Univ. Press, 1991).

Reference Books:

4. Electricity and Magnetism. By D C Tayal (Himalaya Publishing House,1988).
5. David J. Griffiths, Introduction to Electrodynamics, 3rd Edn, (Benjamin Cummings,1998).

**Semester II
OPTICS**

Course Code: BAS-209

L	T	P	C
3	2	0	4

Course Contents

Unit I

(Lectures 08)

Geometrical Optics: Fermat's Principle: Principle of extremum path and its simple application as reflection, refraction and straight line motion of light. General theory of Image formation: Cardinal points of an optical system, general relationship, thick lens, combination of two thin lenses, nodal slide and Newton's formula, Huygens and Ramsden's eyepieces.

Unit II

(Lectures 08)

Physical Optics I: Interference. Interference of Light: The principle of superposition, two slide interferences, coherence requirement of the sources, optical path retardation, lateral shift of fringes, Rayleigh refractometer and other applications. Thin films, application for precision measurement for displacements. Interference in thin films, Newton's ring, its application in determination of wave length, refractive index of liquid.

Unit III

(Lectures 08)

Physical Optics-II Interference. Michelson interferometer: Its application for a precision determination of wave length, wave length difference refractive index of thin transparent film and width of spectral lines. Intensity distribution in multiple beam interference, Fabry - Perot interferometer & etalon

Unit IV

(Lectures 08)

Physical Optics-III Diffraction. Diffraction of Light: Fresnel diffraction, intensity due to cylindrical wavefront by Fresnel half period method, zone plate, Diffraction at straight edge. Fraunhofer Diffraction: Diffraction at a slit & circular aperture, Diffraction at N-parallel slits, its intensity distribution, plane diffraction grating, concave grating and different mounting. Resolution of images, Rayleigh criterion, resolving power of grating, telescope and prism.

Unit V

(Lectures 08)

Physical Optics-IV Polarization. Double refraction and Optical Rotation: Refraction in uniaxial crystal, its electromagnetic theory, Phase retardation, Quarter waveplate and half waveplate, double image prism. Rotation of plane of polarization. Fresnel explanation of rotation.

Text Books:

Optics by Ajoy Ghatak, Tata Mc Graw Hill.

Reference Books

Engineering Physics by V S Yadav, Tata Mc Graw Hill

Semester-II FOUNDATION ENGLISH - II

Course code: BHM201

(Common with EHM201/BPH206/BBA206/BCA206/AR207/BCH206/ BFA203)

L	T	P	C
2	0	2	3

Unit I

Functional Grammar: Articles, Preposition, Tenses: Functions, Synthesis, Transformation, Spotting errors and correction of sentences. **(10 Hours)**

Unit II

Pre- Requisites of Technical written Communication: One word substitution, Spelling rules, Words often confused & misused, Phrases. **(10 Hours)**

Unit III

The Structure of sentences/ clauses: Adverb clause, Adjective clause, Noun clause. Sentences: Simple, Double, Multiple and complex, Transformation of sentences: simple to complex & vice versa, simple to compound & vice-versa, Interrogative to assertive & to negative & vice-versa. **(10 Hours)**

Unit IV

Technical Communication: Nature, Origin and Development, Salient features, Scope & Significance, Forms of Technical Communication, Difference between Technical Communication & General writing, Objective Style vs. Literary Composition. **(10 Hours)**

Text-Books:

1. Wren & Martin, *High School English Grammar & Composition* – S. Chand & Co. Delhi.
2. Raman Meenakshi & Sharma Sangeeta, *Technical Communication-Principles & Practice* – O.U.P. New Delhi. 2007.
3. Mitra Barum K., *Effective Technical Communication* – O.U.P. New Delhi. 2006.
4. Better Your English- A Workbook for 1st year Students- Macmillan India, New Delhi.

Reference Books:

1. Horn A.S., *Guide to Patterns & Usage in English* – O.U.P. New Delhi.

NOTE:

This syllabus has been designed to improve the oral and written communication skills of students. The faculty members should put emphasis on practical (oral) activities for generating students' interest in language learning.

* Latest editions of all the suggested books are recommended.

Semester II
ELECTRICITY AND MAGNETISM LAB

Course Code: BAS-258

L	T	P	C
0	0	4	2

LIST OF EXPERIMENT

Note : Select any ten experiments from the following list

1. To determine acceleration due to gravity (g) by Bar Pendulum.
2. To determine acceleration due to gravity (g) by Kater's Pendulum.
3. To study the Motion of a Spring and calculate (a) Spring Constant (b) acceleration due to gravity (g) and (c) Modulus of Rigidity
4. To determine the Frequency of an Electrically Maintained Tuning Fork by Melde's experiment.
5. To determine a Low Resistance by Carey Foster's Bridge.
6. To determine High Resistance by Leakage of a Capacitor.
7. To determine the (a) Charge Sensitivity and (b) Current Sensitivity of a B.G.
8. To determine the Ratio of Two Capacitances by de Sauty's Bridge.
9. To determine Self Inductance of a Coil by Anderson's Bridge using AC
10. To determine Self Inductance of a Coil by Rayleigh's Method.
11. To determine the Mutual Inductance of Two Coils by Absolute method using a B.G.
12. To study the response curve of a Series LCR circuit and determine its (a) Resonant Frequency, (b) Impedance at Resonance and (c) Quality Factor Q , and (d) Band Width.

Evaluation of Practical Examination:

Internal Evaluation (50 marks)

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 5 point scale (two for experiment, two for file work and one for viva) which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation scheme:

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (30 MARKS)			ATTENDANCE (5 MARKS)	QUIZ (5 MARKS)	VIVA (10 MARKS)	TOTAL INTERNAL (50 MARKS)
EXPERIMENT (10 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)				

External Evaluation (50 marks)

The external evaluation would be done by the external faculty based on the experiment conducted during the examination.

Semester II
OPTICS (LAB)

Course Code: BAS-259

L T P C
0 0 4 2

LIST OF EXPERIMENTS

Note: Select any ten experiments from the following list

1. To determine the wavelength of Sodium light by Newton's rings.
2. To determine the wavelength of Sodium light by Fresnel's biprism.
3. To determine the specific rotation of the cane sugar solution with the help of Polarimeter.
4. To study the forward characteristics of a light emitting diode.
5. To determine the resolving power and dispersive power by a prism.
6. To determine the resolving power of grating.
7. To study the elliptically polarised light.
8. To determine slit width using He-Ne laser.
9. To determine the Flashing & Quenching of Neon bulb.
10. To determine the Resolving power of a telescope
11. To determine the wavelength of the sodium lamp by Michelson interferometer.
12. To determine the wave form and frequency of a given signal using C.R.O.

Internal Evaluation (50 marks)

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 5 point scale(two for experiment, two for file work and one for viva) which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation scheme:

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (30 MARKS)			ATTENDANCE (5 MARKS)	QUIZ (5 MARKS)	VIVA (10 MARKS)	TOTAL INTERNAL (50 MARKS)
EXPERIMENT (10 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)				

External Evaluation (50 marks)

The external evaluation would be done by the external faculty based on the experiment conducted during the examination.

Semester II
INORGANIC CHEMISTRY LAB

Course Code: BAS-257

L	T	P	C
0	0	4	2

LIST OF EXPERIMENT

1. Determination of strength of given HCL solution by titrating against N/10 Standard sodium hydroxide solution.
2. Determination of temporary and permanent hardness in water sample using EDTA as standard solution.
3. Determination of free chloride content in the given water sample by Mohr's method.
4. To determine the Ferrous content in the given sample of Iron ore by titrimetric analysis against standard $K_2Cr_2O_7$ using $K_3Fe(CN)_6$ as an external indicator.
5. Determination of Equivalent weight of Iron by the chemical displacement Method (equivalent weight of copper is 63.5).
6. To synthesis copper ammonia complex.
7. To prepare tris (thiourea) copper (I) sulphate complex.
8. Group test of given inorganic sample.
9. To determine the concentration of $KMnO_4$ solution spectrophotometrically.
10. To determine the element (N, S and halogens) in given inorganic samples.

Evaluation of Practical Examination:

Internal Evaluation (50 marks)

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 5 point scale(two for experiment, two for file work and one for viva) which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation scheme:

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (30 MARKS)			ATTENDANCE (5 MARKS)	QUIZ (5 MARKS)	VIVA (10 MARKS)	TOTAL INTERNAL (50 MARKS)
EXPERIMENT (10 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)				

External Evaluation (50 marks)

The external evaluation would be done by the external faculty based on the experiment conducted during the examination.

Semester III
NUMERICAL ANALYSIS

Course Code: BAS-301

L	T	P	C
3	2	0	4

Unit I

(Lectures 08)

Calculus of finite differences: Finite differences and difference formulae; Operators E , Δ , ∇ , Properties and relation between operators, difference table, Factorial notation.

Unit II

(Lectures 08)

Interpolation with equal intervals and Unequal Intervals: Newton Gregory Forward and Backward Formula, Newton's divide difference Formula, Lagrange's Interpolation Formula, Hermit Interpolation formulas using differences. Different interpolation methods, curve fittings use of calculus of finite difference, divided difference. Newton's formula of unequal intervals, Lagranges interpolation formula for unequal intervals. Iterative Methods.

Unit III

(Lectures 06)

Central difference formulae: Gaussian formula Bessel's and Sterling formula, Gauss Evertt formula.

Unit IV

(Lectures 08)

Numerical differentiation and Integration: Derivative using forward and backward difference interpolation formula, Trapezoidal Formulae, Simposon's Formula, Cotes formula.

Unit V

(Lectures 10)

Numerical solution of first order differential equation: By using Kutta & Runge Kutta method and solution of algebraic and Transcendental Equations using Newton Raphson method & Graff's squaring method.

Text Books:

1. "Numerical analysis", by Burden, Cengage Learning
2. "Numerical Analysis" by B. S. Grewal, Khanna Publishing
3. "Numerical Analysis" by Pradeep Niyosi, Tata Mcgraw Hell

Reference Books:

1. "Numerical Analysis" by P.P. Gupta and Sanjay Gupta, Krishana Prakashan Mandir
2. "Numerical Analysis" by S.S. Sastry, Prentice Hall Of India.
3. "Introduction to Numerical Analysis" by C. E. Froberg, Addition –Welly Publishing Co.

Semester III
FUNDAMENTALS OF ORGANIC CHEMISTRY

Course Code: BAS-304

L	T	P	C
3	2	0	4

Unit I

(Lectures 08)

Hybridization: Bond lengths and bond angles, bond energy, vander waals integrations, resonance, hyper-conjugation, aromaticity inductive and field electrometric, hydrogen bonding, Curved arrow notation, drawing electron movements with arrows, half headed and double headed arrows hemolytic and hetrolytic bond breaking

Unit II

(Lectures 08)

Concept of isomerism: Types of isomerism, optical isomerism, Geometrical isomerism, conformational isomerism, Newman projection, Alkenes dienes and alkynes

Unit III

(Lectures 08)

Alcohols: Monohydric alcohols, Nomenclature, methods of formation by reduction of aldehydes, Ketones, carboxylic acid and esters, Hydrogen bonding, Acidic nature, Reaction of alcohols, dihydrid alcohols, trihydric alcohols, phenols.

Unit IV

(Lectures 08)

Ether and Epoxides: Nomenclature of ethers and methods of their formation physical properties, chemical reactions-cleavage and autoxidation, Ziesel's method, Aldehyde and Ketones, Nomenclature and structure of the carbonyl group.

Unit V

(Lectures 08)

Organometallic Compounds: Organo magnesium compounds the Grignard reagents-formation, structure and chemical reactions. Organozinc Compounds: Formation and chemical reactions.

Organolithium: Compounds formation and chemical reactions.

Organosulphur Compounds: Nomenclature structural features Methods of formation and chemical reactions of thiols, sulphonic acids, Saccharin, chloramine-T.

Text Books:

"Organic Chemistry" by Bahel & Bahel.

Reference Books:

"Organic Chemistry" by Morrison & Boid

Semester III
THERMAL & LOW TEMPERATURE PHYSICS

Course Code: BAS-305

L	T	P	C
3	2	0	4

Unit –I

(Lectures 08)

Kinetic Theory of Gases: Maxwell's speed distribution, Mean free path, flow and Thermal conduction in gases. Real gases, Andrew's curves, Equation of state, Virial coefficients, Van der Waals equation, Joule-Thomson effect, Thermodynamic analysis, Inversion temperature, Thermodynamic equations for a Van der Waals gas. Liquefaction of gases.

Unit –II

(Lectures 08)

Thermodynamics: Reversible and irreversible processes, Examples of thermal, mechanical and chemical irreversibility, Carnot's cycle and Carnot's theorem. Second law of thermodynamics, Thermodynamic scale of temperature. Concept of entropy, Entropy change in reversible and irreversible processes. Entropy and disorder, Principle of increase of entropy, Entropy and unavailable energy, Entropy of ideal gases, Entropy as a thermodynamic variable, S-T diagram.

Unit –III

(Lectures 08)

Maxwell's Thermodynamics Equations and Radiation : Maxwell's thermodynamical equations and their applications Energy and heat capacity equations Clapeyron equations, Application to sublimation, vaporization and freezing processes, Heat capacity of saturated vapours. The blackbody spectrum, Wien's displacement law, Rayleigh-Jean's law, Planck's quantum theory of radiation.

Unit –IV

(Lectures 08)

Some Systems at Low Temperatures: Low temperature technique, Use of liquid air and other liquified gases, Superfluidity in He II, Bose-Einstein Condensation in atomic clouds. Trapping and cooling of atoms, Superconductivity, Soft and Hard superconductors, Specific Heat and energy band gap for superconductors, Applications and Examples of superconductors.

Unit –V

(Lectures 08)

Production and Measurement of Low Temperatures: Adiabatic throttling of gases, liquefaction of H₂ and He, Solidification of He. Liquid He II, Thermodynamics of phase- transition, Adiabatic demagnetization, Temperatures below 0.01K, Low temperature thermometry.

Text Books:

1. Heat and Thermodynamics: K.W. Zeemansky.
2. Thermal Physics: B.K. Agarwal.
3. Heat and Thermodynamics: Brij Lal and N. Subramanyam.
4. Solid State Physics, Pillai

Reference Books:

1. Heat and Thermodynamics: Dayal, Verma and Pandey.
2. A Treatise on Heat: M.N. Saha and B.N. Srivastava.

Semester III
CLASSICAL PHYSICS

Course Code: BAS-306

L	T	P	C
3	2	0	4

Unit I

(Lectures 08)

System of particles, Constraints, Generalized coordinates, D'Alemberts principle and Lagrange's equation, Velocity dependent potential of electro-magnetic field.

Unit II

(Lectures 08)

Calculus of Variation, Hamilton's principle, Lagrange's equation, Lagrangian for simple systems, Cyclic coordinates, symmetries and conservation laws. Advantages of Lagrangian: electro-mechanical Analogies.

Unit III

(Lectures 08)

Lagrange's undetermined multipliers, Lagrange's equation for non holonomic systems, Virial theorem, Principle of mechanical similarity.

Unit IV

(Lectures 08)

Legendre transformations and Hamilton's equations of motion, Hamiltonian for a charge particle in Electro-magnetic field, Cyclic coordinates and conservation laws, Poisson Brackets, Jacobi Identity, Canonical transformation.

Unit V

(Lectures 08)

Hamilton-Jacobi theory, Action-Angle variables, related problems. Two body central force problem, reduction to the equivalent one body problem, Differential equation for the orbit and integrable power law potentials, Condition for stable circular orbit, Kepler problems.

Text Books:

1. Classical Mechanics: H. Goldstein.
2. Mechanics: L . D. Landau and E. M. Lifshitz
3. Introduction to Classical Mechanics: R. G. Takwale and Puranik.

Reference Books:

1. Classical Mechanics of Particles and Rigid Bodies: K. C. Gupta.
2. Introduction to Classical Mechanics: N. C. Rana and P. Joag.

Semester III/IV
FUNDAMENTALS OF COMPUTERS

Course Code: BCS-301/BCS-401

L	T	P	C
3	2	0	4

Unit I

(Lectures 08)

Concepts in Computer Application: Definition of Electronic Computer, History, Generations, Characteristic and Application of Computers, Classification of Computers, Functional Component of Computer: CPU, I/O devices, Type of Memory & Memory Hierarchy, Firmware and Human ware.

Unit II

(Lectures 08)

Programming Language Classification & Number System: Generation of Languages, Introduction to 4GLs. Translators: Assembler, Compiler, and Interpreter. Number System: Decimal, Octal, Binary and Hexadecimal & their Conversions. Various Codes: BCD, ASCII and EBCDIC and Gray Code.

Unit III

(Lectures 08)

Concepts in Operating System, Office Tools and Data Management: Elementary Concepts in Operating System, textual Vs GUI Interface, Introduction to DOS, MS Windows, MS office Tools, MS WORD, MS EXCEL, MS Power Point.

Unit IV

(Lectures 08)

Data Communication & Networks: Basic Concepts in Computer Networks, Networking of computers- Introduction of LAN and WAN, Network Topologies.

Internet and Web Technologies: Hypertext Markup Language, DHTML, WWW, Gopher, FTP, Telnet, Web Browsers, Net Surfing, Search Engines, Email.

Unit V

(Lectures 08)

IT Industry Trends: Careers and Applications in India, Basic Awareness of NICNET and ERNET. Application of IT to Areas like E Commerce, electronic governance, Multimedia, and Entertainment.

Information Representation: Introduction to Information representation in Digital Media, Text, image, graphics, Animation, Audio, Video etc., Introduction to JPEG, MPEG, MHEG, MP3 & AVI.

Text Books

1. Sinha P.K., Computer Fundamentals
2. Yadav, D S, *Foundations of IT*, New Age, Delhi
3. Rajaraman, *Introduction to Computers*, Prentice-Hall India

Reference Books

1. Peter Nortans, *Introduction to Computers*, TME
2. Leon & Leon, *Fundamental of Information Technology*, Vikas Publishing
3. Lehngart, *Internet 101*, Addison Wesley

**Semester III/IV
ENVIRONMENTAL SCIENCE**

Course Code: BAS-309/BAS-409

L	T	P	C
3	2	0	4

Unit I

(Lectures 08)

General: Definition, Scope, Segments of Environment and its Multidisciplinary Nature, Some Major Environmental Problems, Definition and Scope of Ecology.

Unit II

(Lectures 08)

Ecology And Environment: Concept of an Ecosystem- its components and functions, Trophic Levels- Producer, Consumer and Decomposer, Energy Flow in an Ecosystem, Biogeochemical Cycles, Food Chain, Food Web and Ecological Pyramid.

Unit III

(Lectures 08)

Air pollution: Various segments of Atmosphere and their Significance, Sources and Effects of Air Pollution, Classification of Air Pollutants, Stationary and Mobile Sources of Air Pollution, Photochemical Smog, Acid Rain, Global Warming (Greenhouse Effect), Ozone Layer - Its Depletion and Control Measures, El-Nino.

Unit IV

(Lectures 08)

Water pollution: Water Resources of the Earth and Indian Scenario, Point and non-Point sources of Water Pollution, Treatment of Water Pollution, Eutrophication,

Bio-Diversity- Hot Spots of Biodiversity in India and World, Conservation, Importance and Factors Responsible for Loss of Biodiversity, Deforestation- causes and effects, Biogeographical Classification of India.

Unit V

(Lectures 08)

Soil pollution-Sources and Consequences, Noise, Thermal - sources and consequences, Sustainable Development, Dams and Reservoirs- Their Benefits and Problems, Solid Wastes - Pollution, Treatment & Disposal, Environment Conservation Movement in India (Chipko Movement, Appiko Movement), Bioremediation, Biological Magnification

Text Books:

1. "Fundamentals of Ecology", Odum, E.P., W.B. Saunders Co.
2. "Environmental Chemistry", De, A.K., New Age Publishers Pvt. Ltd.
3. "Introduction to Environmental Engineering and Science", Masters, G.M., Prentice Hall India Pvt. Ltd.

Reference Books:

1. "Biodiversity and Conservation", Bryant, P.J., Hypertext Book.
2. "Textbook of Environment Studies", Tewari, Khulbe & Tewari, I.K. Publication.

Semester-III
PROFESSIONAL WRITING

Course code: BHM301

(Common with EHM 301/BBA306/BCA305/AR307/BCH306/BFA303)

L	T	P	C
2	0	2	3

Course Contents:

Unit I

Functional Grammar: Active and passive voice, Conditional sentences, Syntax, Concord, Common errors. (10 Hours)

Unit II

Requisites of Paragraph writing: Structure of Paragraph, Coherence & Unity, Development of paragraph, Inductive order, Deductive order, Spatial order, Linear, Chronological orders, Expository writing, and Argumentative writing, Factual description of objects, process, experiments. (10 Hours)

Unit III

Précis Writing: Techniques of Précis writing, Writing a précis. (10 Hours)

Unit IV

Comprehension skills: Role of listening, Reading comprehension; Reasons for poor comprehension, Improving comprehension skills. (10 Hours)

Text Books:

1. Rutherford A., *Basic Communication Skills* – Pearson Education, New Delhi.

References Books:

1. Raman Meenakshi & Sharma Sangeeta, *Technical Communication-Principles & Practice* – O.U.P. New Delhi. 2007.
2. Mohan Krishna & Banerji Meera, *Developing Communication Skills* – Macmillan India Ltd. Delhi.

NOTE:

This syllabus has been designed to improve the oral and written communication skills of students. The faculty members should put emphasis on practical (oral) activities for generating students' interest in language learning.

* Latest editions of all the suggested books are recommended.

Semester III
ORGANIC CHEMISTRY LAB

Course Code: BAS-354

L	T	P	C
0	0	4	2

LIST OF EXPERIMENTS

1. To detect the functional groups in organic compounds.
2. To detect elements (N, S and halogens) in organic compounds.
3. To prepare Aspirin.
4. To prepare methyl orange.
5. To prepare phenolphthalein.
6. To synthesize p-nitroaniline from acetanilide.
7. To determine the ion exchange capacity of the given ion exchange.
8. To find out the R_f values and identify amino acids present in a given mixture by thin layer chromatography.
9. To find out the saponification value of a given oil.
10. To prepare the phenol formaldehyde resin.

Evaluation of Practical Examination:

Internal Evaluation (50 marks)

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 5 point scale (two for experiment, two for file work and one for viva) which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation scheme:

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (30 MARKS)			ATTENDANCE (5 MARKS)	QUIZ (5 MARKS)	VIVA (10 MARKS)	TOTAL INTERNAL (50 MARKS)
EXPERIMENT (10 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)				

External Evaluation (50 marks)

The external evaluation would be done by the external faculty based on the experiment conducted during the examination.

Semester III
THERMAL PHYSICS LAB

Course Code: BAS-355

L	T	P	C
0	0	4	2

LIST OF EXPERIMENTS

1. To determine J by Callender and Barne's constant flow method.
2. To determine the Coefficient of Thermal Conductivity of Copper by Searle's Method.
3. To determine the Coefficient of Thermal Conductivity of Copper by Angstrom's Method.
4. To determine the Coefficient of Thermal Conductivity of a bad conductor by Lee and Charlton's disc method.
5. To determine the Temperature Coefficient of Resistance by Platinum Resistance Thermometer (PRT).
6. To calibrate a Resistance Temperature Device (RTD) to measure temperature in a specified range using

Null Method/ Off-Balance Bridge with Galvanometer based measurement.

7. To study the variation of Thermo-Emf of a Thermocouple with Difference of Temperature of its Two

Junctions.

8. To Calibrate a Thermocouple to measure Temperature in a Specified Range using Null Method.

9. Direct Measurement using an Op-Amp Difference Amplifier and to determine Neutral Temperature

10. To determine the value of Boltzmann Constant by studying Forward Characteristics of a Diode.

11. To determine the value of Stefan's Constant.

Evaluation of Practical Examination:

Internal Evaluation (50 marks)

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 5 point scale which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation Scheme

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (30 MARKS)			ATTENDANCE (5 MARKS)	QUIZ (5 MARKS)	VIVA (10 MARKS)	TOTAL INTERNAL (50 MARKS)
EXPERIMENT (10 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)				

External Evaluation (50 marks)

The external evaluation would be done by the external faculty based on the experiment conducted during the examination.

Semester III/IV
FUNDAMENTALS OF COMPUTERS LAB

Course Code: BCS-351/BCS-451

L	T	P	C
0	0	4	2

1. Fundamentals of computer system, with its functional components.
2. Create a formatted WORD document.
3. Create a WORD document using different fonts.
4. Create a table & perform operations in it.
5. Create a WORD document, using the functions page set up, & page preview, and then print that document.
6. Implementation of Mail Merge.
7. Collect the information of any company & perform the below operation in it:
 - (a) Insert the data into Row/Column of Excel, worksheet
 - (b) Create a worksheet in Excel, perform alignment, text wrapping & sort the data.
8. Collect the information of any company & perform the below operation in it:
 - (a) Generate the graph in Excel.
 - (b) Create a Hyperlink to a word document.
- (e) Create a worksheet using the functions- page set up, print preview & then print the worksheet.
9. Create, save & print the power point presentation
10. Create a power point presentation using clipart, Word art gallery & then add transition & Animation effects.

Evaluation of Practical Examination:

Internal Evaluation (50 marks)

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 5 point scale (two for experiment, two for file work and one for viva) which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation scheme:

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (30 MARKS)			ATTENDANCE (5 MARKS)	QUIZ (5 MARKS)	VIVA (10 MARKS)	TOTAL INTERNAL (50 MARKS)
EXPERIMENT (10 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)				

External Evaluation (50 marks)

The external evaluation would be done by the external faculty based on the experiment conducted during the examination.

Semester III/IV
ENVIRONMENTAL SCIENCE (LAB)

Course Code: BAS-359/BAS-459

L	T	P	C
0	0	4	2

LIST OF EXPERIMENT

1. To determine total alkalinity in the given water sample.
2. To determine the temporary and permanent hardness in water sample.
3. To determine the pH of the given solution using pH meter.
4. To determine the turbidity in given water sample.
5. To determine the dissolved oxygen present in a water sample.
6. To determine the conductivity in water sample.
7. To determine the carbon-di-oxide content in polluted water sample.
8. To find chemical oxygen demand of waste water sample by potassium dichromate.
9. To determine the TDS and TSS in water sample.
10. To determine the noise level in ambient air.

Evaluation of Practical Examination:

Internal Evaluation (50 marks)

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 5 point scale (two for experiment, two for file work and one for viva) which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation scheme:

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (30 MARKS)			ATTENDANCE (5 MARKS)	QUIZ (5 MARKS)	VIVA (10 MARKS)	TOTAL INTERNAL (50 MARKS)
EXPERIMENT (10 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)				

External Evaluation (50 marks)

The external evaluation would be done by the external faculty based on the experiment conducted during the examination.

Semester IV
QUANTUM PHYSICS

Course Code: BAS-405

L	T	P	C
3	2	0	4

Unit-I (Lectures 08)

Limits of Classical Physics: Black body radiation (without derivation), Photoelectric effect, Compton effect

Unit-II (Lectures 08)

Wave Packets and Uncertainty Relation: de Broglie hypothesis, Wave-particle duality, Davisson-Germer experiment, Wave packets, Group velocity and phase velocity, Uncertainty principle, Complementarity.

Unit-III (Lectures 08)

Wave Mechanics: Schrödinger equation, Physical interpretation of wave function, Probability current density and conservation of probability, Free particle wave function, Schroedinger equation in the presence of a potential.

Unit-IV (Lectures 08)

Linear operators: Hermitian operators, Observables, Eigenvalues and Eigenfunctions, Expectation values, Ehrenfest's theorem, Stationary states, Superposition principle, Commutation relations, Commuting observables and compatibility.

Unit-V (Lectures 08)

Application of Schrödinger Wave Equation: Particle in one dimensional Box, Square well, Rectangular potential barrier and tunnelling, Linear harmonic oscillator, Spherically symmetric potential, Angular momentum operators and their eigenfunctions, Concept of spin, Hydrogen atom.

Text Books:

1. Quantum Physics: S. Gasiorowicz.
2. Quantum Mechanics: B. H. Bransden and C. J. Joachain.

Reference Books:

1. Quantum Physics of Atoms, Molecules, Nuclei and Solids: R. M. Eisberg and R. Resnick.
2. Quantum Mechanics: V. Devanathan.
3. Quantum Mechanics: C. S. Chaddha

Semester IV
MATHEMATICAL PHYSICS

Course Code: BAS-406

L	T	P	C
3	2	0	4

Unit-I

(Lectures 08)

Vector Calculus Vector Differentiation :- Scalar and Vector Fields. Ordinary and Partial Derivative of a

Vector w.r.t. Coordinates. Space Curves. Unit Tangent Vector and Unit Normal Vector.

Directional Derivatives and Normal Derivative. Gradient of a Scalar Field and its Geometrical Interpretation

Vector Integration :- Ordinary Integral of Vectors. Line, Surface and Volume Integrals. Flux of a Vector

Field. Gauss' Divergence Theorem, Green's Theorem and Stokes Theorem.

Unit-II

(Lectures 08)

Orthogonal Curvilinear Coordinates:-Orthogonal Curvilinear Coordinates. Derivation of Gradient, Divergence, Curl and Laplacian in Cartesian, Spherical and Cylindrical Coordinate Systems. Multiple Integrals Double and Triple Integrals : Change of Order of Integration. Change of Variables and Jacobian. Applications of Multiple Integrals : (1) Area Enclosed by Plane Curves, (2) Area of a Curved Surface.

Unit-III

(Lectures 08)

Some Special Integrals Beta and Gamma Functions and Relation between them: Expression of Integrals in terms of Gamma Functions. Fourier Series Fourier Series. Dirichlet Conditions (Statement only). Kronecker's Method for Computation of Fourier Coefficients. Even and Odd Functions. Orthogonality of Sine and Cosine Functions. Sine and Cosine Series. Applications: Square Wave, Triangular Wave, Output of Full Wave Rectifier and other Simple Functions.

Unit-IV

(Lectures 08)

Differential Equations Classification : Ordinary and Partial, Order and Degree, Linear and Nonlinear,

Homogeneous and Non-homogeneous. Solution : Explicit and Implicit, Number of Arbitrary Constants.

Linear Ordinary Differential Equations First order :- (1) Separable Equations. Initial Value Problem. (2)

Exact Equations. Integrating Factor. (3) Linear Equations. Lagrange's Method of Variation of Parameters.

Unit-V

(Lectures 08)

Linear Ordinary Differential Equations Second order:- Homogeneous Equations with Constant

Coefficients. Wronskian and General Solution. Statement of Existence and Uniqueness Theorem for Initial

Value Problems. Solution of Non-homogeneous Equations by D Operator Method. Particular Integral.

Methods of Undetermined Coefficients and Variation of Parameters. Equations Reducible to those with

Constant Coefficients. Bernoulli and Euler Equations. Coupled Differential Equations :- Solution by Method

of Elimination.

Text Books:

1. Schaum's Outline of Vector Analysis, 2nd Edn. By Murray Spiegel, Seymour Lipschutz (McGraw-Hill,

2009)

2. Vector Analysis and Cartesian Tensors, 3ed By D. E. Bourne, P C Kendall (Chapman & Hall, 1992)

3. Schaum's Outline of Theory and Problems of Fourier Analysis By Murray R. Spiegel (McGraw-Hill,

1974)

Reference Books:

1. Advanced Engineering Mathematics by Erwin Kreyszig (Wiley Eastern Limited, 1985)

2. Introduction to Mathematical Physics by Charlie Harper. (P.H.I., 1995).

3. Higher Engineering Mathematics by B S Grewal, Khanna Publishers (2000)

Semester IV
ATOMIC AND MOLECULAR PHYSICS

Course Code: BAS-407

L	T	P	C
3	2	0	4

Unit-I

(Lectures 08)

Determination of e/m of the Electron. Thermionic Emission. Isotopes and Isobars. X-rays :- Ionizing

Power, X-ray Diffraction, Bragg's Law. Bohr Atomic Model, Critical Potentials, X-rays-Spectra:

Continuous and Characteristic X-rays, Moseley Law.

Unit-II

(Lectures 08)

Atoms in Electric and Magnetic Fields :- Electron Angular Momentum. Space Quantization. Electron

Spin and Spin Angular Momentum. Larmor's Theorem. Spin Magnetic Moment. Stern-Gerlach

Experiment. Zeeman Effect: Electron Magnetic Moment and Magnetic Energy, Gyromagnetic Ratio and Bohr Magneton. Zeeman Effect. Paschen Back and Stark Effect

Unit-III

(Lectures 08)

Many electron atoms :- Pauli's Exclusion Principle. Symmetric and Antisymmetric Wave Functions.

Periodic table. Fine structure. Spin orbit coupling. Spectral Notations for Atomic States. Total Angular

Momentum. Vector Model. L-S and J-J couplings. Hund's Rule. Term symbols. Spectra of Hydrogen

and Alkali Atoms (Na etc.).

Unit-IV

(Lectures 08)

Molecular Spectra :- Rotational Energy levels, Selection Rules and Pure Rotational Spectra of a Molecule. Vibrational Energy Levels, Selection Rules and Vibration Spectra. Rotation- Vibration Energy Levels, Selection Rules and Rotation-Vibration Spectra. Determination of Internuclear Distance.

Unit-V

(Lectures 08)

Raman Effect :- Quantum Theory of Raman Effect. Characteristics of Raman Lines. Stoke's and Anti-Stoke's Lines. Complimentary Character of Raman and infrared Spectra. Concepts of Holography

Text Books:

1. Concepts of Modern Physics by Arthur Beiser (McGraw-Hill Book Company, 1987)
2. Atomic physics by J.B.Rajam & foreword by Louis De Broglie.(S.Chand & Co., 2007).
3. Atomic Physics by J.H.Fewkes & John Yarwood. Vol. II (Oxford Univ. Press, 1991).

Reference Books:

1. Physics of Atoms and Molecules, Bransden and Joachein.
2. Molecular Spectroscopy, Banwell.
3. Optoelectronics by Ghatak and Thyagarajan
4. Principles of Lasers by Svelto

B.Sc.(H) Physics : Semester IV
SEMICONDUCTOR/ SOLID STATE DEVICES

Amended vide approval dated November 5, 2012

L T P C
3 2 0 4

Course Code: BEC 401

Unit I

(Lectures 08)

Crystal and Lattice: Crystal lattice, Packing fraction, Crystal planes and sections, Crystal structure of Ge, Si and GaAs, Band theory of semiconductors, Metals, semiconductors and insulators, Semiconductors crystals, Effective mass concept.

Unit II

(Lectures 08)

CARRIER CONCENTRATIONS: The Fermi level, Electron and Hole concentration at equilibrium, Direct and Indirect recombination of electrons and holes, Hall effect, Steady-state carrier generation, Quasi-Fermi levels.

Unit III

(Lectures 08)

TRANSPORT PHENOMENA: Drift and Diffusion of Carriers, Recombination, Continuity and Diffusion equations, Hynes-Shockley experiment.

P-N JUNCTIONS: The Contact Potential, Space Charge at a junction, Steady state condition, Current at a junction, Carrier injection, Junction breakdown, Time variation of stored charge, P-N junction capacitance, Graded junction.

Unit IV

(Lectures 08)

JUNCTION DIODES: Varactor Diode, Concept of negative resistance Devices, Tunnel Diode, Current and Voltage in an illuminated junction, Photo Diode, Photo detector, Solar Cells, Light Emitting Diode, Metal Semiconductor Junction. Principle of PIN photo detector and Avalanche photodiode, Noise in photo detectors, Detector response time, Photodiode materials.

Unit V

(Lectures 08)

Bipolar Junction Transistor (BJT): Charge transport and current in a BJT, Current transfer ratio, Terminal currents, Generalized biasing, Charge control analysis, BJT switching, Turn-on and Turnoff transients, Base narrowing, Frequency limitations of a transistor.

FET, MOSFET: Principle of Operation and I-V Characteristics of FET, MESFET, MOSFET, MOS Capacitor, Threshold voltage in MOSFET.

Text Books:

1. "Solid State Electronic Devices" – B. G. Streetman, PHI
2. "Integrated Electronics" – Millman & Halkies, Tata McGraw.
3. "Physics of Semiconductor Devices" – S. M. Sze..

Semester III/IV
FUNDAMENTALS OF COMPUTERS

Course Code: BCS-301/ BCS-401

L	T	P	C
3	2	0	4

Unit I **(Lectures 08)**

Concepts in Computer Application: Definition of Electronic Computer, History, Generations, Characteristic and Application of Computers, Classification of Computers, Functional Component of Computer: CPU, I/O devices, Type of Memory & Memory Hierarchy, Firmware and Human ware.

Unit II **(Lectures 08)**

Programming Language Classification & Number System: Generation of Languages, Introduction to 4GLs. Translators: Assembler, Compiler, and Interpreter. Number System: Decimal, Octal, Binary and Hexadecimal & their Conversions. Various Codes: BCD, ASCII and EBCDIC and Gray Code.

Unit III **(Lectures 08)**

Concepts in Operating System, Office Tools and Data Management: Elementary Concepts in Operating System, textual Vs GUI Interface, Introduction to DOS, MS Windows, MS office Tools, MS WORD, MS EXCEL, MS Power Point.

Unit IV **(Lectures 08)**

Data Communication & Networks: Basic Concepts in Computer Networks, Networking of computers- Introduction of LAN and WAN, Network Topologies. **Internet and Web Technologies:** Hypertext Markup Language, DHTML, WWW, Gopher, FTP, Telnet, Web Browsers, Net Surfing, Search Engines, Email.

Unit V **(Lectures 08)**

IT Industry Trends: Careers and Applications in India Basic Awareness of NICNET and ERNET. Application of IT to Areas like E Commerce, electronic governance, Multimedia, and Entertainment.

Information Representation: Introduction to Information representation in Digital Media, Text, image, graphics, Animation, Audio, Video etc., Introduction to JPEG, MPEG, MHEG, MP3 & AVI

Text Books

1. Sinha P.K., Computer Fundamentals
2. Yadav, D S, *Foundations of IT*, New Age, Delhi
3. Rajaraman, *Introduction to Computers*, Prentice-Hall India

Reference Books

1. Peter Nortans, *Introduction to Computers*, TME
2. Leon & Leon, *Fundamental of Information Technology*, Vikas Publishing
Lehngart, *Internet 101*, Addison Wesley

Semester III/IV
ENVIRONMENTAL SCIENCE

Course Code: BAS-309/BAS-409

L	T	P	C
3	2	0	4

Unit I

(Lectures 08)

General: Definition, Scope, Segments of Environment and its Multidisciplinary Nature, Some Major Environmental Problems, Definition and Scope of Ecology.

Unit II

(Lectures 08)

Ecology And Environment: Concept of an Ecosystem- its components and functions, Trophic Levels- Producer, Consumer and Decomposer, Energy Flow in an Ecosystem, Biogeochemical Cycles, Food Chain, Food Web and Ecological Pyramid

Unit III

(Lectures 08)

Air pollution: Various segments of Atmosphere and their Significance, Sources and Effects of Air Pollution, Classification of Air Pollutants, Stationary and Mobile Sources of Air Pollution, Photochemical Smog, Acid Rain, Global Warming (Greenhouse Effect), Ozone Layer - Its Depletion and Control Measures, El-Nino

Unit IV

(Lectures 08)

Water pollution: Water Resources of the Earth and Indian Scenario, Point and non-Point sources of Water Pollution, Treatment of Water Pollution, Eutrophication, Bio-Diversity- Hot Spots of Biodiversity in India and World, Conservation, Importance and Factors Responsible for Loss of Biodiversity, Deforestation- causes and effects, Biogeographical Classification of India.

Unit V

(Lectures 08)

Soil pollution-Sources and Consequences, Noise, Thermal - sources and consequences, Sustainable Development, Dams and Reservoirs- Their Benefits and Problems, Solid Wastes - Pollution, Treatment & Disposal, Environment Conservation Movement in India (Chipko Movement, Appiko Movement), Bioremediation, Biological Magnification

Text Books:

1. "Environmental Chemistry", De,A.K., New Age Publishers Pvt. Ltd.
2. "Introduction to Environmental Engineering and Science", Masters,G.M., Prentice Hall India Pvt.Ltd.
3. "Fundamentals of Ecology", Odem,E.P., W.B.Sannders Co.

Reference Books:

1. "Biodiversity and Conservation", Bryant,P.J., Hypertext Book
2. "Textbook of Environment Studies", Tewari, Khulbe & Tewari, I.K. Publication

Semester-IV
TECHNICAL COMMUNICATION

Course code: BHM401

(Common with EHM 401/BPH406/BBA406/BCA406/ /BCH406/BFA403)

L	T	P	C
2	0	2	3

Course Contents:

Unit I

Communication: Objectives of Communication, Need for Communication, Types of communication, written & Verbal communication, Formal and informal communication (The grapevine), upward and downward communication. **(10 Hours)**

Unit II

Business communication: Importance of written business correspondence, General principles and essentials of good commercial correspondence, Different types of commercial correspondence & their drafting, Types of Business letters, Official letters, electronic communication process. **(10 Hours)**

Unit III

Project, Thesis and Dissertation writing: Project Report, Thesis & Dissertation writing Structure of Thesis writing. **(10 Hours)**

Unit IV

Modern Technology and Communication: Globalization of Business, Role of Information Technology, Tele- communication, Internet, Tele-conferencing and Video-conferencing. **(10 Hours)**

Text Books:

1. Mishra Sunita & Muraliksishra C., *Communication Skills for Engineers* – Pearson Education, New Delhi.
2. Raman Meenakshi & Sharma Sangeeta, *Technical Communication-Principles & Practice* – O.U.P. New Delhi. 2007.
3. Chabbra T N, *Business Communication*, Sun India Pub. New Delhi.

Reference Books:

1. Mohan Krishna & Banerji Meera, *Developing Communication Skills* – Macmillan India Ltd. Delhi.
2. Mitra Barum K., *Effective Technical Communication* – O.U.P. New Delhi. 2006.

NOTE:

This syllabus has been designed to improve the oral and written communication skills of students. The faculty members should put emphasis on practical (oral) activities for generating students' interest in language learning.

* Latest editions of all the suggested books are recommended.

Semester IV
ATOMIC AND MOLECULAR PHYSICS LAB

Course Code: BAS-457

L	T	P	C
0	0	4	2

LIST OF EXPERIMENTS

1. To determine the value of e/m by Magnetic Focussing Bar Magnet.
2. To determine the wavelengths of Hydrogen spectrum and hence to determine the value of Rydberg's Constant.
3. To determine the value of e/m by Bar Magnet. To determine the wavelengths of Hydrogen spectrum and hence to determine the value of Rydberg's Constant.
4. To determine the Wavelength of H-alpha Emission Line of Hydrogen Atom.
5. To determine the Absorption Lines in the Rotational Spectrum of Iodine Vapour.
6. To determine the Wavelength and the Angular Spread of a He-Ne Laser.
7. To determine the Wavelength and the Velocity of Ultrasonic Waves in a liquid (Kerosene Oil, Xylene, etc.) by studying the Diffraction of light through an Ultrasonic Grating.
8. To determine the value of Planck's Constant by using a Photoelectric Cell.
9. To determine the value of Planck's Constant by using LEDs of at least 4 Different Wavelengths.

Evaluation of Practical Examination:

Internal Evaluation (50 marks)

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 5 point scale which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation Scheme

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (30 MARKS)			ATTENDANCE (5 MARKS)	QUIZ (5 MARKS)	VIVA (10 MARKS)	TOTAL INTERNAL (50 MARKS)
EXPERIMENT (10 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)				

External Evaluation (50 marks)

The external evaluation would be done by the external faculty based on the experiment conducted during the examination.

Semester IV
SEMICONDUCTOR AND SOLID STATE DEVICES LAB

Course Code: BEC-451

L	T	P	C
0	0	4	2

LIST OF EXPERIMENTS

1. To determine the Low resistance by Carey Foster's bridge with calibration.
2. To determine the Impedance of an A.C. circuit and its verification.
3. To draw forward and reverse bias characteristics of a semiconductor diode.
4. To study the characteristics of Zener Diode voltage regulation.
5. To verify the inverse square law by photo-cell.
6. To study the characteristics of a solar cell.

7. To measure the Resistivity of a Ge Crystal with Temperature by Four-Probe Method

(from room temperature to 200° C) and to determine the Band Gap E_g for it.
8. To determine the Hall Coefficient and the Hall angle of a Semiconductor.
9. To study the PE Hysteresis loop of a Ferroelectric Crystal.
10. To measure the Magnetic susceptibility of Solids and Liquids.
11. To Measure the angle of dip by earth inductor.
12. To determine High resistance by substitution method.

Internal Evaluation (50 marks)

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 5 point scale which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation Scheme

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (30 MARKS)			ATTENDANCE (5 MARKS)	QUIZ (5 MARKS)	VIVA (10 MARKS)	TOTAL INTERNAL (50 MARKS)
EXPERIMENT (10 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)				

External Evaluation (50 marks)

The external evaluation would be done by the external faculty based on the experiment conducted during the examination.

Semester III/IV
FUNDAMENTALS OF COMPUTERS LAB

Course Code: BCS-351/BCS-451

L	T	P	C
0	0	4	2

1. Fundamentals of computer system, with its functional components.
2. Create a formatted WORD document.
3. Create a WORD document using different fonts.
4. Create a table & perform operations in it.
5. Create a WORD document, using the functions page set up, & page preview, and then print that document.
6. Implementation of Mail Merge.
7. Collect the information of any company & perform the below operation in it:
 - (a) Insert the data into Row/Column of Excel, worksheet
 - (b) Create a worksheet in Excel, perform alignment, text wrapping & sort the data.
8. Collect the information of any company & perform the below operation in it:
 - (a) Generate the graph in Excel.
 - (b) Create a Hyperlink to a word document.
- (e) Create a worksheet using the functions- page set up, print preview & then print the worksheet.
9. Create, save & print the power point presentation
10. Create a power point presentation using clipart, Word art gallery & then add transition & Animation effects.

Evaluation of Practical Examination:

Internal Evaluation (50 marks)

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 5 point scale (two for experiment, two for file work and one for viva) which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation scheme:

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (30 MARKS)			ATTENDANCE (5 MARKS)	QUIZ (5 MARKS)	VIVA (10 MARKS)	TOTAL INTERNAL (50 MARKS)
EXPERIMENT (10 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)				

External Evaluation (50 marks)

The external evaluation would be done by the external faculty based on the experiment conducted during the examination.

Semester III/IV
ENVIRONMENTAL SCIENCE LAB

Course Code: BAS-359/BAS-459

L	T	P	C
0	0	4	2

LIST OF EXPERIMENT

1. To determine total alkalinity in the given water sample.
2. To determine the temporary and permanent hardness in water sample.
3. To determine the pH of the given solution using pH meter.
4. To determine the turbidity in given water sample.
5. To determine the dissolved oxygen present in a water sample.
6. To determine the conductivity in water sample.
7. To determine the carbon-di-oxide content in polluted water sample.
8. To find chemical oxygen demand of waste water sample by potassium dichromate.
9. To determine the TDS and TSS in water sample.
10. To determine the noise level in ambient air.

Evaluation of Practical Examination:

Internal Evaluation (50 marks)

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 5 point scale(two for experiment, two for file work and one for viva) which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation scheme:

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (30 MARKS)			ATTENDANCE (5 MARKS)	QUIZ (5 MARKS)	VIVA (10 MARKS)	TOTAL INTERNAL (50 MARKS)
EXPERIMENT (10 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)				

External Evaluation (50 marks)

The external evaluation would be done by the external faculty based on the experiment conducted during the examination.

Semester II OSCILLATIONS & WAVE

Course Code: BAS-506

L	T	P	C
3	2	0	4

Unit I

(Lectures 08)

Oscillations SHM :- Simple Harmonic Oscillations. Differential Equation of SHM and its Solution.

Amplitude, Frequency, Time Period and Phase. Velocity and Acceleration. Kinetic, Potential and Total Energy and their Time Average Values. Reference Circle. Rotating Vector Representation of SHM.

Unit-II

(Lectures 08)

Free Oscillations of Systems with One Degree of Freedom :- (1) Mass-Spring system, (2) Simple

Pendulum, (3) Torsional Pendulum, (4) Oscillations in a U-Tube, (5) Compound pendulum: Centres of

Percussion and Oscillation, and (6) Bar Pendulum.

Unit-III

(Lectures 08)

Superposition of Two Collinear Harmonic Oscillations :- Linearity and Superposition Principle.

(1) Oscillations having Equal Frequencies and (2) Oscillations having Different Frequencies. Superposition of Two Mutually Perpendicular Simple Harmonic Motions with Frequency Ratios 1:1 and 1:2 .

Unit-IV

(Lectures 08)

System with Two Degrees of Freedom : Coupled Oscillators. Normal Coordinates and Normal Modes. Energy Relation and Energy Transfer. Normal Modes of N Coupled Oscillators. Free Oscillations. Damped Oscillations Transient and Steady States, Amplitude, Phase, Resonance, Power Dissipation and Quality Factor. Helmholtz Resonator.

Unit-V

(Lectures 08)

Wave Motion: Plane and Spherical Waves. Longitudinal and Transverse Wave Equation. Particle and

Wave Velocities. Velocity of Waves :- Velocity of Transverse Vibrations of Stretched Strings. Velocity

of Longitudinal Waves in a Fluid in a Pipe. Newton's Formula for Velocity of Sound. Laplace's Correction.

Text Books:

1. Vibrations and Waves by A. P. French.(CBS Pub. & Dist., 1987)

2. The Physics of Waves and Oscillations by N.K. Bajaj (Tata McGraw-Hill, 1988)

3. Fundamentals of Waves & Oscillations By K. Uno Ingard (Cambridge University Press, 1988)

Reference Books:

1. An Introduction to Mechanics by Daniel Kleppner, Robert J. Kolenkow

(McGraw-Hill, 1973)

2. Waves: BERKELEY PHYSICS COURSE (SIE) by Franks Crawford (Tata McGraw-Hill, 2007).

Semester V
STATISTICAL PHYSICS

Course Code: BAS-507

L	T	P	C
3	2	0	4

Unit-I

(Lectures 08)

Classical Statistics : Entropy and Thermodynamic Probability. Maxwell-Boltzmann Distribution

Law. Ensemble Concept. Partition Function. Thermodynamic Functions of Finite Number of Energy Levels. Negative Temperature. Thermodynamic Functions of an Ideal Gas. Classical Entropy Expression, Gibbs Paradox. Law of Equipartition of Energy – Applications to Specific Heat and its Limitations.

Unit-II

(Lectures 08)

Classical Theory of Radiation: Properties of Thermal Radiation. Blackbody Radiation. Pure

Temperature Dependence. Kirchhoff's Law. Stefan-Boltzmann Law and Wien's Displacement law.

Saha's Ionization Formula.

Unit-III

(Lectures 08)

Quantum Theory of Radiation: Radiation :- Stefan-Boltzmann Law: Thermodynamic Proof.

Radiation Pressure. Spectral Distribution of Black Body Radiation. Wien's Distribution Law and Displacement Law.

Planck's Quantum Postulates. Planck's Law of Blackbody Radiation .

Unit-IV

(Lectures 08)

Bose-Einstein Statistics : B-E distribution law. Thermodynamic functions of a Completely

Degenerate Bose Gas. Bose-Einstein condensation, properties of liquid He (qualitative description).

Radiation as photon gas. Bose's derivation of Planck's law.

Unit-V

(Lectures 08)

Fermi-Dirac Statistics : Fermi-Dirac Distribution Law. Thermodynamic functions of an ideal

Completely Degenerate Fermi Gas. Fermi Energy. Electron gas in a Metal. Specific Heat of Metals. White Dwarf Stars. Chandrasekhar Mass Limit.

Text Books:

1. Statistical Physics : Berkeley Physics Course Volume 5 by F Reif (Tata

McGraw-Hill Company Ltd, 2008)

2. Statistical and Thermal Physics: an introduction by S.Lokanathan and R.S.Gambhir.
(P.H.I., 1991).

Reference Books:

1. Statistical Mechanics by R. K. Patharia.(Oxford: Butterworth, 1996).

2. Statistical Mechanics by K. Huang (Wiley, 1987.)

3. Statistical Mechanics by Eyring Eyring Eyring

Semester V
NUCLEAR & PARTICLE PHYSICS

Course Code: BAS-508

L	T	P	C
3	2	0	4

Unit-I **(Lectures 08)**

Properties of Nuclei and Models: Introduction to the nucleus, Fermi gas model, Binding energy, Bethe-Weizsaecker mass formula and its application to explain most stable isobars and nuclear fission, Inferences of nuclear size from elastic electron-nucleus experiments (no derivation).

Unit-II **(Lectures 08)**

Nuclear Force and Two-nucleon System: Properties of nucleon-nucleon interaction, General forms of N-N potential, Description of low energy neutron-proton scattering to show the spin dependence of nuclear force, Ground state properties of deuteron, Simple consideration of deuteron using central potential (square well).

Unit-III **(Lectures 08)**

Nuclear Stability: Nucleon emission, separation energy, Alpha decay and its energy spectrum, Q-value, Gamow's theory of alpha decay (no derivation), Beta decay and its energy spectrum (for example, ^{137}Cs), Need for neutrinos, Q-value for beta decay, Gamma decay, Selection rules for gamma transitions (no derivation).

Unit-IV **(Lectures 08)**

Accelerators and Detectors: Van de Graaff and Linear accelerators, Synchrotrons, Geiger Muller detector, Scintillation detector.

Unit-V **(Lectures 08)**

Elementary Particles: Classification of particles and their interactions, Quantum numbers, Quarks as the building blocks of hadrons, colour degree of freedom.

Text Books:

1. Introductory Nuclear Physics: S. S. M. Wong.
2. Nuclear Physics: V. Devanathan.

Reference Books:

1. Concepts of Nuclear Physics: B. L. Cohen.
2. Fundamentals of Nuclear Physics: B. B. Srivastava.
3. Introduction to Nuclear Physics: H. A. Enge.

Semester V
ELECTRONICS DEVICES & CIRCUIT THEORY

Course Code: BEC 512

L	T	P	C
3	2	0	4

Unit-I

(Lectures 08)

Circuit Analysis :- Kirchhoff's Laws, Mesh and Node Analysis of dc and ac Circuits, Duality in

Networks, Equivalent Star (T) and delta (π) Networks of a Given Network, Star to Delta and Delta to Star Conversion; Wheatstone Bridge and its Applications to Wein Bridge and Anderson Bridge.

Unit-II

(Lectures 08)

Semiconductor Diodes :- p and n Type Semiconductors. Energy Level Diagram. Conductivity and Mobility. pn Junction Fabrication (Simple Idea). Barrier Formation in pn Junction Diode. Current Flow Mechanism in Forward and Reverse Biased Diode (Recombination, Drift and Saturation of Drift Velocity). Barrier Potential, Barrier Width and Current for Step Junction. pn junction and its characteristics. Static and Dynamic Resistance. Diode Equivalent Circuit. Ideal Diode. Load Line

Analysis of Diodes. Load Line and Q-point.

Unit-III

(Lectures 08)

Two-terminal Devices and their Applications: (1) Rectifier Diode. Half-wave Rectifiers.

Centre-tapped and Bridge Full-wave Rectifiers Calculation of Ripple Factor and Rectification

Efficiency. (2) Zener Diode and Voltage Regulation. (3) Photo Diode, (4) Tunnel Diode, (5) LED (6) Varactor Diode. Mechanism of Current Flow. Active, Cutoff, and Saturation Regions.

Unit-IV

(Lectures 08)

Amplifiers : – Transistor Biasing and Stabilization Circuits. Fixed Bias and Voltage Divider Bias.

Input and Output Impedance. Current, Resistance, Voltage and Power Gains. Coupled Amplifiers :-

RC-Coupled Amplifier and its Frequency Response of Voltage Gain. Feedback in Amplifiers, Input

Impedance, Output Impedance and Gain, Stability, Distortion and Noise.

Unit-V

(Lectures 08)

Three-terminal Devices (UJT and FETs):- (1) UJT : Its Characteristics and Equivalent Circuit. Relaxation Oscillator, (2) JFET : Its Characteristics and Equivalent Circuit. Advantages of JFET. MOSFET Modulation and Demodulation:- Types of Modulation. Amplitude Modulation. Modulation and Digital Modulation.

Text Books:

1. Robert Boylestad, Louis Nashelsky, Electronic Devices and Circuit Theory, 8Th Edition, Pearson Education, India, 2004 .
2. A. P. Malvino, Electronic Principals, Glencoe, 1993.
3. John Morris, Analog Electronics.

Reference Books:

1. Allen Mottershead, Electronic Circuits and Devices, PHI, 1997.
2. Solid state electronic devices By Ben G. Streetman & Sanjay Banerjee, Pearson Prentice Hall, 2006.
3. Basic Electronics & Linear Circuits By N. N. Bhargava, D. C. Kulshreshtha & SC Gupta, Tata McGrawHill, 2006

Semester V MATERIAL SCIENCE

Course Code: BME501

L	T	P	C
3	2	0	4

Unit-I

(Lectures 08)

Internal Structure of Materials: Atomic basis of structure – ionic bonding, Covalent bonding, Metallic bonding, Secondary bonding. Crystalline and non-crystalline states, Crystal symmetry, Metal Structures, Ionic and Covalent Structures, *Silica and silicates*, Polymers, Fullerenes, Experimental methods for *structural determination*: x-ray and neutron diffraction.

Unit-II

(Lectures 08)

Crystal Imperfections: Point, line, surface and volume imperfections, dislocations and their geometry, Disorder in polymers and non-crystalline materials.

Unit-III

(Lectures 08)

Phase Diagrams: Phase rule, Single component systems, Binary phase diagrams, *Lever rule*, phases in polymers, non-crystalline and crystalline phases. Non-equilibrium in phase diagrams, Cu-Zn system, Fe- C alloys, Ceramic Systems, Other applications of phase diagrams.

Unit-IV

(Lectures 08)

Phase Transformations: Time scale for phase changes, Nucleation kinetics, Growth of nuclei and solidification of alloys, Transformations in steel, Precipitation processes, Glass Transition; Recovery, re-crystallization and grain growth.

Unit-V

(Lectures 08)

Elastic Properties: Elastic behaviour and its atomic model, Rubber like elasticity, inelastic behaviour, Relaxation processes, Visco-elastic behaviour, and spring dash pot model, Plastic deformation.

Text Books:

1. Introduction to Solid State Physics : C. Kittel (Wiley, VII ed.)
2. Introduction to Solids : L.V. Azaroff (Tata McGraw Hill)
3. Solid State Physics : A.J. Dekker (Prentice-Hall)

Reference Books:

1. Essentials of Materials Science: A.G. Guy (McGraw Hill)
2. Materials Science and Engineering: V. Raghvan (Prentice Hall)
3. Elements of Materials Science and Engineering: L.H. Van Vlack (Addison- Wesley).

Semester V
‘C’ PROGRAMMING

Course Code: BCS-501

L	T	P	C
2	1	0	2

Unit I **(Lectures 08)**

Elementary data types: Definitions, data, data types, integer, character, float, string, etc., constants and variables. Declaration, statement, integer, constant, variable, integer, expression, assignment, Boolean type, tokens, keywords, identifiers.

Unit II **(Lectures 08)**

Control Structure: While statement, if statement, else statement. Nested logic: for loop, do- while loop, loop inside a loop structure, operators and expressions.

Unit III **(Lectures 08)**

Arrays and Strings: declaration, initialization. String handling: comparison, concatenation, copy, finding length of string

Unit IV **(Lectures 08)**

Sequence Control: user defined functions, library functions.

Functions: Definition, declaration, returns values and their types. Function calls. Recursion, pointers

Unit V **(Lectures 08)**

Structure data type: Structures and union, enumerations. File and file structure: opening, closing, input/output operations on file.

Text Books

1. Balaguru Swamy E., *Programming with ANSI C*, TMH Publications.
2. Yashwant Kantikar, *Let Us C*, BPB Publications.

Reference Book

1. John Pratt, *Principle of Programming Languages*, PHI Publications.

Semester-V TECHNICAL WRITING

Course code: BHM501

(Common with EHM 501/BPH506)

L	T	P	C
2	0	2	3

Course Contents:

Unit I

Forms of Technical Communication: Report writing, Definition and characteristics, Steps towards report writing, Structure, style of Report writing, Types & forms of Reports, Presentation of Reports, Importance of Report writing. **(10 Hours)**

Unit II

Technical Paper writing: Definition and purpose, Essentials of a good technical paper/Article, Scientific Article writing, Difference between Technical paper/Article and scientific article, Methods of writing technical paper & Scientific article. **(10 Hours)**

Unit III

Technical Proposal: Definition and meaning of Technical Proposal, Significance of Proposal, Characteristics of a good Proposal, Format of Proposal, Uses of Proposals. **(10 Hours)**

Unit IV

Writing Skills: Reporting events, Writing newspaper reports, Essentials of essay writing –writing an essay of about 300 words on a given topic. Bio-Data Making, Writing of CV & Resumes, Difference between CV and Resume, Writing Job application etc. **(10 Hours)**

Text Books:

1. Raman Meenakshi & Sharma Sangeeta, *Technical Communication-Principles & Practice* – O.U.P. New Delhi. 2007.

Reference Books:

1. Monippally Matthukutty M., *Business Communication Strategies* – Tata- Mc Graw Hill Publications Company, New Delhi.
2. Mohan K. & Sharma R.C., *Business Correspondence of Report Writing* –TMH, New Delhi.

NOTE:

This syllabus has been designed to improve the oral and written communication skills of students. The faculty members should put emphasis on practical (oral) activities for generating students' interest in language learning.

*** Latest editions of all the suggested books are recommended.**

Semester V
OSCILLATIONS & WAVE LAB

Course code: BAS-556

L	T	P	C
0	0	4	2

LIST OF EXPERIMENTS

1. To measure the (a) Area of a window
(b) Height of an inaccessible object.
2. To determine Refractive index and dispersive power of a prism material by spectrometer.
3. To draw a graph between wave length and minimum deviation for various lines from a Mercury discharge source.
4. To determine wavelength of sodium light and the number of lines per centimeter using a diffraction grating.
5. To determine wavelength by Newton's Rings.
6. To determine Resolving power of a telescope.
7. To Compare Illuminating Powers by a Photometer.
8. To Measure the (a) Specific rotation (b) concentration of sugar solution using polarimeter.
9. To determine ordinary and extra ordinary refractive indices for calcite or quartz crystal.
10. To find the equivalent focal length of a lens system by nodal slide assembly.

Evaluation of Practical Examination:

Internal Evaluation (50 marks)

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 5 point scale (two for experiment, two for file work and one for viva) which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation scheme:

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (30 MARKS)			ATTENDANCE (5 MARKS)	QUIZ (5 MARKS)	VIVA (10 MARKS)	TOTAL INTERNAL (50 MARKS)
EXPERIMENT (10 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)				

External Evaluation (50 marks)

The external evaluation would be done by the external faculty based on the experiment conducted during the examination.

Semester V
ELECTRONICS DEVICES & CIRCUIT THEORY LAB

Course code: BEC-551

L	T	P	C
0	0	4	2

LIST OF EXPERIMENTS

Note : Select any ten experiments from the following list

1. To verify the Thevenin, Norton, Superposition, and Maximum Power Transfer Theorem
2. To measure the Input and Output Impedance of an Unknown Network and to convert it into Equivalent T and π Circuits.
- 3 . To study (a) Half-wave Rectifier and (b) Full-wave Bridge Rectifier and investigate the effect of C, L and π filters.
- 4 . To design a Semiconductor Power Supply of given rating using (a) Half wave, (b) Full wave or (c) Bridge rectifier and investigate the effect of C-filter.
5. To study the Forward and Reverse characteristics of a Zener Diode and to study its use as a Voltage Regulator.
6. To investigate simple regulation and stabilization circuits using Voltage Regulator ICs.
7. To determine the Characteristics of p-n junction of a Solar Cell.
8. To study the Characteristics of a Photo-diode.
9. To determine the Coupling Coefficient of a Piezoelectric crystal.
- 10.To study the CE Characteristics of a Transistor.
11. To study the various Transistor Biasing Configurations.
12. To design a CE Amplifier of a given gain (mid-gain) using Voltage Divider Bias.
- 13.To study the Frequency Response of Voltage Gain of a RC-Coupled Amplifier.
- 14.To design an Oscillator of given specifications using Transistors.
15. To study the Characteristics of a FET and design a common source amplifier.

Evaluation of Practical Examination:

Internal Evaluation (50 marks)

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 5 point scale (two for experiment, two for file work and one for viva) which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation scheme:

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (30 MARKS)			ATTENDANCE (5 MARKS)	QUIZ (5 MARKS)	VIVA (10 MARKS)	TOTAL INTERNAL (50 MARKS)
EXPERIMENT (10 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)				

External Evaluation (50 marks)

The external evaluation would be done by the external faculty based on the experiment conducted during the examination.

Semester V
MATERIAL SCIENCE LAB

Course code: BME-551

L	T	P	C
0	0	4	2

LIST OF EXPERIMENTS

Note : Select any ten experiments from the following list

1. Determination of energy band gap.
2. Determination of elastic constants – Hyperbolic fringes.
3. Determination of elastic constants – Elliptical fringes.
4. Determination of dielectric constant.
5. To determine the velocity of Ultrasonic in liquids.
6. To Study the crystal lattices.
7. Strain gauge meter – Determination of Young's modulus of a metallic wire.
9. To determine the Conductivity of ionic crystals.
10. To study regulated power supply.
11. To study the characteristics and applications of Operational amplifier.
12. To study RC Phase Shift Oscillator (FET)

Evaluation of Practical Examination:

Internal Evaluation (50 marks)

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 5 point scale (two for experiment, two for file work and one for viva) which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation scheme:

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (30 MARKS)			ATTENDANCE (5 MARKS)	QUIZ (5 MARKS)	VIVA (10 MARKS)	TOTAL INTERNAL (50 MARKS)
EXPERIMENT (10 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)				

External Evaluation (50 marks)

The external evaluation would be done by the external faculty based on the experiment conducted during the examination.

Semester V
‘C’ PROGRAMMING LAB

Course code: BCS-551

L	T	P	C
0	0	4	2

LIST OF EXPERIMENTS

1. Write a Program (WAP) to calculate Sum & average of N numbers.
2. WAP to convert integer arithmetic to a given number of day and month.
3. WAP to find maximum and minimum out of 3 numbers a, b & c.
4. WAP to find factorial of positive integer.
5. WAP to find sum of series up to n number, $2+5+8+\dots+n$.
6. WAP to print all the number between 1 to 100 which are dividing by 7.
7. WAP to generate Fibonacci series up to n.
8. Write a function to calculate area of circle.
9. Write a recursive function to calculate factorial of given number.
10. WAP to find whether number is prime or not.
11. WAP to find that the enter character is a letter or digit.
12. WAP to find addition of two matrix of $n \times n$ order.
13. WAP to find multiplication of two matrix of $n \times n$ order.
14. WAP to add 6 digit numbers in even case & multiple 6 digit number in odd case.
15. WAP to find even or odd up to a given limit n.
16. WAP to find whether a given no is palindrome or not.
17. WAP to joining & Comparing the 2 string.

Evaluation of Practical Examination:

Internal Evaluation (50 marks)

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 5 point scale (two for experiment, two for file work and one for viva) which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation scheme:

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (30 MARKS)			ATTENDANCE (5 MARKS)	QUIZ (5 MARKS)	VIVA (10 MARKS)	TOTAL INTERNAL (50 MARKS)
EXPERIMENT (10 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)				

External Evaluation (50 marks)

The external evaluation would be done by the external faculty based on the experiment conducted during the examination.

Semester VI
LASER & MICROSCOPIC TECHNIQUES

Course code: BAS606

L	T	P	C
3	2	0	4

Unit-I

(Lectures 08)

Principle of Lasers, Einstein coefficients, ratio of rates of stimulated and spontaneous emission – Threshold condition for laser action – Small signal gains of a laser – Population inversion in three level and four level systems

Unit-II

(Lectures 08)

Optical Resonators: Resonant cavities, resonator modes, spot size – Types of resonators, **Laser Systems:** Gas lasers: He-Ne laser, Carbondioxide gas laser, Nitrogen gas laser, Argon ion gas laser; **Solid state lasers:** Ruby laser, Nd-YAG laser, Semiconductor Laser– Liquid Lasers: Dye lasers & Laser Applications.

Unit-III

(Lectures 08)

Thermal Analysis Introduction – thermogravimetric analysis (TGA) – instrumentation – determination of weight loss and decomposition products – differential thermal analysis (DTA)-cooling curves differential scanning calorimetry (DSC) – instrumentation – specific heat capacity measurements determination of thermomechanical parameters .

Unit-IV

(Lectures 08)

Microscopic Methods: Optical Microscopy: optical microscopy techniques – Bright field optical microscopy – Dark field optical microscopy – Dispersion staining microscopy - phase contrast microscopy - differential interference contrast microscopy - fluorescence microscopy - confocal microscopy - scanning probe microscopy (STM, AFM) - scanning new field optical microscopy - digital holographic microscopy - oil immersion objectives - quantitative metallography - image analyzer.

Unit-V

(Lectures 08)

Electron Microscopy & Optical Characterization SEM, EDAX, EPMA, TEM: construction and working principle, Instrumentation – sample preparation – data collection, processing and analysis- Photoluminescence – light – matter interaction – instrumentation – electroluminescence – instrumentation – Applications.

Text Books:

1. Stradling, R.A; Klipstain, P.C; Growth and Characterization of semiconductors, Adam Hilger, Bristol,1990.
2. Belk, J.A; Electron microscopy and microanalysis of crystalline materials, Applied Science Publishers, London, 1979.

Reference Books:

1. Lawrence E.Murr, Electron and Ion microscopy and Microanalysis principles and Applications, Marcel Dekker Inc., New York, 1991
2. D.Kealey & P.J.Haines, Analytical Chemistry, Viva Books Private Limited, New Delhi 2002.

Semester VI
CONDENSE MATTER PHYSICS

Course code: BAS 607

L	T	P	C
3	2	0	4

Unit-I

(Lectures 08)

Solids and Crystal Structure : General definitions of Lattice, basis and primitive cell, Symmetry operations, Bravais lattices in two and three dimensions, Index system for crystal planes, resume of common lattice types (sc, fcc, bcc, hcp, diamond, NaCl, CsCl & Zns structures), fcc & hcp structures as stacking*, Structures of insulators and metals*, radius ratio rules and Pauling's principles*

Unit-II

(Lectures 08)

Reciprocal Lattice and X-ray Diffraction : Reciprocal Lattice, *Miller indices*, Brillouin zone of sc, fcc and bcc lattices, Experimental diffraction methods, Bragg diffraction, scattered wave amplitude: atomic form factor, structure factor of simple structures (sc, fcc, cc, hcp, diamond, NaCl, CsCl & Zns), Neutron and electron diffraction methods, temperature dependence of reflection lines.

Unit-III

(Lectures 08)

Crystal Binding: Cohesive energy and bulk modulus in inert gas and ionic crystal, binding in metallic, covalent and H-bonded crystals (basic ideas only).

Unit-IV

(Lectures 08)

Lattice Vibrations : Dynamics of monatomic and diatomic linear chains, optical and acoustic modes, concept of phonons, inelastic scattering of photons and neutrons by phonons, density of states (one & three dimensions) Einstein and Debye models of heat capacity, thermal expansion

Unit-V

(Lectures 08)

Free Electron Fermi Gas: Review of statistical mechanics of Fermi Gas of non- interacting electrons, heat capacity of electron gas, electrical conductivity, Ohm's Law, Hall Effect, thermal conductivity and Pauli Paramagnetism.

Band Theory: Bloch functions, Kronig-Penney model, Qualitative ideas of bands in metals, semi-metals, semiconductors and insulators, Fermi surface-basic idea with square lattice as an example.

Text Books:

1. Principle of condensed matter physics, by P. M. Chaikin and T.C Lubensky. Cambridge University Press.
2. Condensed Matter Physics by M.P Marder. Wiley & Sons.

Reference Books:

1. Condensed Matter in Nutshell by G. D. Mahen, Princeton.
2. Introduction to Condensed Matter Physics by K. C. Barua. Narosa.

Semester VI
INTRODUCTION TO NANO SCIENCE & TECHNOLOGY

Course code: BAS 608

L	T	P	C
3	2	0	4

Unit-I

(Lectures 08)

NANOSCALE SYSTEMS: Length, energy, and time scales - Quantum confinement of electrons in semiconductor nanostructures: Quantum confinement in 3D, 2D, 1D and zero dimensional structures -Size effect and properties of nanostructures- Landauer-Buttiker formalism for conduction in confined geometries - Top down and Bottom up approach.

Unit-II

(Lectures 08)

QUANTUM DOTS: Excitons and excitonic Bohr radius – difference between nanoparticles and quantum dots - Preparation through colloidal methods - Epitaxial methods- MOCVD and MBE growth of quantum dots - current-voltage characteristics - magneto tunneling measurements - spectroscopy of Quantum Dots: Absorption and emission spectra - photo luminescence spectrum - optical spectroscopy - linear and nonlinear optical spectroscopy.

Unit-III

(Lectures 08)

SYNTHESIS OF NANOSTRUCTURE MATERIALS: Gas phase condensation – Vacuum deposition -Physical vapor deposition (PVD) - chemical vapor deposition (CVD) – laser ablation- Sol-Gel- Ball milling –Electro deposition- electroless deposition – spray pyrolysis – plasma based synthesis process (PSP) - hydrothermal synthesis.

Unit-IV

(Lectures 08)

CHARACTERIZATION: Principle and working of Atomic Force Microscopy (AFM) and Scanning tunneling microscopy (STM) - near-field Scanning Optical Microscopy – Principle of Transmission Electron Microscopy (TEM) – applications to nanostructures – nanomechanical characterization – nanoindentation

Unit-V

(Lectures 08)

NANOTECHNOLOGY APPLICATIONS: Applications of nanoparticles, quantum dots, nanotubes and nanowires for nanodevice fabrication – Single electron transistors, coulomb blockade effects in ultra-small metallic tunnel junctions - nanoparticles based solar cells and quantum dots based white LEDs – CNT based transistors – principle of dip pen lithography.

Text Books :

1. Hand book of Nanoscience, Engineering and Technology (The Electrical Engineering handbook series), Kluwer Publishers, 2002
2. “Sol-Gel Science”, C.J. Brinker and G.W. Scherrer, Academic Press, Boston (1994).
3. Nanoscale characterization of surfaces & interfaces, N John Dinardo, Weinheim Cambridge: Wiley-VCH, 2nd ed., 2000.

REFERENCES:

1. “Nanotechnology” G. Timp. Editor, AIP press, Springer-Verlag, New York, 1999
2. “Nanostructured materials and nanotechnology”, Concise Edition, Editor:-Hari Singh Nalwa; Academic Press, USA (2002).
3. “Hand book of Nanostructured Materials and Technology”, Vol.1-5, Editor:- Hari Singh Nalwa; Academic Press, USA (2000).

Semester VI

MICROPROCESSOR & COMPUTER PROGRAMMING

Course code: BEC 601

L	T	P	C
3	2	0	4

Unit-I

(Lectures 08)

Microprocessor: Define and calling macros, passing values to the compiler.

File handling: File concepts, file handling in c, file operations, file modes and its purposes, standard dos devices. Hexadecimal Number System and Arithmetic. Computer Organization. Input / Output Devices. Data Storage. Computer Memory. Memory Organization and Addressing. Memory Interfacing. Memory Map.

Intel 8085 Microprocessor Architecture: Main Features of 8085. Block Diagram. Components.

Pin-out Diagram. Buses. Registers. ALU. Memory. Stack Memory. Interfacing Devices. Timing and Control Circuitry .

Unit-II

(Lectures 08)

8085 Instructions :- Instructions. Machine Language. Assembly Language. Instruction Set and

Format. Data Transfer, Arithmetic, Logical, Branching and Machine Control Operations. RIM and SIM. Addressing Modes : Register, Implied, Immediate, Direct and Indirect. Microprocessor

Programming :- Algorithm and Flowcharts. Simple programming Exercises : Addition, Subtraction,

Multiplication and Division - Both 8 and 16 bit etc.

Unit-III

(Lectures 08)

C & C++ Programming Languages: Basic Components of Computer Systems. Types of

Computer Systems. Types of Operating Systems. Introduction to Programming :- Algorithms:

Sequence, Selection and Repetition. Structured Programming. Basic Idea of Compilers. Data

and Statements :- Data Types. Enumerated Data. Conversion and Casting. Constants and

Variables.

Unit-IV

(Lectures 08)

Mathematical, Relational, Logical and Bitwise Operators. Precedence of Operators. Expressions and Statements. Scope and Visibility of Data. Block, Local and Global variables. Auto, Static and

External Variables. I/O Statements :- printf, scanf, getc, getch, getchar, getche, etc. Streams : cin and

cout. Manipulators for Data Formatting: setw, width, endl and setprecision etc. Ascii Files I/O.

Unit V

(Lectures 08)

Arrays: Notation and representation, manipulating array elements, using multidimensional arrays.

Structure: Structure representation, purpose and usages of structure. Declaring structure, assigning of structure. **Pointer:** pointer representation, address arithmetic, pointer operations and declaration, using pointer as function arguments.

Text Books:

1. Karnitkar Yashwant, *Let Us "C"*, BPB Publications.
2. *Programming in ANSI "C"*, TMH Publications.

Reference Book

1. Balaguru Swamy E., *Computer Concept and Programming in C*, TMH Publications.

Semester VI
ELECTRO MAGNETIC FIELD THEORY

Course code: BEC 602

L	T	P	C
3	2	0	4

Unit-I

(Lectures 08)

Maxwell's Equations Displacement Current. Vector and Scalar Potentials. Gauge Transformations: Lorentz and Coulomb Gauge. Boundary Conditions at Interface between Different Media. Wave Equations. Plane Waves in Dielectric Media. Poynting Theorem and Poynting Vector.

Unit-II

(Lectures 08)

Reflection and Refraction of Electromagnetic Waves Reflection and Refraction of a Plane Wave at a Plane Interface between Dielectrics. Fresnel Formulae. Total Internal Reflection. Brewster's Angle. Waves in Conducting Media & Dielectric media Maxwell's Equations in Microscopic Media (Plasma).

Unit-III

(Lectures 08)

Polarization of Electromagnetic Waves Description of Linear, Circular and Elliptical Polarization. Propagation of e.m. Waves in Anisotropic Media. Symmetric Nature of Dielectric Tensor. Fresnel's Formula. Uniaxial and Biaxial Crystals.

Unit-IV

(Lectures 08)

Rotatory Polarization:- Optical Rotation. Biot's Laws for Rotatory Polarization. Fresnel's Theory of

Optical Rotation. Calculation of Angle of Rotation. Experimental Verification of Fresnel's Theory.

Specific Rotation. Laurent's Half-Shade Polarimeter.

Unit-V

(Lectures 08)

Wave Guides : Planar Optical Wave Guides. Planar Dielectric Wave Guide. Condition of Continuity at Interface. Phase Shift on Total Reflection. Einenvale Equations. Phase and Group Velocity of the Guided Waves. Field Energy and Power Transmission.

Text Books:

1. Introduction to Electrodynamics by A.Z.Capri & P.V.Panat.(New Delhi: Narosa Pub.House, 2002).
2. Electromagnetics by Joseph A.Edminister 2nd ed.(New Delhi: Tata Mc Graw Hill, 2006).
3. Fundamentals of electromagnetics by M.A.W.Miah.(Tata Mc Graw Hill,1992)

Reference Books:

1. Applied electromagnetism By Liang Chi Shen, Jin Au Kong (PWS Pub. Co., 1995)
2. David J. Griffiths, Introduction to Electrodynamics, 3rd edition, (Benjamin Cummings 1998).
3. J. D. Jackson, Classical Electrodynamics, 3rd edition, (Wiley, New York 1998)
4. M. Lifshitz and L. D. Landau, Classical Theory of Fields (Course of Theoretical Physics), 2nd Edition, (Pergamon Pr; 1981).

Semester-VI COMMUNICATION TECHNIQUE

Course code: BHM601

(Common with EHM601/BPH606/BBA603/BCA604/BCH606)

L	T	P	C
2	0	2	3

Course Contents:

Unit I

Oral Communication: Principles of effective oral communication, Features, Vitals of communication, Interpersonal communication, Persuasive communication. **(10 Hours)**

Unit II

Presentation Strategies: Purpose, Audience & Locale, Organizing contents, Preparing outlines. Audio- Visual aids, Body Language, Voice dynamics. **(10 Hours)**

Unit III

Listening Skills: The Listening process, Hearing & listening, Types of listening, Listening with a purpose, Barriers to listening, Telephonic conversation. **(10 Hours)**

Unit IV

Speaking Skills: Improving voice & speech, Art of public speaking, Using visual aids, Job interview being interviewed by the media, Dealing with the boss. Dealing with subordinates, How to run a meeting. **(10 Hours)**

Text Book:

1. Raman Meenakshi & Sharma Sangeeta, *Technical Communication-Principles & Practice* – O.U.P. New Delhi. 2007.

Reference Books:

1. Rutherford A., *Basic Communication Skills* – Pearson Education, New Delhi.
2. Mitra Barun K., *Effective Technical Communication* – O.U.P. New Delhi. 2006.

NOTE:

This syllabus has been designed to improve the oral and written communication skills of students. The faculty members should put emphasis on practical (oral) activities for generating students' interest in language learning.

* Latest editions of all the suggested books are recommended.

Semester VI
LASER & MICROSCOPIC TECHNIQUES LAB

Course code: BAS -656

L	T	P	C
0	0	4	2

LIST OF EXPERIMENTS

1. Density measurements – organic materials and polymers
2. NDT – Ultrasonic flaw detector
3. Resistivity measurements.
4. To study Faraday's effect.
5. X-ray powder method – Identification of unknown elements
6. X -ray powder method – indexing and cell determination
7. Charge density, atomic scattering factor calculations.
8. To study Kerr's effect.
9. Laser coherence and divergence measurement
10. To study Optical absorption – spectrophotometer
11. Identification of phases.
12. Preparation of buffer solutions and pH measurements.
13. Laser Raman - sample preparation, recording and analysis
14. FTIR studies - sample preparation, recording and analysis
15. Etch pattern of single crystals

Evaluation of Practical Examination: Internal Evaluation (50 marks) Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 5 point scale which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation Scheme

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (30 MARKS)			ATTENDANCE (5 MARKS)	QUIZ (5 MARKS)	VIVA (10 MARKS)	TOTAL INTERNAL (50 MARKS)
EXPERIMENT (10 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)				

External Evaluation (50 marks) The external evaluation would be done by the external faculty based on the experiment conducted during the examination.

Semester VI MICROPROCESSOR & COMPUTER PROGRAMMING LAB

Course code: BEC -651

L	T	P	C
0	0	4	2

Note: Minimum 10 experiments should be performed

Assembly Language Programming (using 8 bit processor).

1. Addition and Subtraction of Numbers using Direct Addressing Mode.
2. Addition and Subtraction of Numbers using Indirect Addressing Mode
3. Multiplication by Repeated Addition.
4. Division by Repeated Subtraction.

5. Handling of 16-bit Numbers.

6. Use of CALL and RETURN Instruction.
7. Block Data Handling.
8. Other Exercises (e.g. Parity Check etc.).

I. C & C++ Programming

1. To evaluate a Polynomial :-
 - a) Converting Temperature from Fahrenheit to Celsius,
 - b) Area of a Circle,
 - c) Volume of Sphere etc.
2. To find the Roots of a Quadratic Equation : Real and Distinct, Repeated and Imaginary.
3. To locate a Number in a Given List (linear search).
 - a) To find the Largest of Three Numbers.
 - b) To find the Largest Number in a Given List of Numbers.
 - c) To check whether a Given Number is a Prime Number.
 - d) To calculate the first 100 prime numbers.
4. To rearrange a List of Numbers in Ascending and Descending Order.
 - a) To calculate Factorial of a Number.
 - b) To calculate the first few Factorials.
5. Manipulation of Matrices
 - a) To Add and Subtract two Matrices.
 - b) To Multiply two Matrices.

Evaluation of Practical Examination:

Internal Evaluation (50 marks) Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 5 point scale which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation Scheme

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (30 MARKS)			ATTENDANCE (5 MARKS)	QUIZ (5 MARKS)	VIVA (10 MARKS)	TOTAL INTERNAL (50 MARKS)
EXPERIMENT (10 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)				

External Evaluation (50 marks)

The external evaluation would be done by the external faculty based on the experiment

conducted during the examination.

Semester VI SEMINAR

Course code: BAS699

L	T	P	C
0	0	4	2

Selection of Topic:

1. All students pursuing B.Sc. shall select and propose a topic of the seminar in the first week of the semester. Care should be taken that the topic selected is not directly related to the subjects of the course being pursued or thesis work, if any. The proposed topic should be submitted to the course coordinator.
2. The course coordinator shall forward the list of the topics to the coordinator of concerned department, who will consolidate the list including some more topics, in consultation with the faculty of the department. The topics will then be allocated to the students along with the name of the faculty guide and also forwarded to the director for approval.
3. On approval by the Director, the list shall be displayed on the notice board and the students will also be accordingly informed by the course coordinator within three weeks of the commencement of the semester.

Preparation of the Seminar

1. The student shall meet the guide for the necessary guidance for their preparation for the seminar.
2. During the next two to four weeks the student will read the primary literature related to the topic under the guidance of supervisor.
3. After necessary collection of data and literature survey, the students must prepare a report. The report shall be arranged in the sequence as per following format & lay out plan :-

- a. Top Sheet of transparent plastic.
- b. Top cover.
- c. Preliminary pages.
 - (i) Title page
 - (ii) Certification page.
 - (iii) Acknowledgment.
 - (iv) Abstract.
 - (v) Table of Content.
 - (vi) List of Figures and Tables.
 - (vii) Nomenclature.
 - d. Chapters (Main Material).
 - e. Appendices, If any.
 - f. Bibliography/ References.
 - g. Evaluation Form.
 - h. Back Cover (Blank sheet).
 - i. Back Sheet of Plastic (May be opaque or transparent).

1. **Top Cover-** The sample top cover shall be as Under:

TITLE OF THE SEMINAR

NAME OF THE STUDENT WITH COURSE, STREAM, SEMESTER & SECTION.

Department of Applied Science



**College of Engineering
Teerthanker Mahaveer University
Moradabad-244001
MONTH AND YEAR**

2. **Title Page:-** The Title Page cover shall be as Under

Title of the seminar

(Submitted in Partial fulfillment of the requirement for the degree of

BACHELOR OF SCIENCE in

Mathematics (Hons.)

by

Name of Student in capital Letters

(Roll No.)



COLLEGE OF ENGINEERING

TEERTHANKAR MAHAVEER UNIVERSITY

N.H. 24, BAGARPUR,

MORADABAD-244001

MONTH AND YEAR

3. **Certification page:-** This shall be as under

Department of Applied Science
College of Engineering
Teerthankar Mahaveer University
Moradabad-244001

The seminar Report and Title “Name of the Topic of the Seminar.” Submitted by Mr./Ms. (Name of the student) (Roll No.) may be accepted for being evaluated-

Date

Signature

Place

(Name of guide)

Note:

For Guide If you choose not to sign the acceptance certificate above, please indicate reasons for the same from amongst those given below:

- i) The amount of time and effort put in by the student is not sufficient;
- ii) The amount of work put in by the student is not adequate;
- iii) The report does not represent the actual work that was done / expected to be done;
- iv) Any other objection (Please elaborate)

4. **Abstract:-** A portion of the seminar grade will be based on the abstract. The abstract will be graded according to the adherence to accepted principles of English grammar and according to the adherence to the format described below.

The seminar abstract is an important record of the coverage of your topic and provides a valuable source of leading references for students and faculty alike. Accordingly, the abstract must serve as an introduction to your seminar topic. It will include the key hypotheses, the major scientific findings and a brief conclusion. **The abstract will be limited to 500 words, excluding figures, tables and references.** The abstract will include references to the research articles upon which the seminar is based as well as research articles that have served as key background material.

5. **Table of Content:-** This shall be as under

SAMPLE SHEET FOR TABLE OF CONTENTS

<u>TABLE OF CONTENTS</u>		
Chapter No	Title	Page No.
	Certificate	ii
	Abstract	iii
	Acknowledgement	iv
	List of Figures	v
	List of Table	vi
1	Introduction	1
	1.1	
	1.2	
	1.3	
2		
3		
4	References/ Bibliography	
5	Evaluation sheets	

6. List of Figures and Tables:- This will be as under

List of Figures and Tables - sample entries are given below:

List of Figures

Figure No.	Caption / Title	Page No.
2.1	Schematic representation of a double layered droplet	... 21
...		
3.2	Variation in rate versus concentration	... 32

List of Tables - sample entries are given below:

List of Tables

Table No.	Caption / Title	Page No.
2.1	Thickness of a double layered droplet	... 22
...		
3.2	Variation in rate versus concentration	... 34

12. Main Pages- The Main report should be divided in chapters (1, 2, 3 etc.) and structured into sections (1.1, 1.2 etc) and subsections (1.2.1, 1.2.2, ... etc). Suitable title should be given for sections and subsections, where necessary.

Referencing style- wherever reference is given in the main pages it should have the following format.

The values of thermal conductivities for a variety of substances have been reported by Varma (1982). For polymers, however, the information is more limited and some recent reviews have attempted to fill the gaps (Batchelor and Shah, 1985).

For two authors - (Batchelor and Kapur, 1985)

For more than two authors - (Batchelor et al., 1986)

By same author/combination of authors in the same year -

(Batchelor, 1978*a*; Batchelor, 1978*b*; Batchelor et al., 1978)

13. Bibliography/References- In the bibliography/ references list standard formats must be used. The typical formats are given blow-

Journal articles: -

David, A.B., Pandit, M.M. and Sinha, B.K., 1991, "Measurement of surface viscosity by tensiometric methods", Chem. Engng Sci.47, 931-945.

Books: -

Doraiswamy, L.K. and Sharma, M.M., 1984, "Heterogeneous Reactions- Vol 1", Wiley, New York, pp 89-90.

Edited books/Compilations/Handbooks: -

Patel, A.B., 1989, "Liquid -liquid dispersions", in Dispersed Systems Handbook, Hardy, L.C. and Jameson, P.B. (Eds.), McGraw Hill, Tokyo, pp 165-178.

Lynch, A.B. (Ed.), 1972, "Technical Writing", Prentice Hall, London.

Theses/Dissertations: -

Pradhan, S.S., 1992, "Hydrodynamic and mass transfer characteristics of packed extraction columns", Ph.D. Thesis, University of Manchester, Manchester, U.K..

Citations from abstracts: -

Lee, S. and Demlow, B.X., 1985, US Patent 5,657,543, *Cf C.A.* 56, 845674.

Personal Communications: -

Reddy, A.R., 1993, personal communication at private meeting on 22 October 1992 at Physics Department, Indian Institute of Technology, Delhi.

Electronic sources (web material and the like)- For citing web pages and electronic documents, use the APA style given at:

<http://www.apastyle.org/electsource.html>

14. **Evaluation Form:-** Three sheets of evaluation form should be attached in the report as under.

- a. Evaluation form for guide and other Internal Examiner.
- b. Evaluation form for external examiners.
- c. Summary Sheet.

15. **Evaluation form for Guide & Internal Examiners:-**

EVALUATION SHEET

(To be filled by the GUIDE & Internal Examiners only)

Name of Candidate :

Roll No :

Class and Section:

Please evaluate out of Five marks each.

S. No .	Details	Marks (5)	Marks (5)	Marks (5)
		Guide	Int. Exam. 1	Int. Exam. 2
1	OBJECTIVE IDENTIFIED & UNDERSTOOD			
2	LITERATURE REVIEW / BACKGROUND WORK (Coverage, Organization, Critical review)			
3	DISCUSSION/CONCLUSIONS (Clarity, Exhaustive)			
4	SLIDES/PRESENTATION SUBMITTED (Readable, Adequate)			
5	FREQUENCY OF INTERACTION (Timely submission, Interest shown, Depth, Attitude)			
	Total (Out of 25)			
	Average out of 50			

Signature:

Signature:

Signature:

Date:

Date:

Date:

EVALUATION SHEET FOR EXTERNAL EXAMINER

(To be filled by the External Examiner only)

Name of Candidate:

Roll No :

I. For use by **External Examiner ONLY**

Please evaluate out of Ten marks each.

S.No.	Details	Marks (10)
1	OBJECTIVE IDENTIFIED & UNDERSTOOD	
2	LITERATURE REVIEW / BACKGROUND WORK (Coverage, Organization, Critical review)	
3	DISCUSSION/CONCLUSIONS (Clarity, Exhaustive)	
4	POWER POINT PRESENTATION (Clear, Structured)	
5	SLIDES (Readable, Adequate)	
	Total (Out of 50)	

Signature:

Date:

EVALUATION SUMMARY SHEET

(To be filled by External Examiner)

Name and Roll No.	Internal Examiners (50)	External Examiner (50)	Total (100)	Result (Pass/Fail)

Note:- The summary sheet is to be completed for all students and the same shall also be compiled for all students examined by External Examiner. The Format shall be provided by the course coordinator.

16. General Points for the Seminar

1. The report should be typed on A4 sheet. The Paper should be of 70-90 GSM.
2. Each page should have minimum margins as under-
 - (i) Left 1.5 inches
 - (ii) Right 0.5 Inches
 - (iii) Top 1 Inch
 - (iv) Bottom 1 Inch (Excluding Footer, If any)
3. The printing should be only on one side of the paper
4. The font for normal text should Times New Roman, 14 size for text and 16 size for heading and should be typed in double space. The references may be printed in Italics or in a different fonts.
5. The Total Report should not exceed 50 pages including top cover and blank pages.
6. A CD of the report should be pasted/attached on the bottom page of the report.
7. Similarly a hard copy of the presentation (Two slide per page) should be attached along with the report and a soft copy be included in the CD.
8. Three copies completed in all respect as given above is to be submitted to the guide. One copy will be kept in departmental/University Library, One will be return to the student and third copy will be for the guide.
9. The power point presentation should not exceed 30 minutes which include 10 minutes for discussion/Viva

Study & Evaluation Scheme

Of

Bachelor of Science (Hons.) Chemistry

[Applicable w.e.f. Academic Year 2011-12]

[With amendments in Code 161/261/361/461 vide approval dated 5th Nov 2012]



TEERTHANKER MAHAVEER UNIVERSITY

N.H.-24, Delhi Road, Moradabad, Uttar Pradesh-244001

Website: www.tmu.ac.in



TEERTHANKER MAHAVEER UNIVERSITY

(Established under Govt. of U. P. Act No. 30, 2008)

Delhi Road, Bagarpur, Moradabad (U.P.)-244001

Study & Evaluation Scheme

Of

Bachelor of Science

SUMMARY

Programme	:	B.Sc. (Hons) Chemistry
Duration	:	Three year full time (Six Semesters)
Medium	:	English
Minimum Required Attendance	:	75 %
Credit	:	
Maximum Credit	:	166
Minimum credit required for the degree	:	162

Assessment- Theory

:

Internal	External	Total
30	70	100

Internal Evaluation
(Theory Papers)

Class Test I	Class Test II	Class Test III	Assignment(s)	Other Activity (including attendance)	Total
Best two out of the three					
10	10	10	5	5	40

Evaluation of Practical/Project Reports, Seminar & Professional Communication

:

Internal	External	Total
50	50	100

Duration of Examination

:

External	Internal
3 hrs.	1 ½ hrs

To qualify the course a student is required to secure a minimum of 40 marks in aggregate including the semester end examination and teachers continuous evaluation.(i.e. both internal and external).

A Candidate who secures less than 40% of marks in a course shall be deemed to have failed in that course. The student should have at least 50% marks in aggregate to clear the semester. In case a student has more than 40% in each course, but less than 50% overall in a semester, he/she shall re-appear in courses where the marks are less than 50% to achieve the required aggregate percentage (of 50%) in the semester.

Question Paper Structure

1. The question paper shall consist of eight questions. Out of which first question shall be of short answer type (not exceeding 50 words) and will be compulsory. Question No. 1 shall contain 8 parts representing all units of the syllabus and students shall have to answer any five (weightage 4 marks each).
2. Out of the remaining seven questions, student shall be required to attempt any five questions. There will be minimum one and maximum two questions from each unit of the syllabus. The weightage of question no.2 to 8 shall be 10 marks each.

Study & Evaluation Scheme
Programme: B.Sc. Hons. (Chemistry) - Regular

Semester I

S. No.	Course Code	Subject	Periods			Credit	Evaluation Scheme		
			L	T	P		Internal	External	Total
1	BAS124	Elementary Mathematics	3	2	-	4	30	70	100
2	BAS 101	Basics Physics-I	3	2	-	4	30	70	100
3	BAS121	Inorganic Chemistry-I	3	2	-	4	30	70	100
4	BAS 122	Organic Chemistry-I	3	2	-	4	30	70	100
5	BAS 123	Physical Chemistry-I	3	2	-	4	30	70	100
6	BHM 101	Foundation English-I	2	-	2	3	30	70	100
7	BAS 151	Basics Physics-I Lab	-	-	4	2	50	50	100
8	BAS 161	Inorganic & Organic Chemistry-I Lab	-	-	4	2	50	50	100
9	BAS 163	Physical Chemistry-I Lab	-	-	4	2	50	50	100
10	BGP101	Discipline & General Proficiency	-	-		1	100	-	100
		Total	17	10	14	30	430	570	1000

Semester II

S. No.	Course Code	Subject	Periods			Credit	Evaluation Scheme		
			L	T	P		Internal	External	Total
1	BAS 206	Basics Physics-II	3	2	-	4	30	70	100
2	BAS221	Inorganic Chemistry-II	3	2	-	4	30	70	100
3	BAS222	Organic Chemistry-II	3	2	-	4	30	70	100
4	BAS223	Physical Chemistry-II	3	2	-	4	30	70	100
5	BHM201	Foundation English-II	2	-	2	3	30	70	100
6	BAS256	Basic Physics-II Lab	-	-	4	2	50	50	100
7	BAS261	Inorganic & Organic Chemistry-II Lab	-	-	4	2	50	50	100
8	BAS263	Physical Chemistry-II Lab	-	-	4	2	50	50	100
9	BGP201	Discipline & General Proficiency	-			1	100	-	100
		Total	14	8	14	26	400	500	900

Semester III

S. No.	Subject Code	Subject	Periods			Credit	Evaluation Scheme		
			L	T	P		Internal	External	Total
1	BAS307	Inorganic Chemistry-III	3	2	-	4	30	70	100
2	BAS308	Organic Chemistry-III	3	2	-	4	30	70	100
3	BAS310	Physical Chemistry-III	3	2	-	4	30	70	100
4	BAS303	Basic Physics-III	3	2	-	4	30	70	100
5	BCS301	Fundamentals of Computers	3	2	-	4	30	70	100
	BAS309	Environmental Science							
6	BHM301	Professional Writing	2	-	2	3	30	70	100
7	BAS357	Inorganic &/Organic Chemistry-III Lab	-	-	4	2	50	50	100
8	BAS358	Physical Chemistry-III Lab	-	-	4	2	50	50	100
9	BCS351	Fundamentals of Computers Lab	-	-	4	2	50	50	100
	BAS359	Environmental Science Lab							
10	BGP301	Discipline & General Proficiency	-	-		1	100	-	100
		Total	17	10	14	30	430	570	1000

Semester IV

S. No.	Subject Code	Subject	Periods			Credit	Evaluation Scheme		
			L	T	P		Internal	External	Total
1	BAS408	Inorganic Chemistry-IV	3	2	-	4	30	70	100
2	BAS410	Organic Chemistry-IV	3	2	-	4	30	70	100
3	BAS411	Physical Chemistry-IV	3	2	-	4	30	70	100
4	BCS401	Fundamentals of Computers	3	2	-	4	30	70	100
	BAS409	Environmental Science							
5	BHM401	Technical Communication	2	-	2	3	30	70	100
6	BAS458	Inorganic & Organic Chemistry-IV Lab	-	-	4	2	50	50	100
7	BAS460	Physical Chemistry-IV Lab	-	-	4	2	50	50	100
8	BCS451	Fundamentals of Computers Lab	-	-	4	2	50	50	100
	BAS459	Environmental Science Lab							
9	BGP401	Discipline & General Proficiency	-	-		1	100	-	100
		Total	14	8	14	26	400	500	900

Semester V

S. No.	Subject Code	Subject	Periods			Credit	Evaluation Scheme		
			L	T	P		Internal	External	Total
1	BAS509	Inorganic Chemistry-V	3	2	-	4	30	70	100
2	BAS510	Organic Chemistry-V	3	2	-	4	30	70	100
3	BAS511	Physical Chemistry-V	3	2	-	4	30	70	100
4	BAS512	Analytical Chemistry	3	2	-	4	30	70	100
5	BHM 501	Technical Writing	2	-	2	3	30	70	100
6	BAS557	Inorganic Chemistry-V Lab	-	-	4	2	50	50	100
7	BAS558	Organic Chemistry-V Lab	-	-	4	2	50	50	100
8	BAS559	Physical Chemistry-V Lab	-	-	4	2	50	50	100
9	BGP 501	Discipline & General Proficiency	-	-		1	100	-	100
		Total	14	8	14	26	400	500	900

Semester VI

S. No.	Subject Code	Subject	Periods			Credit	Evaluation Scheme		
			L	T	P		Internal	External	Total
1	BAS609	Inorganic Chemistry-VI	3	2	-	4	30	70	100
2	BAS610	Organic Chemistry-VI	3	2	-	4	30	70	100
3	BAS611	Physical Chemistry-VI	3	2	-	4	30	70	100
4	BAS612	Industrial Chemistry	3	2	-	4	30	70	100
5	BHM 601	Communication Technique	2	-	2	3	30	70	100
6	BAS651	Inorganic Chemistry-VI Lab	-	-	4	2	50	50	100
7	BAS652	Organic Chemistry-VI Lab	-	-	4	2	50	50	100
8	BAS653	Physical Chemistry-VI Lab	-	-	4	2	50	50	100
9	BAS699	Seminar/Viva-voce			4	2	50	50	100
10	BGP601	Discipline & General Proficiency	-	-		1	100	-	100
		Total	14	8	18	28	450	550	1000

B.Sc. Chemistry (Hons.)
Semester I
ELEMENTARY MATHEMATICS

Course Code: BAS-124

L	T	P	C
3	2	0	4

Course Content:

Unit I

Series: A.P. and G.P.; n^{th} term, Sum to n term, Arithmetic Mean. Binomial theorem for positive, negative and fractional index (without proof). Application of binomial theorem.

(Lectures 08)

Unit II

Determinants: Elementary properties of determinants of order 2 and 3, Multiplication system of algebraic equations, Consistency of equation, Cramer's rule.

(Lectures 08)

Unit III

Vector Algebra: Dot and cross product of two vectors, Scalar and vector triple products. Work done, Moment of a force.

(Lectures 08)

Unit IV

Matrix: Definition of Matrix of order $m \times n$. Types of Matrix, Addition, Subtraction, Multiplication, inverse of Matrix, Elementary Row transformation method.

(Lectures 08)

Unit V

Statistics: Meaning of statistics, Measures of Central tendency. Mean, Median, Mode, Measures of Variation- Dispersion, Range, Quartile Deviation, Mean deviations.

(Lectures 08)

Text Books:

1. Sharma, R D, Applied Mathematics.
2. Grewal B S, Elementary Engineering Mathematics, Khanna Publication.

Reference Books

1. Gorakh Prasad, Differential & integral calculus
2. Mittal S C & Mittal, SK., Two Dimensional Coordinate, Pragati Prakashan, Meerut
3. Mittal S C & Mittal, SK., Three Dimensional Coordinate, Pragati Prakashan, Meerut

*** Latest editions of all the suggested books are recommended.**

Semester I

BASIC PHYSICS-I

Course Code: BAS-101

L	T	P	C
3	2	0	4

Course Content:

Unit I

Conservation of Energy and Linear Momentum Mechanics of a particle, work-energy theorem. Conservative and non-conservative forces and their examples. Conservation of force as negative gradient of potential energy. Center of mass of a system of particles. Conservation of linear momentum and energy. Systems of variable mass, single and multistage rockets. Elastic and inelastic collisions. **(Lectures 08)**

Unit II

Rotational Dynamics Rigid body motion. Rotation motion, torque and angular momentum. Moment of inertia and its calculations for disc, cylinder, spherical shell and solid sphere. Body rolling down on an inclined plane. Fly wheel, Motion of Top. **(Lectures 08)**

Unit III

Motion under Central Forces Concept of central force. Kepler's laws of planetary motion. Gravitational law, Gravitational Potential and fields due to spherical shell and solid sphere. Gravitational potential energy and escape velocity. Two particle central force problem and reduced mass. Motion of planets and satellites. **(Lectures 08)**

Unit IV

Properties of Matter

Elasticity, small deformations, Hooke's law, Elastic constants and relation among them. Beam supported at the ends, cantilever. Streamline and turbulent flow, equation of continuity, viscosity, Poiseuille's law critical velocity, Reynolds's number. Surface tension and surface energy, pressure on a curved liquid surface. **(Lectures 08)**

Unit V

Nuclear Physics

Nuclear Forces, Binding Energy, Liquid Drop Model, Fission, Nuclear Reactors, Fusion and Energy Processes in Stars, Controlled Thermonuclear Reactions. **(Lectures 08)**

Text Books:

1. "Mechanics", D S Mathur; Khanna Publications
2. "Mechanics", Goldstein; New Age Publications.

*** Latest editions of all the suggested books are recommended.**

Semester I

Inorganic Chemistry-I

Course Code: BAS-121

L	T	P	C
3	2	0	4

Course Content:

Unit I:

Atomic Structure

Bohr's theory, its limitations and atomic spectrum of hydrogen atom. Wave mechanics: de Broglie equation, Heisenberg's uncertainty principle and its significance, Schrodinger's wave equation, significance of ψ and ψ^2 . Quantum numbers and their significance. Shapes of *s*, *p*, *d* and *f* orbitals. (Lectures 08)

Unit II

Pauli's exclusion principle, Hund's rule of maximum multiplicity, Aufbau's principle and its limitations, Variation of orbital energy with atomic number. (Lectures 08)

Unit III

Classification of Elements based on their electronics structure

The long form of periodic table *s*, *p*, *d*, *f* block elements. Their position in periodic table and general properties related to their electronic structures. (Lectures 08)

Unit IV

Periodicity of Elements

Detailed discussion of the following properties of the elements, with reference to *s* & *p*-block.

- (a) Effective nuclear charge, shielding or screening effect, Slater rules, variation of effective nuclear charge in periodic table.
- (b) Atomic radii (Vander Waals)
- (c) Ionic and crystal radii.
- (d) Covalent radii (octahedral and tetrahedral)
- (e) Ionization enthalpy, Successive ionization enthalpies and factors affecting ionization energy. Applications of ionization enthalpy.
- (g) Electro negativity, Pauling's/ Mullikan's/ Electro negativity scales. (Lectures 08)

Unit V

Chemistry of Hydrogen, Hydrogen peroxide including manufacturing and structure, Heavy Hydrogen, Heavy water, ortho and Para Hydrogen. Hardness of water, removal of hardness, estimation of hardness of water. (Lectures 08)

Recommended Texts:

1. Lee, J.D. Concise Inorganic Chemistry, ELBS, 1991.
2. Douglas, B.E. and Mc Daniel, D.H., Concepts & Models of Inorganic Chemistry, Oxford, 1970
3. Atkins, P.W. & Paula, J. Physical Chemistry, Oxford Press, 2006.
4. Day, M.C. and Selbin, J. Theoretical Inorganic Chemistry, ACS Publications 1962.

*** Latest editions of all the suggested books are recommended.**

Semester I

Organic Chemistry-I

Course Code: BAS-122

L	T	P	C
3	2	0	4

Course Content:

Unit I

Basics of Organic Chemistry

Organic Compounds: Classification, and Nomenclature, Hybridization, Shapes of molecules, Influence of hybridization on bond properties. Electronic Displacements: Inductive, electromeric, resonance and mesomeric effects, hyperconjugation and their applications; Dipole moment. Homolytic and Heterolytic fission with suitable examples. Electrophiles and Nucleophiles; Nucleophilicity and basicity; Types, shape and their relative stability of Carbonations, Carbanions, Free radicals and Carbenes. Introduction to types of organic reactions and their mechanism: Addition, Elimination and Substitution reactions.

(Lectures 08)

Unit II

Stereochemistry

Fischer Projection, Newmann and Sawhorse Projection formulae and their interconversions; Geometrical isomerism: cis-trans and, syn-anti isomerism E/Z notations with C.I.P rules. Relative and absolute configuration: D/L and R/S designations.

(Lectures 08)

Unit III

Chemistry of Aliphatic Hydrocarbons

Carbon-Carbon sigma bonds

Chemistry of alkanes: Formation of alkanes, Wurtz Reaction, Wurtz- Fittig Reactions, Free radical substitutions: Halogenation - relative reactivity and selectivity.

(Lectures 08)

Unit IV

Carbon-Carbon pi bonds

Formation of alkenes and alkynes by elimination reactions, Mechanism of E1, E2, reactions. Saytzeff eliminations. Reactions of alkenes: Electrophilic additions, their mechanisms (Markownikoff/ Anti Markownikoff addition), mechanism of oxymercuration-demercuration, hydroboration- oxidation, ozonolysis, reduction (catalytic and chemical), syn and anti hydroxylation (oxidation).

(Lectures 08)

Unit V

Aromatic Hydrocarbons

Aromaticity: Huckel's rule, aromatic character of arenes, cyclic carbocations/carbanions and heterocyclic compounds with suitable examples. Electrophilic aromatic substitution: halogenation, nitration, sulphonation and Friedel-Craft's alkylation/acylation with their mechanism. Directing effects of the groups.

(Lectures 08)

Recommended Texts:

1. Morrison, R. N. & Boyd, R. N. *Organic Chemistry*, Dorling Kindersley (India) Pvt. Ltd. (Pearson Education).
2. Finar, I. L. *Organic Chemistry (Volume 1)*, Dorling Kindersley (India) Pvt. Ltd. (Pearson Education).
3. Finar, I. L. *Organic Chemistry (Volume 2: Stereochemistry and the Chemistry of Natural Products)*, Dorling Kindersley (India) Pvt. Ltd. (Pearson Education).
4. Eliel, E. L. & Wilen, S. H. *Stereochemistry of Organic Compounds*; Wiley: London, 1994.

*** Latest editions of all the suggested books are recommended.**

Semester I Physical Chemistry-I

Course Code: BAS-123

L	T	P	C
3	2	0	4

Course Content:

Unit I

Gaseous state: Deviation of real gases from the equation of state for an ideal gas, Vander Waals and Virial equation of state, critical phenomena, principle's of corresponding states, equation for reduced state, Liquefaction of gases, distribution of molecular speed, collisions between molecules in a gas, collision numbers, mean free path. **(Lectures 08)**

Unit II

Phase rule and its application: Equilibrium between liquid, solid and vapour of a pure substance, Clausius-Clapeyron equation and its applications. Number of components, phases and degrees of freedom, phase rule and its applications simple systems with one (water and sulphur) and two components (lead-silver, NaCl-H₂O), Distribution law, its modifications, limitations and application. **(Lectures 08)**

Unit III

First law of thermodynamics and their applications, thermodynamic system, states and processes work, heat and internal energy, zeroth law of thermodynamics, various types of work done on a system in reversible and irreversible process, Calorimetry and thermochemistry, enthalpy, changes in various physical and chemical process, second law of thermodynamics and its applications. **(Lectures 08)**

Unit IV

Absorption of light, laws of photochemistry quantum yield, the excited state and its decay by radioactive, nonradioactive and chemical pathways, simple photochemical reactions. **(Lectures 08)**

Unit V

Colloids, the colloidal state, preparation and purification of colloids and their characteristic properties, lyophilic and lyophobic colloids and coagulation, protection of colloids, gels, emulsions, surfactants and micelles. **(Lectures 08)**

Text Books:

1. "Physical Chemistry" by Puri Sharma and Pathania.

Reference Books:

1. "Physical Chemistry" by Borrow.

*** Latest editions of all the suggested books are recommended.**

Semester I FOUNDATION ENGLISH - I

Course code: BHM101

(Common with EHM101/BPH105/BED105/BAL101/AR107/BFS106/BCA106/BBA106/BCH106/ BFA103)

L	T	P	C
2	0	2	3

Course Contents:

Unit I

Functional Grammar: Patterns & Parts of speech Subject, Predicate, Noun, Pronoun, Adjective, Adverb, Verb, Verb phrases, Conjunction, Interjection. **(10 Hours)**

Unit II

Vocabulary: Word formation, Prefix, Suffix, Compound words, Conversion, Synonyms, Antonyms, Homophones and Homonyms, How to look up a dictionary. **(10 Hours)**

Unit III

Communication: Meaning & importance of communication, Barriers to effective communication, Channels of communication, Language as a tool of communication. **(10 Hours)**

Unit IV

Requisites of Sentence writing: Fragmented sentences, A good sentence, expletives, Garbled sentences, Rambling sentences, Loaded sentences, Parallel Comparison, Squinting construction, Loose & periodic sentences. **(10 Hours)**

Text Books:

1. Martin & Wren - *High School English Grammar & Composition*, S.Chand & Co. Delhi.
2. Lewis Norman - *Word Power made easy*, W.R.Goyal. Publication & Distributors Delhi.
3. Better Your English- A Workbook for 1st year Students- Macmillan India, New Delhi.

Reference Books:

1. Raman Meenakshi & Sharma Sangeeta, *Technical Communication-Principles & Practice* – O.U.P. New Delhi. 2007.
2. Mohan Krishna & Banerji Meera, *Developing Communication Skills* – Macmillan India Ltd. Delhi.
3. Rosen Blum M., *How to Build Better Vocabulary* – Bloomsbury Publication. London.

Note:

This syllabus has been designed to improve the oral and written communication skills of students. The faculty members should put emphasis on practical (oral) activities for generating students' interest in language learning.

*** Latest editions of all the suggested books are recommended.**

Semester I
BASIC PHYSICS-I LAB

Course Code: BAS-151

L T P C
0 0 4 2

LIST OF EXPERIMENTS

Note: Select any ten experiments from the following list

1. To determine Ionizations potential of a gas (Soft valve)
2. To determine Plank's constant.
3. To determine the Ionization Potential of mercury.
4. To plot the V-I characteristic of the Solar cell.
5. To determine Moment of inertia of a Flywheel.
6. To determine Young's Modulus in case of Uniform bending using Scale, telescope and optic lever.
7. To determine Young's Modulus in case of Cantilever using Pin and Microscope
8. To determine Modulus of Rigidity by using Torsion pendulum.
9. To determine Viscosity by the Capillary flow (Radius using Mercury pellet).
10. To determine Surface tension by using Capillary rise (Radius using Vernier microscope).
11. To verify Bernoulli's theorem.
12. To determine the frequency of A.C. mains by means of a sonometer.

Evaluation of Practical Examination:

Internal Evaluation (50 marks)

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 5 point scale (two for experiment, two for file work and one for viva) which would include the practical conducted by the students and a Viva voce taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation scheme:

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (30 MARKS)			ATTENDANCE (5 MARKS)	QUIZ (5MARKS)	VIVA (10 MARKS)	TOTAL INTERNAL (50 MARKS)
EXPERIMENT (10 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)				

External Evaluation (50 marks)

The external evaluation would be done by the external faculty based on the experiment conducted during the examination.

Semester I
Inorganic & Organic Chemistry-I Lab
[With amendment in Code vide approval dated 5th Nov 2012]

Course Code: BAS-161

L	T	P	C
0	0	4	2

LIST OF EXPERIMENTS

1. Estimation of Fe (II) and oxalic acid solutions using standardized KMnO₄ solution.
2. Estimation of Fe (II) solutions with K₂Cr₂O₇ using external indicator.
3. Determination of the melting points of organic compounds and unknown organic compounds (electrically heated melting point apparatus).
4. Effect of impurities on the melting point – mixed melting point of two unknown organic compounds.
5. Determination of boiling point of liquid compounds. (Boiling point lower than and more than 100° C).

Evaluation of Practical Examination:

Internal Evaluation (50 marks)

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 5 point scale (two for experiment, two for file work and one for viva) which would include the practical conducted by the students and a Viva voce taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation scheme:

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (30 MARKS)			ATTENDANCE (5 MARKS)	QUIZ (5 MARKS)	VIVA (10 MARKS)	TOTAL INTERNAL (50 MARKS)
EXPERIMENT (10 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)				

External Evaluation (50 marks)

The external evaluation would be done by the external faculty based on the experiment conducted during the examination.

Reference text:

1. Vogel, A.I. *A Textbook of Quantitative Inorganic Analysis*, ELBS

*** Latest editions of all the suggested books are recommended.**

Semester I Physical Chemistry-I Lab

Course Code: BAS-163

L	T	P	C
0	0	4	2

LIST OF EXPERIMENTS

1. To determine the surface tension of the given liquid by drop number method.
2. To determine the viscosity of a given liquid at room temperature by using Oswald's viscometer (Densities to be determined).
3. To study partition coefficient of iodine between carbon tetra chloride and water.
4. To study the adsorption of acetic acid on dispersed charcoal.
5. To determine the integral enthalpy of solution of $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$.
6. To determine the reaction rate constant of acid catalyzed hydrolysis of ester- titrimetry.
7. To find out the rate constant for the inversion of cane sugar in acid medium and to show that inversion follows the first order kinetics.
8. To study the kinetics of acetone-iodine reaction.
9. To determine the rate of reaction of iodine with hydrogen peroxide (H_2O_2) at room temperature (clock reaction).
10. To determine the enthalpy of neutralization of hydrochloric acid with sodium hydroxide.

Evaluation of Practical Examination:

Internal Evaluation (50 marks)

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 5 point scale (two for experiment, two for file work and one for viva) which would include the practical conducted by the students and a Viva voce taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation scheme:

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (30 MARKS)			ATTENDANCE (5 MARKS)	QUIZ (5 MARKS)	VIVA (10 MARKS)	TOTAL INTERNAL (50 MARKS)
EXPERIMENT (10 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)				

External Evaluation (50 marks)

The external evaluation would be done by the external faculty based on the experiment conducted during the examination.

Reference text:

1. Vogel, A.I. *A Textbook of Quantitative Inorganic Analysis*, ELBS

*** Latest editions of all the suggested books are recommended.**

Semester I

Discipline & General Proficiency

Course Code: BGP-101/BGP201/BGP301/BGP401/BGP501/BGP601

L	T	P	C
0	0	0	2

Course Content:

There shall be continuous evaluation of the student on the following broad parameters:

1. Observance of dress code.
2. Participation in Conferences /Workshops / Seminars.
3. Attendance in guest lectures, talks by the invitees and special technical sessions organized from time to time.
4. Participation in community projects including NCC and NSS.
5. Exhibiting team spirit in different activities of the University and College organized from time to time.
6. Observance of rule & regulations in the College/University.
7. Behaviour in hostel mess and hostel.
8. Performance and awards received in different events (sports/ co-curricular activities) organized at College / University and other level.
9. General behavior.

The above mentioned is an indicative list of parameters on which the students shall be continuously evaluated. The college may evaluate the student on the specific parameters by informing them through a notice displayed on the notice board before evaluation. There shall be no external examination for this course; however the marks shall be included for calculation of cumulative Performance Index (CPI).

Semester II BASIC PHYSICS-II

Course Code: BAS-206

L	T	P	C
3	2	0	4

Course Content:

Unit I

FIELDS: Vector and scalar fields, gradient, divergence and curl (Cartesian coordinates only), Gauss's theorem and Stokes' theorem (Statements only). **(Lectures 08)**

Unit II

ELECTROMAGNETIC THEORY: Gauss's law in integral and differential form, electric potential and relation with E, capacitance and electric energy density, dielectrics, three electric vectors, dielectric susceptibility, boundary conditions on E and D. Ampere's law in integral and differential form, applications, Hall effect, three magnetic vectors magnetic permeability and susceptibility, boundary conditions on B and H. **(Lectures 08)**

Unit III

Electro-magnetics: Faraday's law in integral and differential form, continuity equation for charge, displacement current, Maxwell's equations in free space, electromagnetic wave equation for plane waves in dielectric medium and free space, relation between E, B and k, Poynting vector. **(Lectures 08)**

Unit IV

PHYSICAL OPTICS: Interference: two-beam interference, interference in thin films and wedge-shaped layers, reflection and anti-reflection coatings, applications of interferometry: Newton's rings, Michelson's interferometer.

Diffraction: Fraunhofer diffraction by single slit, double slit and grating, limit of resolution, Rayleigh criterion and Fresnel diffraction **(Lectures 08)**

Unit V

Polarization: polarization of light, Malus's law, Brewster's law, double refraction), analysis of linearly and circularly polarized light, Fresnel's Theory.

Lasers And Applications: Spontaneous and Stimulated Emission, Einstein's A and B Coefficients, Laser: Population-Inversion, Properties of laser radiation, Ruby & He-Ne Lasers, Applications of Lasers-Elementary Ideas of Holography and Fiber Optics.

(Lectures 08)

Reference:

1. Mathew N.O. Sadiku, Elements of Electromagnetics, Oxford Univ. Press (2001).
2. A. Ghatak, Optics, 3rd edition, Tata McGraw Hill (2005).
3. Resnick, Halliday and Krane, Physics Part-I & II, 5th edition, John Wiley (2002).
4. M. R. Srinivasan, Physics for Engineers, New Age International (1996).

*** Latest editions of all the suggested books are recommended.**

Semester II Inorganic Chemistry-II

Course Code: BAS-221

L	T	P	C
3	2	0	4

Course Content:

Unit I

Chemical Bonding: Ionic bond: General characteristics, types of ions, size effects, radius ratio rule and its limitations. Packing of ions in crystals. Madelung constant, Born-Haber cycle and its application, Solvation energy. **(Lectures 08)**

Unit II

Covalent bond: Lewis structure, Valence Bond theory (Heitler-London approach). Energetics of hybridization. Resonance and resonance energy, Molecular orbital theory. Molecular orbital diagrams of diatomic and simple polyatomic molecules N₂, O₂, C₂, B₂, F₂, CO, NO, and their ions; HCl, BeF₂, CO₂, (idea of s-p mixing and orbital interaction to be given). **(Lectures 08)**

Unit III

Valence shell electron pair repulsion theory (VSEPR), shapes of simple molecules and ions containing lone pairs and bond pairs of electrons, multiple bonding (σ and π bond approach), and bond lengths.

Fajan's rules and consequences of polarization. Ionic character in covalent compounds: Bond moment and dipole moment. **(Lectures 08)**

Unit IV

Weak Chemical forces: van der Waals forces, ion-dipole forces, dipole-dipole interactions, induced dipole interactions, Instantaneous dipole-induced dipole interactions. Repulsive forces, Hydrogen bonding, melting and boiling points. **(Lectures 08)**

Unit V

Acids and Bases: Bronsted- Lowry concept of acid-base reaction, solvated proton, relative strength of acids, types of acid-base reactions, leveling solvents, Lewis acid-base concept, Classification of Lewis acids, Hard and Soft Acids and Bases (HSAB), Application of HSAB principle. **(Lectures 08)**

Recommended Texts:

1. Huhey, J.E. *Inorganic Chemistry*, Prentice Hall 1993
2. Douglas, B.E. and Mc Daniel, D.H., *Concepts & Models of Inorganic Chemistry*, Oxford 1970
3. Lee, J.D. *Concise Inorganic Chemistry*, ELBS (1991)
4. Shriver & Atkins, *Inorganic Chemistry*, Third Edition, Oxford Press 1994.
5. H.W. Porterfield, *Inorganic Chemistry*, Second Edition, Academic Press, 2005.

*** Latest editions of all the suggested books are recommended.**

Semester II Organic Chemistry-II

Course Code: BAS-222

L	T	P	C
3	2	0	4

Course Content:

Unit I

Chemistry of Halogenated hydrocarbons: Alkyl halides: Methods of preparation, nucleophilic substitution reactions – SN1, SN2 mechanisms.

Aryl halides: Preparation, including preparation from diazonium salts. nucleophilic aromatic Substitution,

Organometallic compounds of Mg and Li – Use in synthesis of organic compounds.

(Lectures 08)

Unit II

Alcohols and Phenols: Alcohols: preparation, properties and relative reactivity of 1^o, 2^o, 3^o alcohols, Preparation and properties of glycols: Oxidation by periodic acid and lead tetraacetate,

Phenols: Preparation and properties; Acidity and factors effecting it, Ring substitution reactions, Reimer – Tiemann and Kolbe's – Schmidt Reactions.

(Lectures 08)

Unit III

Ethers and Epoxide: Ethers and Epoxides: Preparation and reactions with acids. Reactions of epoxides with alcohols, ammonia derivatives and LiAlH₄.

(Lectures 08)

Unit IV

Carbonyl Compounds: Structure, reactivity and preparation; Mechanisms of Aldol and Benzoin condensation, Knoevenagel condensation, Perkin, Cannizzaro and haloform reaction.

(Lectures 08)

Unit V

Carboxylic Acids and their Derivatives: Preparation, physical properties and reactions of monocarboxylic acids. Typical reactions of dicarboxylic acids, hydroxy acids and unsaturated acids: succinic/ phthalic, lactic, malic, tartaric, citric, maleic and fumaric acids; Preparation and reactions of acid chlorides, anhydrides, esters and amides.

(Lectures 08)

Recommended Texts:

1. Morrison, R. T. & Boyd, R. N. *Organic Chemistry*, Dorling Kindersley (India) Pvt. Ltd. (Pearson Education).

2. Finar, I. L. *Organic Chemistry (Volume 1)*, Dorling Kindersley (India) Pvt. Ltd. (Pearson Education).

*** Latest editions of all the suggested books are recommended.**

Semester II

Physical Chemistry-II

Course Code: BAS-223

L	T	P	C
3	2	0	4

Course Content:

Unit I

Chemical thermodynamics: Intensive and extensive variables; state and path functions; isolated, closed and open systems; zeroth law of thermodynamics.

First law: Concept of heat, q , work, w , internal energy U and statement of first law; enthalpy, H ,

Second Law: Concept of entropy; thermodynamic scale of temperature, statement of the second law of thermodynamics; Calculation of entropy change for reversible and irreversible processes. **(Lectures 08)**

Unit II

Third Law: Statement of third law, concept of residual entropy, calculation of absolute entropy of molecules.

Free Energy Functions: Gibbs and Helmholtz energy; variation of S , G , A with T , V , P ; Free energy change and spontaneity. **(Lectures 08)**

Unit III

Chemical equilibrium: Criteria of thermodynamic equilibrium, degree of advancement of reaction, chemical equilibria in ideal gases, concept of fugacity. Thermodynamic derivation of relation between Gibbs free energy of reaction and reaction quotient.

Le Chatelier principle (quantitative treatment); equilibrium between ideal gases and a pure condensed phase. **(Lectures 08)**

Unit IV

Solutions and Colligative Properties: Dilute solutions; lowering of vapour pressure, Raoult's and Henry's Laws and their applications. **(Lectures 08)**

Unit V

Excess thermodynamic functions. Thermodynamic derivation using chemical potential to derive relations between the four colligative properties [(i) relative lowering of vapour pressure, (ii) elevation of boiling point, (iii) Depression of freezing point, (iv) osmotic pressure] and amount of solute. Applications in calculating molar masses of normal dissociated, and associated solutes in solution. **(Lectures 08)**

Recommended Texts:

1. Atkins, P. W. & Paula, J. de *Atkin's Physical Chemistry* 8th Ed., Oxford University Press (2006).
2. Castellan, G. W. *Physical Chemistry* 4th Ed. Narosa (2004).
3. Engel, T. & Reid, P. *Thermodynamics, Statistical Thermodynamics, & Kinetics* Pearson Education, Inc: New Delhi (2007).
4. McQuarrie, D. A. & Simon, J. D. *Molecular Thermodynamics* Viva Books Pvt. Ltd.: New Delhi (2004).

*** Latest editions of all the suggested books are recommended.**

Semester-II Foundation English - II

Course code: BHM201

(Common with EHM201/BPH206/BBA206/BCA206/AR207/BCH206/ BFA203)

L	T	P	C
2	0	2	3

Unit I

Functional Grammar: Articles, Preposition, Tenses: Functions, Synthesis, Transformation, Spotting errors and correction of sentences. **(10 Hours)**

Unit II

Pre- Requisites of Technical written Communication: One word substitution, Spelling rules, Words often confused & misused, Phrases. **(10 Hours)**

Unit III

The Structure of sentences/ clauses: Adverb clause, Adjective clause, Noun clause. Sentences: Simple, Double, Multiple and complex, Transformation of sentences: simple to complex & vice versa, simple to compound & vice-versa, Interrogative to assertive & to negative & vice-versa. **(10 Hours)**

Unit IV

Technical Communication: Nature, Origin and Development, Salient features, Scope & Significance, Forms of Technical Communication, Difference between Technical Communication & General writing, Objective Style vs. Literary Composition. **(10 Hours)**

Text-Books:

1. Wren & Martin, *High School English Grammar & Composition* – S. Chand & Co. Delhi.
2. Raman Meenakshi & Sharma Sangeeta, *Technical Communication-Principles & Practice* – O.U.P. New Delhi. 2007.
3. Mitra Barum K., *Effective Technical Communication* – O.U.P. New Delhi. 2006.
4. Better Your English- A Workbook for 1st year Students- Macmillan India, New Delhi.

Reference Books:

1. Horn A.S., *Guide to Patterns & Usage in English* – O.U.P. New Delhi.

NOTE:

This syllabus has been designed to improve the oral and written communication skills of students. The faculty members should put emphasis on practical (oral) activities for generating students' interest in language learning.

*** Latest editions of all the suggested books are recommended.**

Semester II Basic Physics-II Lab

Course Code: BAS-256

L	T	P	C
0	0	4	2

LIST OF EXPERIMENTS

Note: Select any ten experiments from the following list

1. To determine the wavelength of Sodium light by Newton's rings.
2. To determine the wavelength of Sodium light by Fresnel's biprism.
3. To determine the specific rotation of the cane sugar solution with the help of Polarimeter.
4. To study the forward characteristics of a light emitting diode.
5. To determine the resolving power and dispersive power by a prism.
6. To determine the resolving power of grating.
7. To study the elliptically polarized light.
8. To determine slit width using He-Ne laser.
9. To determine the Flashing & Quenching of Neon bulb.
10. To determine the Resolving power of a telescope
11. To determine the wavelength of the sodium lamp by Michelson interferometer.
12. To determine the wave form and frequency of a given signal using C.R.O.

Evaluation of Practical Examination:

Internal Evaluation (50 marks)

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 5 point scale (two for experiment, two for file work and one for viva) which would include the practical conducted by the students and a Viva voce taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation scheme:

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (30 MARKS)			ATTENDANCE (5 MARKS)	QUIZ (5 MARKS)	VIVA (10 MARKS)	TOTAL INTERNAL (50 MARKS)
EXPERIMENT (10 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)				

External Evaluation (50 marks)

The external evaluation would be done by the external faculty based on the experiment conducted during the examination.

Semester II
Inorganic & Organic Chemistry-II Lab
[With amendment in Code vide approval dated 5th Nov 2012]

Course Code: BAS-261

L T P C
0 0 4 2

LIST OF EXPERIMENTS

1. Estimation of Cu (II) and $K_2Cr_2O_7$ Using sodium thiosulphate solution (Iodimetrically).
2. Estimation of available chlorine in bleaching powder iodometrically.
3. Preparation of Aluminium Potassium sulphate $KAl(SO_4)_2 \cdot 12H_2O$ (Potash alum) or Chrome alum.
4. Acetylation of one of the following compounds: amines (aniline, o-,m-,p- toluidines) and phenols (β -naphthol, salicylic acid)
5. Benzoylation of one of the following compounds: amines (aniline, o-,m-,p- toluidines) and phenols (β -naphthol, resorcinol) by Schotten- Baumann reaction
6. Nitration of one the following compounds: nitrobenzene, chlorobenzene, bromobenzene

Evaluation of Practical Examination:

Internal Evaluation (50 marks)

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 5 point scale (two for experiment, two for file work and one for viva) which would include the practical conducted by the students and a Viva voce taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation scheme:

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (30 MARKS)			ATTENDANCE (5 MARKS)	QUIZ (5 MARKS)	VIVA (10 MARKS)	TOTAL INTERNAL (50 MARKS)
EXPERIMENT (10 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)				

External Evaluation (50 marks)

The external evaluation would be done by the external faculty based on the experiment conducted during the examination.

Recommended Texts:

1. Vogel, A.I. A text book of quantitative Inorganic Analysis, ELBS.

*** Latest editions of all the suggested books are recommended.**

Semester II Physical Chemistry-II Lab

Course Code: BAS- 263

L	T	P	C
0	0	4	2

LIST OF EXPERIMENTS

1. Determination of heat capacity of the calorimeter and enthalpy of neutralization of hydrochloric acid with sodium hydroxide.
2. Calculation of the enthalpy of ionization of ethanoic acid.
3. Determination of heat capacity of the calorimeter and integral enthalpy (endothermic and exothermic) solution of salts.
4. Determination of enthalpy of hydration of copper sulphate.
5. Study of the solubility of benzoic acid in water and determination of ΔH .

Evaluation of Practical Examination:

Internal Evaluation (50 marks)

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 5 point scale (two for experiment, two for file work and one for viva) which would include the practical conducted by the students and a Viva voce taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation scheme:

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (30 MARKS)			ATTENDANCE (5 MARKS)	QUIZ (5 MARKS)	VIVA (10 MARKS)	TOTAL INTERNAL (50 MARKS)
EXPERIMENT (10 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)				

External Evaluation (50 marks)

The external evaluation would be done by the external faculty based on the experiment conducted during the examination.

Recommended Texts:

1. Vogel, A.I. A text book of quantitative Inorganic Analysis, ELBS.

*** Latest editions of all the suggested books are recommended.**

Semester III

Inorganic Chemistry-III

Course Code: BAS- 307

L	T	P	C
3	2	0	4

Course Content:

Unit I:

Chemistry of s and p block elements: Inert pair effect, Relative stability of different oxidation states, diagonal relationship and anomalous behavior of first member of each group. Allotropy and catenation. Complex formation tendency of s and p block elements.

(Lectures 08)

Unit II

Study of the following compounds with emphasis on structure, bonding, preparation, properties and uses: Boric acid, borohydrides (diborane), silanes, Peroxo acids of sulphur, interhalogen compounds, polyhalide ions, pseudohalogens and basic properties of halogens.

(Lectures 08)

Unit III

Study of the following compounds with emphasis on structure, bonding, preparation, properties and uses. interhalogen compounds, polyhalide ions, pseudohalogens and basic properties of halogens.

(Lectures 08)

Unit IV

Noble Gases : Occurrence & uses, rationalization of inertness of noble gases, Clathrates; preparation and properties of XeF₂ and XeF₄, XeF₆; Nature of bonding in noble gas compounds (Valence bond treatment and MO treatment for XeF₂). Molecular shapes of noble gas compounds (VSEPR theory).

(Lectures 08)

Unit V

Inorganic Polymers: Types of inorganic polymers, comparison with organic polymers, synthesis, structural aspects and applications of silicones and siloxanes. Borazines, silicates and phosphazenes, and polysulphates.

(Lectures 08)

Recommended Texts:

1. Greenwood, N.N. and Earnshaw, *Chemistry of the Elements*, Butterworth- Heinemann. 1997.
2. Lee, J.D. *Concise Inorganic Chemistry*, ELBS (1991).
3. Canham, G.R. and Overton, T., *Descriptive Inorganic Chemistry*, Freeman & Co. 2006
4. Cotton, F.A. and Wilkinson, G, *Advanced Inorganic Chemistry*, Wiley, VCH, 1999.

*** Latest editions of all the suggested books are recommended.**

Semester III Organic Chemistry-III

Course Code: BAS-308

L	T	P	C
3	2	0	4

Course Content:

Unit I

Nitrogen Containing Functional Groups: Preparation and important reactions of nitrocompounds, nitriles and isonitriles Amines: Effect of substituent and solvent on basicity; Preparation and properties: Gabriel phthalimide synthesis, Carbylamine reaction, Mannich reaction, Hoffmann's exhaustive methylation, Hofmann-elimination reaction. Diazonium Salts: Preparation and their synthetic applications. **(Lectures 08)**

Unit II

Polynuclear Hydrocarbons

Reactions of naphthalene phenanthrene and anthracene Structure, Preparation and structure elucidation and important derivatives of naphthalene and anthracene; Polynuclear hydrocarbons. **(Lectures 08)**

Unit III

Heterocyclic Compounds

Classification and nomenclature, Structure, aromaticity in 5-numbered and 6-membered rings containing one heteroatom; Synthesis, reactions and mechanism of substitution reactions of: Furan, Pyrrole, Thiophene, **(Lectures 08)**

Unit IV

Pyridine (Hantzsch synthesis), Pyrimidine, Structure elucidation of indole, Fischer indole synthesis and Madelung synthesis), Structure elucidation of quinoline and isoquinoline, Skraup synthesis, Friedlander's synthesis, Knorr quinoline synthesis, Doebner-Miller synthesis, Derivatives of furan: Furfural and furoic acid. **(Lectures 08)**

Unit V

Alkaloids

Natural occurrence, General structural features, Isolation and their physiological action Hoffmann's exhaustive methylation, Structure elucidation and synthesis of Hygrine and Nicotine. Medicinal importance of Nicotine, Hygrine, Quinine, Morphine, Cocaine, and Reserpine. **(Lectures 08)**

Recommended Texts:

1. Morrison, R. T. & Boyd, R. N. *Organic Chemistry*, Dorling Kindersley (India) Pvt. Ltd. (Pearson Education).
2. Finar, I. L. *Organic Chemistry (Volume 1)*, Dorling Kindersley (India) Pvt. Ltd. (Pearson Education).
3. Finar, I. L. *Organic Chemistry (Volume 2: Stereochemistry and the Chemistry of Natural Products)*, Dorling Kindersley (India) Pvt. Ltd. (Pearson Education).

*** Latest editions of all the suggested books are recommended.**

Semester III

Physical Chemistry-III

Course Code: BAS-310

L	T	P	C
3	2	0	4

Course Content:

Unit I

Phase equilibria

Concept of phases, components and degrees of freedom, derivation of Gibbs Phase Rule for non- reactive and reactive systems; Clausius-Clapeyron equation and its applications to solid-liquid, liquid-vapour and solid-vapour equilibria. **(Lectures 08)**

Unit II

Phase rule, phase diagram for one component (water system) systems, with applications. Phase diagrams for systems of solid-liquid equilibria involving eutectic, congruent and incongruent melting points, solid solutions. Three component systems, water-chloroform-acetic acid system, triangular plots. **(Lectures 08)**

Unit III

Nernst distribution law: its derivation and applications in determination of degree of dissociation, degree of association, solubility, complex ion formation. **(Lectures 08)**

Unit IV

Electrochemistry

Quantitative aspects of Faraday's laws of electrolysis and applications of electrolysis in metallurgy and industry. Chemical cells, reversible and irreversible cells with examples. Electromotive force of a cell and its measurement, Nernst equation; Standard electrode (reduction) potential and its application to different kinds of half-cells. Application of EMF measurements in determining pH values, using hydrogen, quinone-hydroquinone and glass. **(Lectures 08)**

Unit V

Conductance

Arrhenius theory of electrolytic dissociation. Conductivity, equivalent and molar conductivity and their variation with dilution for weak and strong electrolytes. Molar conductivity at infinite dilution. Kohlrausch law of independent migration of ions. Debye-Huckel-Onsager equation. **(Lectures 08)**

Recommended Texts:

1. Atkins, P. W. & Paula, J. de *Atkin's Physical Chemistry* 8th Ed., Oxford University Press (2006).
2. Ball, D. W. *Physical Chemistry* Thomson Press, India (2007).
3. Castellan, G. W. *Physical Chemistry* 4th Ed. Narosa (2004).
4. Laidler, K. J. *Chemical Kinetics* Pearson Education: New Delhi (2004).
5. Mortimer, R. G. *Physical Chemistry* 3rd Ed. Elsevier: NOIDA, UP (2009).

*** Latest editions of all the suggested books are recommended.**

Semester III Basic Physics-III

Course Code: BAS-303

L	T	P	C
3	2	0	4

Course Content:

Unit I

Special Theory Of Relativity: Postulates, Galilean Transformations, Lorentz Transformations, Length Contraction, Time Dilation, Velocity Addition, Mass Change and Einstein's Mass Energy Relation. **(Lectures 08)**

Unit II

Quantum Mechanics: Wave Particle Duality, De Broglie Waves, Davisson and Germer's Experiment, Uncertainty Principle, Physical Interpretation of Wave Function and its Normalization. Schrodinger Equation in One Dimension and its Application (particle in one dimensional potential box). **(Lectures 08)**

Unit III

Capacitors: Spherical capacitor, Cylindrical capacitor, Parallel plate capacitor, Energy in Electrostatic field, Dielectrics: polar and non- polar Three electric vectors: Electric field vector, Polarization Vector and Displacement Vector, dielectric susceptibility, boundary conditions on E and D. **(Lectures 08)**

Unit IV

Biot-Savart's Law: Calculation of B for - Straight current carrying conductor & Solenoid; Ampere's circuital Law and its applications. B-H Hysteresis and its application, Comparison between diamagnetic, paramagnetic and ferromagnetic materials, Langevin's Theory of diamagnetism. **(Lectures 08)**

Unit V

Electro-magnetic Induction, Faraday's law, Lenz's law, Self Inductance, Mutual Inductance, Reciprocity Theorem. Study of LCR circuits with D.C and A.C sources (both series and parallel), Phase impedance Conditions for resonance and its graphical interpretation, Q- factor, Power factor, wattless current, Transformer and its magnetic susceptibility. **(Lectures 08)**

Text Book:

1. Engineering Physics by V S Yadav, TMH

*** Latest editions of all the suggested books are recommended.**

Semester III/IV
FUNDAMENTALS OF COMPUTERS

Course Code: BCS-301/BCS-401

L	T	P	C
3	2	0	4

Course Content:

Unit I

Concepts in Computer Application: Definition of Electronic Computer, History, Generations, Characteristic and Application of Computers, Classification of Computers, Functional Component of Computer: CPU, I/O devices, Type of Memory & Memory Hierarchy, Firmware and Human ware. **(Lectures 08)**

Unit II

Programming Language Classification & Number System: Generation of Languages, Introduction to 4GLs. Translators: Assembler, Compiler, and Interpreter. Number System: Decimal, Octal, Binary and Hexadecimal & their Conversions. Various Codes: BCD, ASCII and EBCDIC and Gray Code. **(Lectures 08)**

Unit III

Concepts in Operating System, Office Tools and Data Management: Elementary Concepts in Operating System, textual Vs GUI Interface, Introduction to DOS, MS Windows, MS office Tools, MS WORD, MS EXCEL, MS Power Point. **(Lectures 08)**

Unit IV

Data Communication & Networks: Basic Concepts in Computer Networks, Networking of computers- Introduction of LAN and WAN, Network Topologies.

Internet and Web Technologies: Hypertext Markup Language, DHTML, WWW, Gopher, FTP, Telnet, Web Browsers, Net Surfing, Search Engines, Email. **(Lectures 08)**

Unit V

IT Industry Trends: Careers and Applications in India Basic Awareness of NICNET and ERNET. Application of IT to Areas like E Commerce, electronic governance, Multimedia, and Entertainment.

Information Representation: Introduction to Information representation in Digital Media, Text, image, graphics, Animation, Audio, Video etc., Introduction to JPEG, MPEG, MHEG, MP3 & AVI. **(Lectures 08)**

Text Books

1. Sinha P.K., Computer Fundamentals
2. Yadav, D S, *Foundations of IT*, New Age, Delhi
3. Rajaraman, *Introduction to Computers*, Prentice-Hall India

Reference Books

1. Peter Nortans, *Introduction to Computers*, TME
2. Leon & Leon, *Fundamental of Information Technology*, Vikas Publishing
3. Lehngart, *Internet 101*, Addison Wesley

*** Latest editions of all the suggested books are recommended.**

Semester III/IV
ENVIRONMENTAL SCIENCE

Course Code: BAS-309/BAS-409

L	T	P	C
3	2	0	4

Course Content:

Unit I

General: Definition, Scope, Segments of Environment and its Multidisciplinary Nature, Some Major Environmental Problems, Definition and Scope of Ecology. **(Lectures 08)**

Unit II

Ecology And Environment: Concept of an Ecosystem- its components and functions, Trophic Levels- Producer, Consumer and Decomposer, Energy Flow in an Ecosystem, Biogeochemical Cycles, Food Chain, Food Web and Ecological Pyramid. **(Lectures 08)**

Unit III

Air pollution: Various segments of Atmosphere and their Significance, Sources and Effects of Air Pollution, Classification of Air Pollutants, Stationary and Mobile Sources of Air Pollution, Photochemical Smog, Acid Rain, Global Warming (Greenhouse Effect), Ozone Layer - Its Depletion and Control Measures, El-Nino. **(Lectures 08)**

Unit IV

Water pollution: Water Resources of the Earth and Indian Scenario, Point and non-Point sources of Water Pollution, Treatment of Water Pollution, Eutrophication, Bio-Diversity- Hot Spots of Biodiversity in India and World, Conservation, Importance and Factors Responsible for Loss of Biodiversity, Deforestation- causes and effects, Biogeographical Classification of India. **(Lectures 08)**

Unit V

Soil pollution-Sources and Consequences, Noise, Thermal - sources and consequences, Sustainable Development, Dams and Reservoirs- Their Benefits and Problems, Solid Wastes - Pollution, Treatment & Disposal, Environment Conservation Movement in India (Chipko Movement, Appiko Movement), Bioremediation, Biological Magnification. **(Lectures 08)**

Text Books:

1. "Environmental Chemistry", De,A.K., New Age Publishers Pvt. Ltd.
2. "Introduction to Environmental Engineering and Science", Masters,G.M., Prentice Hall India Pvt.Ltd.
3. "Fundamentals of Ecology", Odem,E.P., W.B.Sannders Co.

Reference Books:

1. "Biodiversity and Conservation", Bryant,P.J., Hypertext Book
2. "Textbook of Environment Studies", Tewari, Khulbe & Tewari, I.K. Publication

*** Latest editions of all the suggested books are recommended.**

Semester-III Professional Writing

Course code: BHM301

(Common with EHM 301/BBA306/BCA305/AR307/BCH306/BFA303)

L	T	P	C
2	0	2	3

Course Contents:

Unit I

Functional Grammar: Active and passive voice, Conditional sentences, Syntax, Concord, Common errors. (10 Hours)

Unit II

Requisites of Paragraph writing: Structure of Paragraph, Coherence & Unity, Development of paragraph, Inductive order, Deductive order, Spatial order, Linear, Chronological orders, Expository writing, and Argumentative writing, Factual description of objects, process, experiments. (10 Hours)

Unit III

Précis Writing: Techniques of Précis writing, Writing a précis. (10 Hours)

Unit IV

Comprehension skills: Role of listening, Reading comprehension; Reasons for poor comprehension, Improving comprehension skills. (10 Hours)

Text Books:

1. Rutherford A., *Basic Communication Skills* – Pearson Education, New Delhi.

References Books:

1. Raman Meenakshi & Sharma Sangeeta, *Technical Communication-Principles & Practice* – O.U.P. New Delhi. 2007.
2. Mohan Krishna & Banerji Meera, *Developing Communication Skills* – Macmillan India Ltd. Delhi.

NOTE:

This syllabus has been designed to improve the oral and written communication skills of students. The faculty members should put emphasis on practical (oral) activities for generating students' interest in language learning.

* Latest editions of all the suggested books are recommended.

Semester III
Inorganic & Organic Chemistry-III Lab
[With amendment in Code vide approval dated 5th Nov 2012]

Course Code: BAS-357

L	T	P	C
0	0	4	2

LIST OF EXPERIMENTS

1. Estimation of total hardness of water samples.
2. Estimation of Ca^{2+} in solution by (substitution method) using Erio-chrome black-T as indicator.
3. Estimation of Cl^- by Mohr's method.
4. Reduction of m-dinitrobenzene to m- nitroaniline.
5. Saponification value of an oil/fat.

Evaluation of Practical Examination:

Internal Evaluation (50 marks)

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 5 point scale (two for experiment, two for file work and one for viva) which would include the practical conducted by the students and a Viva voce taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation scheme:

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (30 MARKS)			ATTENDANCE (5 MARKS)	QUIZ (5 MARKS)	VIVA (10 MARKS)	TOTAL INTERNAL (50 MARKS)
EXPERIMENT (10 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)				

External Evaluation (50 marks)

The external evaluation would be done by the external faculty based on the experiment conducted during the examination.

Recommended Texts:

1. Vogel, A.I. A text book of quantitative Inorganic Analysis, ELBS.

*** Latest editions of all the suggested books are recommended.**

Semester III Physical Chemistry-III Lab

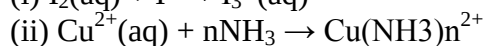
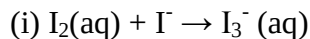
Course Code: BAS-358

L	T	P	C
0	0	4	2

LIST OF EXPERIMENTS

(I) Study the equilibrium of at least one of the following reactions by the distribution method:

(II)



(II) Perform the following potentiometric titrations (at least two):

- (i) Strong acid with strong base
- (ii) weak acid with strong base and
- (iii) dibasic acid with strong base

(III) Potentiometric titration of Mohr's salt with potassium dichromate.

(IV) Determination of critical solution temperature and composition of the phenol-water system and to study the effect of impurities on it.

Evaluation of Practical Examination:

Internal Evaluation (50 marks)

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 5 point scale (two for experiment, two for file work and one for viva) which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation scheme:

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (30 MARKS)			ATTENDANCE (5 MARKS)	QUIZ (5 MARKS)	VIVA (10 MARKS)	TOTAL INTERNAL (50 MARKS)
EXPERIMENT (10 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)				

External Evaluation (50 marks)

The external evaluation would be done by the external faculty based on the experiment conducted during the examination.

Recommended Texts:

1. Vogel, A.I. A text book of quantitative Inorganic Analysis, ELBS.

*** Latest editions of all the suggested books are recommended.**

Semester III /IV
FUNDAMENTALS OF COMPUTERS LAB

Course Code: BCS-351/BCS-451

L	T	P	C
0	0	4	2

LIST OF EXPERIMENTS

1. Fundamentals of computer system, with its functional components.
2. Create a formatted WORD document.
3. Create a WORD document using different fonts.
4. Create a table & perform operations in it.
5. Create a WORD document, using the functions page set up, & page preview, and then print that document.
6. Implement Mail Merge.
7. Collect the information of any company & perform the below operation in it:
 - (a) Insert the data into Row/Column of Excel, worksheet
 - (b) Create a worksheet in Excel, perform alignment, text wrapping & sort the data.
8. Collect the information of any company & perform the below operation in it:
 - (a) Generate the graph in Excel.
 - (b) Create a Hyperlink to a word document.
 - (e) Create a worksheet using the functions- page set up, print preview & then print the worksheet.
9. Create, save & print the power point presentation
10. Create a power point presentation using clipart, Word art gallery & then add transition & Animation effects.

Evaluation of Practical Examination:

Internal Evaluation (50 marks)

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 5 point scale (two for experiment, two for file work and one for viva) which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation scheme:

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (30 MARKS)			ATTENDANCE (5 MARKS)	QUIZ (5 MARKS)	VIVA (10 MARKS)	TOTAL INTERNAL (50 MARKS)
EXPERIMENT (10 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)				

External Evaluation (50 marks)

The external evaluation would be done by the external faculty based on the experiment conducted during the examination.

Semester III/IV
ENVIRONMENTAL SCIENCE LAB

Course Code: BAS-359/BAS-459

L	T	P	C
0	0	4	2

LIST OF EXPERIMENT:

1. To determine total alkalinity in the given water sample.
2. To determine the temporary and permanent hardness in water sample.
3. To determine the pH of the given solution using pH meter.
4. To determine the turbidity in given water sample.
5. To determine the dissolved oxygen present in a water sample.
6. To determine the conductivity in water sample.
7. To determine the carbon-di-oxide content in polluted water sample.
8. To find chemical oxygen demand of waste water sample by potassium dichromate.
9. To determine the TDS and TSS in water sample.
10. To determine the noise level in ambient air.

Evaluation of Practical Examination:

Internal Evaluation (50 marks)

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 5 point scale (two for experiment, two for file work and one for viva) which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation scheme:

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (30 MARKS)			ATTENDANCE (5 MARKS)	QUIZ (5 MARKS)	VIVA (10 MARKS)	TOTAL INTERNAL (50 MARKS)
EXPERIMENT (10 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)				

External Evaluation (50 marks)

The external evaluation would be done by the external faculty based on the experiment conducted during the examination.

Semester IV Inorganic Chemistry-IV

Course Code: BAS-408

L	T	P	C
3	2	0	4

Course Content:

Unit I

Coordination Chemistry: Werner's theory, valence bond theory (inner and outer orbital complexes), electroneutrality principle and back bonding. Crystal field theory, measurement of $10 Dq$ (Δ_o), CFSE in weak and strong fields, pairing energies, factors effecting the magnitude of $10 Dq$ ($o\Delta$, Δ_t). Octahedral vs. tetrahedral coordination, tetragonal distortions from Octahedral geometry Jahn-Teller theorem, square planar geometry. Qualitative aspect of Ligand field and MO Theory. **(Lectures 08)**

Unit II

IUPAC nomenclature of coordination compounds, isomerism in coordination compounds. Stereochemistry of complexes with 4 and 6 coordination numbers. Chelate effect, polynuclear complexes, Labile and inert complexes. **(Lectures 08)**

Unit III

Transition elements: General group trends with special reference to electronic configuration, colour, variable valency, magnetic and catalytic properties, ability to form complexes. Stability of various oxidation states and e.m.f. Difference between the first, second and third transition series. **(Lectures 08)**

Unit IV

Chemistry of Ti, V, Cr, Mn, and Fe in various oxidation states (including their metallurgy). **(Lectures 08)**

Unit V

Lanthanoids and actinoids: electronic configuration, oxidation states, colour, spectral and magnetic properties, lanthanide contraction, separation of lanthanides (ion-exchange method only). **(Lectures 08)**

Recommended Texts:

1. Purecell, K.F. and Kotz, J.C., *Inorganic Chemistry* W.B. Saunders Co. 1977.
2. Basolo, F, and Pearson, R.C., *Mechanisms of Inorganic Chemistry*, John Wiley & Sons, NY, 1967.
3. Greenwood, N.N. & Earnshaw A., *Chemistry of the Elements*, Butterworth-Heinemann, 1997.

*** Latest editions of all the suggested books are recommended.**

Semester IV Organic Chemistry-IV

Course Code: BAS-410

L	T	P	C
3	2	0	4

Course Content:

Unit I

Carbohydrates: Occurrence, classification and their biological importance. Monosaccharides: Constitution and absolute configuration of glucose and fructose, epimers and anomers, mutarotation, determination of ring size of glucose and fructose, Haworth projections and conformational structures; Interconversions of aldoses and ketoses; Killiani-Fischer synthesis and Ruff degradation. **(Lectures 08)**

Unit II

Disaccharides – Structure elucidation of maltose, lactose and sucrose.
Polysaccharides – Elementary treatment of starch, cellulose and glycogen. **(Lectures 08)**

Unit III

Nucleic Acids: Components of nucleic acids, Nucleosides and nucleotides. Structure, synthesis and reactions of: Adenine, Guanine, Cytosine, Uracil and Thymine; Structure of polynucleotide. **(Lectures 08)**

Unit IV

Amino acids, Peptides and Proteins: Amino acids, Peptides and their classification.

α -Amino Acids - Synthesis, ionic properties and reactions. Zwitterions, pK_a values, isoelectric point and electrophoresis.

Study of peptides: determination of their primary structures-end group analysis, methods of peptide synthesis. Synthesis of peptides using N-protecting, C-protecting and C-activating groups. **(Lectures 08)**

Unit V

Pharmaceutical Compounds: Structure and Importance, Classification, structure and therapeutic uses of antipyretics: Paracetamol (with synthesis), Analgesics: Ibuprofen (with synthesis), Antimalarials: Chloroquine (with synthesis). An elementary treatment of Antibiotics and detailed study of chloramphenicol, Medicinal values of curcumin (haldi), azadirachtin (neem), vitamin C and antacid (ranitidine). **(Lectures 08)**

Recommended Texts:

1. Morrison, R. T. & Boyd, R. N. *Organic Chemistry*, Dorling Kindersley (India) Pvt. Ltd. (Pearson Education).
2. Finar, I. L. *Organic Chemistry (Volume 1)*, Dorling Kindersley (India) Pvt. Ltd. (Pearson Education).
3. Finar, I. L. *Organic Chemistry (Volume 2: Stereochemistry and the Chemistry of Natural Products)*, Dorling Kindersley (India) Pvt. Ltd. (Pearson Education).
4. Nelson, D. L. & Cox, M. M. *Lehninger's Principles of Biochemistry*, Fourth Edition, W. H. Freeman.
5. Berg, J. M., Tymoczko, J. L. & Stryer, L. *Biochemistry*, Sixth Edition, W. H. Freeman.

*** Latest editions of all the suggested books are recommended.**

Semester IV

Physical Chemistry-IV

Course Code: BAS-411

L	T	P	C
3	2	0	4

Course Content:

Unit I

Photochemistry: Characteristics of electromagnetic radiation, Lambert-Beer's law and its limitations. Laws of photochemistry, quantum yield with examples of low and high quantum yields, photochemical equilibrium and the differential rate of photochemical reactions, photosensitised reactions, quenching. Role of photochemical reactions in biochemical processes, chemiluminescence. **(Lectures 08)**

Unit II

Applications of conductivity measurements: Ionic velocities, mobilities and their determinations, transference numbers and their relation to ionic mobilities, determination of transference numbers using Hittorf and Moving Boundary methods. Applications of conductance measurement: (i) degree of dissociation of weak electrolytes, (ii) ionic product of water. **(Lectures 08)**

Unit III

Chemical Kinetics: Order and molecularity of a reaction, rate laws in terms of the advancement of a reaction, differential and integrated form of rate expressions first & second order reactions, Temperature dependence of reaction rates; Arrhenius equation; activation energy. Collision theory of reaction rates. Qualitative treatment of the theory of absolute reaction rates. **(Lectures 08)**

Unit IV

Surface chemistry: Physical adsorption, chemisorption, adsorption isotherms. Nature of adsorbed state. **(Lectures 08)**

Unit V

Catalysis: Types of catalyst, specificity and selectivity, mechanisms of catalyzed reactions at solid surfaces; effect of particle size and efficiency of nanoparticles as catalysts. Enzyme catalysis, Michaelis-Menten mechanism, acid-base catalysis. **(Lectures 08)**

Recommended Texts:

1. Atkins, P. W. & Paula, J. de *Atkin's Physical Chemistry* 8th Ed., Oxford University Press (2006).
2. Ball, D. W. *Physical Chemistry* Thomson Press, India (2007).
3. Castellan, G. W. *Physical Chemistry* 4th Ed. Narosa (2004).
4. Laidler, K. J. *Chemical Kinetics* Pearson Education: New Delhi (2004)

*** Latest editions of all the suggested books are recommended.**

Semester III/IV
FUNDAMENTALS OF COMPUTERS

Course Code: BCS-301/BCS-401

L	T	P	C
3	2	0	4

Course Content:

Unit I

Concepts in Computer Application: Definition of Electronic Computer, History, Generations, Characteristic and Application of Computers, Classification of Computers, Functional Components of Computer: CPU, I/O devices, Type of Memory & Memory Hierarchy, Firmware and Human ware. **(Lectures 08)**

Unit II

Programming Language Classification & Number System: Generation of Languages, Introduction to 4GLs. Translators: Assembler, Compiler, and Interpreter. Number System: Decimal, Octal, Binary and Hexadecimal & their Conversions. Various Codes: BCD, ASCII and EBCDIC and Gray Code. **(Lectures 08)**

Unit III

Concepts in Operating System, Office Tools and Data Management: Elementary Concepts in Operating System, textual Vs GUI Interface, Introduction to DOS, MS Windows, MS office Tools, MS WORD, MS EXCEL, MS Power Point. **(Lectures 08)**

Unit IV

Data Communication & Networks: Basic Concepts in Computer Networks, Networking of computers- Introduction of LAN and WAN, Network Topologies.

Internet and Web Technologies: Hypertext Markup Language, DHTML, WWW, Gopher, FTP, Telnet, Web Browsers, Net Surfing, Search Engines, Email. **(Lectures 08)**

Unit V

IT Industry Trends: Careers and Applications in India Basic Awareness of NICNET and ERNET. Application of IT to Areas like E Commerce, electronic governance, Multimedia, and Entertainment.

Information Representation: Introduction to Information representation in Digital Media, Text, image, graphics, Animation, Audio, Video etc., Introduction to JPEG, MPEG, MHEG, MP3 & AVI. **(Lectures 08)**

Text Books:

1. Sinha P.K., Computer Fundamentals.
2. Yadav, D S, *Foundations of IT*, New Age, Delhi.
3. Rajaraman, *Introduction to Computers*, Prentice-Hall India.

Reference Books:

1. Peter Nortans, *Introduction to Computers*, TME.
2. Leon & Leon, *Fundamental of Information Technology*, Vikas Publishing.
3. Lehngart, *Internet 101*, Addison Wesley.

*** Latest editions of all the suggested books are recommended.**

Semester III/IV ENVIRONMENTAL SCIENCE

Course Code: BAS-309/BAS-409

L	T	P	C
3	2	0	4

Course Content:

Unit I

General: Definition, Scope, Segments of Environment and its Multidisciplinary Nature, Some Major Environmental Problems, Definition and Scope of Ecology. **(Lectures 08)**

Unit II

Ecology And Environment: Concept of an Ecosystem- its components and functions, Trophic Levels- Producer, Consumer and Decomposer, Energy Flow in an Ecosystem, Biogeochemical Cycles, Food Chain, Food Web and Ecological Pyramid. **(Lectures 08)**

Unit III

Air pollution: Various segments of Atmosphere and their Significance, Sources and Effects of Air Pollution, Classification of Air Pollutants, Stationary and Mobile Sources of Air Pollution, Photochemical Smog, Acid Rain, Global Warming (Greenhouse Effect), Ozone Layer - Its Depletion and Control Measures, El-Nino. **(Lectures 08)**

Unit IV

Water pollution: Water Resources of the Earth and Indian Scenario, Point and non-Point sources of Water Pollution, Treatment of Water Pollution, Eutrophication, Bio-Diversity- Hot Spots of Biodiversity in India and World, Conservation, Importance and Factors Responsible for Loss of Biodiversity, Deforestation- causes and effects, Biogeographical Classification of India. **(Lectures 08)**

Unit V

Soil pollution-Sources and Consequences, Noise, Thermal - sources and consequences, Sustainable Development, Dams and Reservoirs- Their Benefits and Problems, Solid Wastes - Pollution, Treatment & Disposal, Environment Conservation Movement in India (Chipko Movement, Appiko Movement), Bioremediation, Biological Magnification. **(Lectures 08)**

Text Books:

1. "Environmental Chemistry", De,A.K., New Age Publishers Pvt. Ltd.
2. "Introduction to Environmental Engineering and Science", Masters,G.M., Prentice Hall India Pvt.Ltd.
3. "Fundamentals of Ecology", Odem,E.P., W.B.Sannders Co.

Reference Books:

1. "Biodiversity and Conservation", Bryant,P.J., Hypertext Book.
2. "Textbook of Environment Studies", Tewari, Khulbe & Tewari, I.K. Publication.

Semester-IV Technical Communication

Course code: BHM401

(Common with EHM 401/BPH406/BBA406/BCA406/ /BCH406/BFA403)

L	T	P	C
2	0	2	3

Course Contents:

Unit I

Communication: Objectives of Communication, Need for Communication, Types of communication, written & Verbal communication, Formal and informal communication (The grapevine), upward and downward communication. **(10 Hours)**

Unit II

Business communication: Importance of written business correspondence, General principles and essentials of good commercial correspondence, Different types of commercial correspondence & their drafting, Types of Business letters, Official letters, electronic communication process. **(10 Hours)**

Unit III

Project, Thesis and Dissertation writing: Project Report, Thesis & Dissertation writing Structure of Thesis writing. **(10 Hours)**

Unit IV

Modern Technology and Communication: Globalization of Business, Role of Information Technology, Tele- communication, Internet, Tele-conferencing and Video-conferencing. **(10 Hours)**

Text Books:

1. Mishra Sunita & Muraliksishra C., *Communication Skills for Engineers* – Pearson Education, New Delhi.
2. Raman Meenakshi & Sharma Sangeeta, *Technical Communication-Principles & Practice* – O.U.P. New Delhi. 2007.
3. Chhabra T N, *Business Communication*, Sun India Pub. New Delhi.

Reference Books:

1. Mohan Krishna & Banerji Meera, *Developing Communication Skills* – Macmillan India Ltd. Delhi.
2. Mitra Barum K., *Effective Technical Communication* – O.U.P. New Delhi. 2006.

NOTE:

This syllabus has been designed to improve the oral and written communication skills of students. The faculty members should put emphasis on practical (oral) activities for generating students' interest in language learning.

*** Latest editions of all the suggested books are recommended.**

Semester IV
Inorganic & Organic Chemistry-IV Lab
[With amendment in Code vide approval dated 5th Nov 2012]

Course Code: BAS-458

L	T	P	C
0	0	4	2

LIST OF EXPERIMENTS:

1. Quantitative Analysis: The following quantitative estimations are to be carried out.

1. Estimation of nickel (II) using Dimethylglyoxime as the precipitant.
2. Estimation of copper as CuSCN. Using Ammonium thiocyanide as the precipitant.

2. Inorganic Preparations:

1. Tetraammine copper (II) sulphate, $[\text{Cu}(\text{NH}_3)_4]\text{SO}_4 \cdot \text{H}_2\text{O}$
3. Systematic analysis of extra elements in the given unknown organic compounds
4. Tests for following functional groups and unsaturation. Alcoholic, aldehydic, ketonic
Carboxylic Phenolic, esters.
2. Qualitative analysis of the following types of unknown organic compounds
 - Carboxylic acids
 - Phenols
 - Alcohols
 - Aldehydes
 - Ketones
 - Esters

Evaluation of Practical Examination:

Internal Evaluation (50 marks)

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 5 point scale (two for experiment, two for file work and one for viva) which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation scheme:

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (30 MARKS)			ATTENDANCE (5 MARKS)	QUIZ (5 MARKS)	VIVA (10 MARKS)	TOTAL INTERNAL (50 MARKS)
EXPERIMENT (10 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)				

External Evaluation (50 marks)

The external evaluation would be done by the external faculty based on the experiment conducted during the examination.

Recommended Texts:

1. Vogel, A.I. A text book of Quantitative Analysis, ELBS

*** Latest editions of all the suggested books are recommended.**

Semester IV
Physical Chemistry-IV Lab

Course Code: BAS-460

L	T	P	C
0	0	4	2

LIST OF EXPERIMENTS:

- (I) To study changes in conductance in the following systems
- (i) strong acid-strong base
 - (ii) weak acid-strong base and
 - (iii) mixture of strong acid and weak acid-strong base
- (II) Study the kinetics of the following reactions.
- 1. Initial rate method: Iodide-persulphate reaction
 - 2. Integrated rate method:
 - (a) Acid hydrolysis of methyl acetate with hydrochloric acid, volumetrically or conductometrically.
 - (b) Iodide-persulphate reaction
 - (c) Saponification of ethyl acetate.

Evaluation of Practical Examination:

Internal Evaluation (50 marks)

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 5 point scale (two for experiment, two for file work and one for viva) which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation scheme:

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (30 MARKS)			ATTENDANCE (5 MARKS)	QUIZ (5 MARKS)	VIVA (10 MARKS)	TOTAL INTERNAL (50 MARKS)
EXPERIMENT (10 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)				

External Evaluation (50 marks)

The external evaluation would be done by the external faculty based on the experiment conducted during the examination.

Recommended Texts:

1. Vogel, A.I. A text book of Quantitative Analysis, ELBS

*** Latest editions of all the suggested books are recommended.**

Semester III /IV
FUNDAMENTALS OF COMPUTERS LAB

Course Code: BCS-351/BCS-451

L	T	P	C
0	0	4	2

LIST OF EXPERIMENTS:

1. Fundamentals of computer system, with its functional components.
2. Create a formatted WORD document.
3. Create a WORD document using different fonts.
4. Create a table & perform operations in it.
5. Create a WORD document, using the functions page set up, & page preview, and then print that document.
6. Implement Mail Merge.
7. Collect the information of any company & perform the below operation in it:
 - (a) Insert the data into Row/Column of Excel, worksheet
 - (b) Create a worksheet in Excel, perform alignment, text wrapping & sort the data.
8. Collect the information of any company & perform the below operation in it:
 - (a) Generate the graph in Excel.
 - (b) Create a Hyperlink to a word document.
 - (e) Create a worksheet using the functions- page set up, print preview & then print the worksheet.
9. Create, save & print the power point presentation
10. Create a power point presentation using clipart, Word art gallery & then add transition & Animation effects.

Evaluation of Practical Examination:

Internal Evaluation (50 marks)

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 5 point scale (two for experiment, two for file work and one for viva) which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation scheme:

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (30 MARKS)			ATTENDANCE (5 MARKS)	QUIZ (5 MARKS)	VIVA (10 MARKS)	TOTAL INTERNAL (50 MARKS)
EXPERIMENT (10 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)				

External Evaluation (50 marks)

The external evaluation would be done by the external faculty based on the experiment conducted during the examination.

Semester III/IV
ENVIRONMENTAL SCIENCE LAB

Course Code: BAS-359/BAS-459

L	T	P	C
0	0	4	2

LIST OF EXPERIMENT:

1. To determine total alkalinity in the given water sample.
2. To determine the temporary and permanent hardness in water sample.
3. To determine the pH of the given solution using pH meter.
4. To determine the turbidity in given water sample.
5. To determine the dissolved oxygen present in a water sample.
6. To determine the conductivity in water sample.
7. To determine the carbon-di-oxide content in polluted water sample.
8. To find chemical oxygen demand of waste water sample by potassium dichromate.
9. To determine the TDS and TSS in water sample.
10. To determine the noise level in ambient air.

Evaluation of Practical Examination:

Internal Evaluation (50 marks)

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 5 point scale (two for experiment, two for file work and one for viva) which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation scheme:

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (30 MARKS)			ATTENDANCE (5 MARKS)	QUIZ (5 MARKS)	VIVA (10 MARKS)	TOTAL INTERNAL (50 MARKS)
EXPERIMENT (10 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)				

External Evaluation (50 marks)

The external evaluation would be done by the external faculty based on the experiment conducted during the examination.

Semester V Inorganic Chemistry-V

Course Code: BAS-509

L	T	P	C
3	2	0	4

Course Content:

Unit I

Theoretical principles involved in chemistry practical: Theoretical principles and chemistry involved in qualitative analysis of mixture of cations and anions including interfering and insoluble. **(Lectures 08)**

Unit II

Organometallic Compounds: Definition and classification of organometallic compounds, organometallic compounds of Li & Al, their synthesis & applications. **(Lectures 08)**

Unit III

Metal carbonyls: Preparation, properties, structure and bonding of mononuclear carbonyls. π -acceptor behavior of carbon monoxide, synergic effect (MO diagram of CO) Carbonylate anions, ferrocene and its reactions. **(Lectures 08)**

Unit IV

Bioinorganic Chemistry: Metal ions present in biological systems, classification of elements according to their action in biological system. Geochemical effect on the distribution of metals. Sodium / K-pump, carbonic anhydrase and carboxypeptidase. Excess and deficiency of some trace metals. **(Lectures 08)**

Unit V

Toxicity of metal ions (Hg, Pb, Cd and As), reasons for toxicity, Use of chelating agents in medicine. Iron and its application in bio-systems, Hemoglobin; Storage and transfer of iron. **(Lectures 08)**

Recommended Texts:

1. Purcell, K.F & Kotz, J.C. *Inorganic Chemistry* W.B. Saunders Co, 1977.
2. Huheey, J.E., *Inorganic Chemistry*, Prentice Hall, 1993.
3. Lippard, S.J. & Berg, J.M. *Principles of Bioinorganic Chemistry* Panima Publishing Company 1994.
4. Cotton, F.A. & Wilkinson, G, *Advanced Inorganic Chemistry*. Wiley-VCH, 1999.

*** Latest editions of all the suggested books are recommended.**

Semester V Organic Chemistry-V

Course Code: BAS-510

L	T	P	C
3	2	0	4

Course Content:

Unit I

Organic spectroscopy: General principles Introduction to absorption and emission spectroscopy. UV Spectroscopy: Types of electronic transitions, λ_{max} , Chromophores and Auxochromes, Bathochromic and Hypsochromic shifts.

IR Spectroscopy: Fundamental and non-fundamental molecular vibrations; IR absorption positions of O, N and S containing functional groups; Fingerprint region and its significance.

(Lectures 08)

Unit II

NMR Spectroscopy: Basic principles of Proton Magnetic Resonance, chemical shift and factors influencing it; Spin – Spin coupling and coupling constant; Interpretation of NMR spectra of simple compounds.

Applications of IR, UV and NMR for identification of simple organic molecules.

(Lectures 08)

Unit III

Dyes: Classification, Colour and constitution; Mordant and Vat Dyes; Chemistry of dyeing; Synthesis and applications of: Azo dyes – Methyl Orange, Phthalein Dyes –phenolphthalein Natural dyes –structure elucidation and synthesis of Alizarin and Indigotin.

(Lectures 08)

Unit IV

Polymers: Number average molecular weight, Weight average molecular weight, Degree of polymerization, Polymerization reactions - Addition and condensation - Mechanism of cationic, anionic and free radical addition polymerization; Preparation and applications of plastics – thermo softening (PVC, polythene); Fabrics – natural and synthetic (acrylic, polyamide, polyester); Nylon 6, Nylon 6,6. Rubbers – natural and synthetic: Buna-S, Vulcanization.

(Lectures 08)

Unit IV

Lipids

Introduction to oils and fats; common fatty acids present in oils and fats Hydrogenation of oils and fats. Saponification value, acid value, iodine number. Reversion and rancidity.

(Lectures 08)

Recommended Texts:

1. Kemp, W. *Organic Spectroscopy*, Palgrave.
2. Kalsi, P. S. *Textbook of Organic Chemistry* (1st Ed.), New Age International (P) Ltd. Pub.
3. Morrison, R. T. & Boyd, R. N. *Organic Chemistry*, Dorling Kindersley (India) Pvt. Ltd. (Pearson Education).
4. Billmeyer, F. W. *Textbook of Polymer Science*, John Wiley & Sons, Inc.

*** Latest editions of all the suggested books are recommended.**

Semester V

Physical Chemistry V

Course Code: BAS-511

L	T	P	C
3	2	0	4

Course Content:

Unit I

Chemical bonding: Covalent bonding, valence bond and molecular orbital approaches, LCAO- MO treatment of H_2^+ . Bonding and antibonding orbitals. Qualitative extension to H_2 . Comparison of LCAO-MO and VB treatments of H_2 (only wave functions, detailed solution not required) and their limitations. Qualitative description of LCAO-MO treatment of homonuclear and heteronuclear diatomic molecules (HF, LiH). **(Lectures 08)**

Unit II

Molecular Spectroscopy: Interaction of electromagnetic radiation with molecules and various types of spectra; Born- Oppenheimer approximation.

Rotation spectroscopy: Selection rules, intensities of spectral lines, determination of bond lengths of diatomic and linear triatomic molecules, isotopic substitution. **(Lectures 08)**

Unit III

Vibrational spectroscopy: Classical equation of vibration, computation of force constant, amplitude of diatomic molecular vibrations, anharmonicity, Morse potential, dissociation energies, fundamental frequencies, overtones, hot bands, degrees of freedom for polyatomic molecules, modes of vibration, concept of group frequencies.

Vibration-rotation spectroscopy: diatomic vibrating rotator, P, Q, R branches. **(Lectures 08)**

Unit IV

Raman spectroscopy: Qualitative treatment of Rotational Raman effect; Effect of nuclear spin, Vibrational Raman spectra, Stokes and anti-Stokes lines; their intensity difference, rule of mutual exclusion.

Electronic spectroscopy: Franck-Condon principle, electronic transitions, singlet and triplet states, fluorescence and phosphorescence, dissociation and pre dissociation, calculation of electronic transitions of polyenes using free electron model. **(Lectures 08)**

Unit IV

Nuclear Magnetic Resonance (NMR) spectroscopy: Principles of NMR spectroscopy, Larmor precession, chemical shift and low resolution spectra, different scales, spin-spin coupling and high resolution spectra, interpretation of PMR spectra of organic molecules.

Electron Spin Resonance (ESR) spectroscopy: Its principle, hyperfine structure, ESR of simple radicals. **(Lectures 08)**

Recommended Texts:

1. Banwell, C. N. & McCash, E. M. *Fundamentals of Molecular Spectroscopy* 4th Ed. Tata McGraw-Hill: New Delhi (2006).
2. Chandra, A. K. *Introductory Quantum Chemistry* Tata McGraw-Hill (2001).
3. House, J. E. *Fundamentals of Quantum Chemistry* 2nd Ed. Elsevier: USA (2004).
4. Lowe, J. P. & Peterson, K. *Quantum Chemistry* Academic Press (2005).

*** Latest editions of all the suggested books are recommended.**

Semester V Analytical Chemistry

Course Code: BAS-512

L	T	P	C
3	2	0	4

Course Content:

Unit I

Qualitative and Quantitative aspects of analysis: Sampling, evaluation of analytical data, errors, accuracy and precision, methods of their expression, normal law of distribution if indeterminate errors, statistical test of data; F, Q, and T test, rejection of data, and confidence intervals. **(Lectures 08)**

Unit II

Optical methods of analysis: Origin of spectra, interaction of radiation with matter, fundamental laws of spectroscopy and selection rules, validity of Beer-Lambert's law. *UV and Visible Spectrometry:* Basic principles of instrumentation (choice of source, monochromator and detector) for single and double beam instrument. **(Lectures 08)**

Unit II

Infrared Spectrometry: Basic principles of instrumentation (choice of source, monochromator & detector) for single and double beam instrument; sampling techniques. **(Lectures 08)**

Unit III

Electro analytical methods: Classification of electroanalytical methods, basic principle of pH metric, potentiometric and conductometric titrations. Techniques used for the determination of equivalence point. Techniques used for the determination of pK_a values. **(Lectures 08)**

Unit IV

Separation Techniques: Chromatography: Classification and principle and efficiency of the technique. Mechanism of separation: adsorption, partition & ion exchange. Development of chromatograms: frontal, elution and displacement methods. Qualitative and quantitative aspects of chromatographic methods of analysis: IC, GLC, GPC, TLC and HPLC. **(Lectures 08)**

Recommended texts:

1. Vogel, Arthur I: *A Test book of Quantitative Inorganic Analysis* (Rev. by GH Jeffery and others) 5th Ed. The English Language Book Society of Longman
2. Willard, Hobert H. *et. al: Instrumental Methods of Analysis*, 7th Ed. Wardsworth Publishing Company, Belmont, California, USA, 1988.
3. Christian, Gary D; *Analytical Chemistry*, 6th Ed. New York- John Willy, 2004.
4. Harris, Daniel C: *Exploring Chemical Analysis*, 2nd Ed. New York, W.H. Freeman, 2001.
5. Khopkar, S.M. *Basic Concepts of Analytical Chemistry* New Age, International Publisher, 2009.
6. SKoog, D.A. Holler F.J. and Nieman, T.A. *Principles of Instrumental Analysis*, Thomson Asia Pvt. Ltd. Singapore.
7. Mikes, O. & Chalmes, R.A. *Laboratory Hand Book of Chromatographic & Allied Methods*, Elles Harwood Ltd. London.
8. Ditts, R.V. *Analytical Chemistry – Methods of separation*.

*** Latest editions of all the suggested books are recommended.**

Semester-V Technical Writing

Course code: BHM501

(Common with EHM 501/BPH506)

L	T	P	C
2	0	2	3

Course Contents:

Unit I

Forms of Technical Communication: Report writing, Definition and characteristics, Steps towards report writing, Structure, style of Report writing, Types & forms of Reports, Presentation of Reports, Importance of Report writing. **(10 Hours)**

Unit II

Technical Paper writing: Definition and purpose, Essentials of a good technical paper/Article, Scientific Article writing, Difference between Technical paper/Article and scientific article, Methods of writing technical paper & Scientific article. **(10 Hours)**

Unit III

Technical Proposal: Definition and meaning of Technical Proposal, Significance of Proposal, Characteristics of a good Proposal, Format of Proposal, Uses of Proposals. **(10 Hours)**

Unit IV

Writing Skills: Reporting events, Writing newspaper reports, Essentials of essay writing – writing an essay of about 300 words on a given topic. Bio-Data Making, Writing of CV & Resumes, Difference between CV and Resume, Writing Job application etc. **(10 Hours)**

Text Books:

1. Raman Meenakshi & Sharma Sangeeta, *Technical Communication-Principles & Practice* – O.U.P. New Delhi. 2007.

Reference Books:

1. Monippally Matthukutty M., *Business Communication Strategies* – Tata- Mc Graw Hill Publications Company, New Delhi.
2. Mohan K. & Sharma R.C., *Business Correspondence of Report Writing* –TMH, New Delhi.

NOTE:

This syllabus has been designed to improve the oral and written communication skills of students. The faculty members should put emphasis on practical (oral) activities for generating students' interest in language learning.

*** Latest editions of all the suggested books are recommended.**

Semester V Inorganic Chemistry-V Lab

Course Code: BAS-557

L	T	P	C
0	0	4	2

LIST OF EXPERIMENTS:

I. Qualitative analysis:

Using H₂S, Identification of cations and simple anions in a mixture of salts containing not more than four ions (Two cations and two anions) If combination of cations or anions is given in the mixture, insoluble should be avoided. Spot tests should be carried out for final identifications wherever feasible.

Cation : Pb²⁺, Bi³⁺, Cu²⁺, Cd²⁺, As³⁺, Sb³⁺, Sn²⁺ or Sn⁴⁺, Fe²⁺ OR Fe³⁺, Al³⁺, Cr³⁺, Co²⁺, Ni²⁺, Zn²⁺, Mn²⁺, Ba²⁺, Sr²⁺, Ca²⁺, Mg²⁺, NH₄⁺,

Anion : CO₃²⁻, SO₃²⁻, S²⁻, NO₂⁻, CH₃COO⁻, NO₃⁻, Cl⁻, Br⁻, I⁻, SO₄²⁻, PO₄³⁻, BO₃³⁻, F⁻, C₂O₄²⁻

II. Quantitative Estimation:

Gravimetric estimation of Ag⁺, Ba⁺⁺ in their salt solutions.

Evaluation of Practical Examination:

Internal Evaluation (50 marks)

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 5 point scale (two for experiment, two for file work and one for viva) which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation scheme:

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (30 MARKS)			ATTENDANCE (5 MARKS)	QUIZ (5 MARKS)	VIVA (10 MARKS)	TOTAL INTERNAL (50 MARKS)
EXPERIMENT (10 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)				

External Evaluation (50 marks)

The external evaluation would be done by the external faculty based on the experiment conducted during the examination.

Semester V
Organic Chemistry-V Lab

Course Code: BAS558

L	T	P	C
0	0	4	2

LIST OF EXPERIMENTS:

1. Qualitative analysis of following types of unknown organic compounds:

- I. Carbohydrates
- II. Primary, secondary and tertiary amines
- III. Nitro compounds
- IV. Amides
- V. Aryl halides

2. Preparation of following organic compounds:

- I. Acetanilide
- II. Picric acid
- III. Aspirin

Evaluation of Practical Examination:

Internal Evaluation (50 marks)

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 5 point scale (two for experiment, two for file work and one for viva) which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation scheme:

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (30 MARKS)			ATTENDANCE (5 MARKS)	QUIZ (5 MARKS)	VIVA (10 MARKS)	TOTAL INTERNAL (50 MARKS)
EXPERIMENT (10 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)				

External Evaluation (50 marks)

The external evaluation would be done by the external faculty based on the experiment conducted during the examination.

Semester V
Physical Chemistry-V Lab

Course Code: BAS-559

L	T	P	C
0	0	4	2

LIST OF EXPERIMENTS:

1. Study of Adsorption of acetic acid on charcoal.
2. Determination of heat of solution of a substance(oxalic acid) by solubility method
3. Determination of relative strength of HCl and H₂SO₄ by catalyzing the hydrolysis of methyl acetate.
4. Kinetic study of acetone – iodine reaction by H⁺.
5. Determination of molecular weight by Rast method.
6. Determination of molecular weight of volatile substance by Duma's method.

Evaluation of Practical Examination:

Internal Evaluation (50 marks)

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 5 point scale (two for experiment, two for file work and one for viva) which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation scheme:

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (30 MARKS)			ATTENDANCE (5 MARKS)	QUIZ (5 MARKS)	VIVA (10 MARKS)	TOTAL INTERNAL (50 MARKS)
EXPERIMENT (10 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)				

External Evaluation (50 marks)

The external evaluation would be done by the external faculty based on the experiment conducted during the examination.

Semester VI Inorganic Chemistry-VI

Course Code: BAS-609

L	T	P	C
3	2	0	4

Course Content:

Unit I

Nuclear Chemistry: Composition and stability of nucleus, Nuclear Forces, Mass defect, nuclear binding energy. Artificial and induced radioactivity. Units, detection and measurement of radioactivity, half life, average life and calculation of decay constant, radioactivity equilibrium, particle acceleration and principles of separation of isotopes, Nuclear fission and fusion. **(Lectures 08)**

Unit II

Non –Aqueous Solvent: Classification and properties of non – aqueous solvents. Reactions in liquid NH_3 and liquid SO_2 . **(Lectures 08)**

Unit III

Co-ordination compounds: Stereoisomerism in 4 - & 6-Coordination complex compounds. Valence bond and crystal field theory of co-ordination compounds, factors affecting the stability of metal complexes. **(Lectures 08)**

Unit IV

A critical study of the following – nitrosyls. Carbonyls, hydrides of boron, nitrides, alloys, per acids and their salts. Fluorides of C and Si, Interhalogen compounds, Basic Iodine. **(Lectures 08)**

Recommended Texts:

1. Purcell, K.F & Kotz, J.C. *Inorganic Chemistry*, W.B. Saunders Co, 1977.
2. Huheey, J.E., *Inorganic Chemistry*, Prentice Hall, 1993.
3. Lippard, S.J. & Berg, J.M. *Principles of Bioinorganic Chemistry*, Panima Publishing Company 1994.
4. Cotton, F.A. & Wilkinson, G, *Advanced Inorganic Chemistry*. Wiley-VCH, 1999.

*** Latest editions of all the suggested books are recommended.**

Semester VI Organic Chemistry-VI

Course Code: BAS-610

L	T	P	C
3	2	0	4

Course Content:

Unit I

Aromaticity: Benzenoid and non benzenoid systems, resonance and hyper conjugation. Electrophilic and nucleophilic aromatic substitution Inductive, electromeric and tautomeric effect, steric hindrance. **(Lectures 08)**

Unit II

Stereo Chemistry: Optical isomerism in compounds containing one or more asymmetric carbon atoms. Racemisation, resolution of racemic mixture asymmetric synthesis and walden inversion, optical isomerism due to restricted rotation, geometrical isomerism stereochemistry of nitrogen compounds such as oximes, diazo compounds, Beckmann rearrangement. **(Lectures 08)**

Unit III

Carbohydrates: Chemistry of poly saccharides, starch, cellulose and glycogen.

Terpenes: Bicyclic α -Pinene, camphene and sesquiterpenes. **(Lectures 08)**

Unit IV

Uricids and purins: Structure of uric acid, caffeine, theobromine and theophylline.

(Lectures 08)

Unit V

Reaction Mechanisms: Fries Migration, Hofmann exhaustive methylation, sraup's synthesis, Arndt Eistert synthesis Mannich reaction, Hoffmann reaction, Cannizaro's reaction. **(Lectures 08)**

Recommended Texts:

1. Kalsi, P. S. *Textbook of Organic Chemistry* (1st Ed.), New Age International (P) Ltd. Pub.
2. Morrison, R. T. & Boyd, R. N. *Organic Chemistry*, Dorling Kindersley (India) Pvt. Ltd. (Pearson Education).

*** Latest editions of all the suggested books are recommended.**

Semester VI
Physical Chemistry-VI

Course Code: BAS-611

L	T	P	C
3	2	0	4

Course Content:

Unit I

Gaseous State: Maxwell's distribution law of molecular velocities and its applications; energy distribution law, equipartition principle; Avogadro number and its determination Einstein method; viscosity and thermal conductivity of gases, effect of temperature and pressure on viscosity of gases. **(Lectures 08)**

Unit II

Thermodynamics: Carnot cycle and theorem, Principle of maximum work, thermodynamic functions – work function, free energy, entropy and their properties. Gibbs – Helmholtz equation. Thermodynamic derivation of the law of Mass action. Vant hoff isotherm and isochore. Relation between osmotic pressure, lowering of vapour pressure, Depression of freezing point and elevation of boiling point. **(Lectures 08)**

Unit III

Colloidal State & Adsorption: Stability of colloids, ultra microscope and ultracentrifuge and their use in determining the size of the particle. Electro kinetic (Zeta) potential. Simple ideas of kinetics of coagulation. Colloidal electrolytes, Adsorption indicators & their applications. **(Lectures 08)**

Unit IV

Solid State: Growth and form of crystals, classification of crystals, types of lattice structures, lattice energy and its calculations. Defects in crystals; semiconductors & their uses. **(Lectures 08)**

Unit V

Electrochemistry: Concentration cells with & without transference, calculation of e.m.f. of such cells. Liquid junction potential & its determination. Applications of e.m.f. measurements potentiometric titrations. **(Lectures 08)**

Recommended Texts:

1. Atkins, P. W. & Paula, J. de *Atkin's Physical Chemistry* 8th Ed., Oxford University Press (2006).
2. Ball, D. W. *Physical Chemistry* Thomson Press, India (2007).
3. Castellan, G. W. *Physical Chemistry* 4th Ed. Narosa (2004).
4. Laidler, K. J. *Chemical Kinetics* Pearson Education: New Delhi (2004)

Semester VI INDUSTRIAL CHEMISTRY

Course Code: BAS-612

L	T	P	C
3	2	0	4

Course Content:

Unit I

Silicate Technology: Silicate technology operations, Structure of silicates, some important silicates, Classification of silicates.

Glass: Physical properties of glass, Chemical properties of glass, Characteristics of glass, Raw materials, Chemical reactions, Methods of manufacture., Chemical reactions in the furnace, Shaping or forming , Annealing, Finishing. (Lectures 08)

Unit II

Portland cement: Introduction, Composition of cement, Manufacture, raw materials, types and uses in different forms.

Fertilizers: Fertilizer type, Need for fertilizers, Straight and mixed fertilizers, Sources of fertilizers, Artificial fertilizers, **Nitrogenous fertilizers.** Ammonium nitrate, Ammonium sulphate, Urea, Calcium Cyanamid, Calcium ammonium nitrate, **Phosphate fertilizers:** Normal superphosphate, triple Phosphate, ammonium phosphate, NPK fertilizers.

(Lectures 08)

Unit III

Lubricants: Properties of lubricants, Classification of lubricants, Substances used as lubricants, additives for lubricants oils, Synthetic lubricants, Lubricating greases, Chemical properties of greases, Solid lubricants, Selection of lubricants.

Lubricating oils – Classification and their uses for different types of machinery.

Soap: Soap and its manufacture, Toilet and transparent soap, Other soaps , Oil to be used for soap, Cleansing action of soap.

Detergents: Principal groups of synthetic detergents, Classification of surface active agents, Anionic detergents, Cationic detergents. Nonionic detergents. Amphoteric detergents.

(Lectures 08)

Unit IV

Paints and Pigments.: Introduction, : Characteristic of the pigments Classification of paints, Manufacture of paints, for example white lead, Sublimed white lead (Basic sulphate), Zinc oxide, Lithophone, Titanium dioxide, manufacture, Ultramarine blue , Red lead, Chrome green, Guignet's green , Reinmann's green , Setting of the paints Requirements of a good paint Emulsion paints, Constituents of emulsion paints. Advantages, Luminescent paints. Heat resistant paints, Varnishes, Manufacturing of varnishes, Lacquers, Solvents and thinners. (Lectures 08)

Unit V

Insecticides: Introduction, Inorganic insecticides, Natural or plant insecticides, Organic insecticides, Dinitrophenols, DDT, Methoxychlor, BHC or benzene hexachlore, Gammexane , Chlordane or, 1068, Aldrin and dieldrin, Endrin, Melathion, Parathion, Attractants and repellents, Fumigants, Fungicides, Herbicides.

Drugs: Introduction, Some important drugs, Sulpha drugs, sulphonamide or antibacterial, Some important derivatives of sulphanilamide (or sulphonamide) Antipyretics and analgesics, Aspirin , Phenacetin (p-ethoxy acetanilide) Melubrin and novalgin. (Lectures 08)

Recommended Texts:

1. Industrial Chemistry, Dr. B. K. Sharma, Goel Publishing House, Meerut.

* Latest editions of all the suggested books are recommended.

Semester-VI Communication Technique

Course code: BHM601

(Common with EHM601/BPH606/BBA603/BCA604/BCH606)

L	T	P	C
2	0	2	3

Course Contents:

Unit I

Oral Communication: Principles of effective oral communication, Features, Vitals of communication, Interpersonal communication, Persuasive communication. **(10 Hours)**

Unit II

Presentation Strategies: Purpose, Audience & Locale, Organizing contents, Preparing outlines. Audio- Visual aids, Body Language, Voice dynamics. **(10 Hours)**

Unit III

Listening Skills: The Listening process, Hearing & listening, Types of listening, Listening with a purpose, Barriers to listening, Telephonic conversation. **(10 Hours)**

Unit IV

Speaking Skills: Improving voice & speech, Art of public speaking, Using visual aids, Job interview being interviewed by the media, Dealing with the boss. Dealing with subordinates, How to run a meeting. **(10 Hours)**

Text Book:

1. Raman Meenakshi & Sharma Sangeeta, *Technical Communication-Principles & Practice* – O.U.P. New Delhi. 2007.

Reference Books:

1. Ruther Ford A., *Basic Communication Skills* – Pearson Education, New Delhi.
2. Mitra Barum K., *Effective Technical Communication* – O.U.P. New Delhi. 2006.

NOTE:

This syllabus has been designed to improve the oral and written communication skills of students. The faculty members should put emphasis on practical (oral) activities for generating students' interest in language learning.

*** Latest editions of all the suggested books are recommended.**

Semester VI
Inorganic Chemistry-VI Lab

Course Code: BAS651

L	T	P	C
0	0	4	2

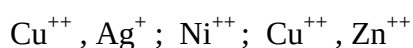
LIST OF EXPERIMENTS:

1. Qualitative Analysis:

Inorganic mixture analysis, containing seven radicals (three or four Basis radicals and four or three acidic radicals) Interfering acid radicals, Insolubles may also be there.

2. Quantitative Analysis (Gravimetric estimations):

Estimation of two salts in a solution mixture of two solutions:



Evaluation of Practical Examination:

Internal Evaluation (50 marks)

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 5 point scale (two for experiment, two for file work and one for viva) which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation scheme:

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (30 MARKS)			ATTENDANCE (5 MARKS)	QUIZ (5 MARKS)	VIVA (10 MARKS)	TOTAL INTERNAL (50 MARKS)
EXPERIMENT (10 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)				

External Evaluation (50 marks)

The external evaluation would be done by the external faculty based on the experiment conducted during the examination.

Semester VI
Organic Chemistry-VI Lab

Course Code: BAS652

L	T	P	C
0	0	4	2

LIST OF EXPERIMENTS:

1. Quantitative Analysis:
Analysis of an organic mixture containing two organic compounds.
2. Preparation of following organic compounds:
 - a) p - nitro acetanilide.
 - b) 2,4,6 Tribromophenol.
 - c) Phenol – Formaldehyde (Bakelite) resin.

Evaluation of Practical Examination:

Internal Evaluation (50 marks)

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 5 point scale (two for experiment, two for file work and one for viva) which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation scheme:

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (30 MARKS)			ATTENDANCE (5 MARKS)	QUIZ (5 MARKS)	VIVA (10 MARKS)	TOTAL INTERNAL (50 MARKS)
EXPERIMENT (10 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)				

External Evaluation (50 marks)

The external evaluation would be done by the external faculty based on the experiment conducted during the examination.

Semester VI
Physical Chemistry-VI Lab

Course Code: BAS653

L	T	P	C
0	0	4	2

LIST OF EXPERIMENTS

1. Determination of Parachor value of $-\text{CH}_2-$ group
2. Determination of percentage composition of Water – Phenol systems.
3. Determination of Transition point of Glauber's salt by Thermometric method.
4. Determination of order of reaction of the hydrolysis of an ester.
5. Determination of Rate coefficient of Hydrolysis of Methyl acetate in acidic medium.
6. Determination of molecular weight of polystyrene sample by viscometer method.

Evaluation of Practical Examination:

Internal Evaluation (50 marks)

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 5 point scale (two for experiment, two for file work and one for viva) which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation scheme:

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (30 MARKS)			ATTENDANCE (5 MARKS)	QUIZ (5 MARKS)	VIVA (10 MARKS)	TOTAL INTERNAL (50 MARKS)
EXPERIMENT (10 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)				

External Evaluation (50 marks)

The external evaluation would be done by the external faculty based on the experiment conducted during the examination.

Semester VI SEMINAR

Course code: BAS699

	L	T	P	C
0	0	4	2	

Selection of Topic:

1. All students pursuing B.Sc. shall select and propose a topic of the seminar in the first week of the semester. Care should be taken that the topic selected is not directly related to the subjects of the course being pursued or thesis work, if any. The proposed topic should be submitted to the course coordinator.
2. The course coordinator shall forward the list of the topics to the coordinator of concerned department, who will consolidate the list including some more topics, in consultation with the faculty of the department. The topics will then be allocated to the students along with the name of the faculty guide and also forwarded to the director for approval.
3. On approval by the Director, the list shall be displayed on the notice board and the students will also be accordingly informed by the course coordinator within three weeks of the commencement of the semester.

Preparation of the Seminar

1. The student shall meet the guide for the necessary guidance for their preparation for the seminar.
2. During the next two to four weeks the student will read the primary literature related to the topic under the guidance of supervisor.
3. After necessary collection of data and literature survey, the students must prepare a report. The report shall be arranged in the sequence as per following format & lay out plan :-
 - a. Top Sheet of transparent plastic.
 - b. Top cover.
 - c. Preliminary pages.
 - (i) Title page
 - (ii) Certification page.
 - (iii) Acknowledgment.
 - (iv) Abstract.
 - (v) Table of Content.
 - (vi) List of Figures and Tables.
 - (vii) Nomenclature.
 - d. Chapters (Main Material).
 - e. Appendices, If any.
 - f. Bibliography/ References.
 - g. Evaluation Form.
 - h. Back Cover (Blank sheet).
 - i. Back Sheet of Plastic (May be opaque or transparent).

1. **Top Cover-** The sample top cover shall be as Under:

TITLE OF THE SEMINAR

NAME OF THE STUDENT WITH COURSE, STREAM, SEMESTER & SECTION.

Department of Applied Science



**College of Engineering
Teerthanker Mahaveer University
Moradabad-244001
MONTH AND YEAR**

2. Title Page:- The Title Page cover shall be as Under:

Title of the seminar

(Submitted in Partial fulfillment of the requirement for the degree of

BACHELOR OF SCIENCE

in

Chemistry (Hons.)

by

Name of Student in capital Letters

(Roll No.)



COLLEGE OF ENGINEERING

TEERTHANKAR MAHAVEER UNIVERSITY

N.H. 24, BAGARPUR,

MORADABAD-244001

MONTH AND YEAR

3. **Certification page:-** This shall be as under

Department of Applied Science
College of Engineering
Teerthankar Mahaveer University
Moradabad-244001

The seminar Report and Title “Name of the Topic of the Seminar.” Submitted by Mr./Ms. (Name of the student) (Roll No.) may be accepted for being evaluated-

Date

Signature

Place

(Name of guide)

Note:

For Guide If you choose not to sign the acceptance certificate above, please indicate reasons for the same from amongst those given below:

- i) The amount of time and effort put in by the student is not sufficient;
- ii) The amount of work put in by the student is not adequate;
- iii) The report does not represent the actual work that was done / expected to be done;
- iv) Any other objection (Please elaborate)

4. **Abstract:-** A portion of the seminar grade will be based on the abstract. The abstract will be graded according to the adherence to accepted principles of English grammar and according to the adherence to the format described below.

The seminar abstract is an important record of the coverage of your topic and provides a valuable source of leading references for students and faculty alike. Accordingly, the abstract must serve as an introduction to your seminar topic. It will include the key hypotheses, the major scientific findings and a brief conclusion. **The abstract will be limited to 500 words, excluding figures, tables and references.** The abstract will include references to the research articles upon which the seminar is based as well as research articles that have served as key background material.

5. **Table of Content:-** This shall be as under

SAMPLE SHEET FOR TABLE OF CONTENTS

<u>TABLE OF CONTENTS</u>		
Chapter No	Title	Page No.
	Certificate	ii
	Abstract	iii
	Acknowledgement	iv
	List of Figures	v
	List of Table	vi
1	Introduction	1
	1.1	
	1.2	
	1.3	
2		
3		
4	References/ Bibliography	
5	Evaluation sheets	

6. List of Figures and Tables:- This will be as under

List of Figures and Tables - sample entries are given below:

List of Figures

Figure No.	Caption / Title	Page No.
2.1	Schematic representation of a double layered droplet	... 21
...		
3.2	Variation in rate versus concentration	... 32

List of Tables - sample entries are given below:

List of Tables

Table No.	Caption / Title	Page No.
2.1	Thickness of a double layered droplet	... 22
...		
3.2	Variation in rate versus concentration	... 34

12. Main Pages- The Main report should be divided in chapters (1, 2, 3 etc.) and structured into sections (1.1, 1.2 etc) and subsections (1.2.1, 1.2.2, ... etc). Suitable title should be given for sections and subsections, where necessary.

Referencing style- wherever reference is given in the main pages it should have the following format.

The values of thermal conductivities for a variety of substances have been reported by Varma (1982). For polymers, however, the information is more limited and some recent reviews have attempted to fill the gaps (Batchelor and Shah, 1985).

For two authors - (Batchelor and Kapur, 1985)

For more than two authors - (Batchelor et al., 1986)

By same author/combination of authors in the same year -

(Batchelor, 1978*a*; Batchelor, 1978*b*; Batchelor et al., 1978)

13. Bibliography/References- In the bibliography/ references list standard formats must be used. The typical formats are given blow-

Journal articles: -

David, A.B., Pandit, M.M. and Sinha, B.K., 1991, "Measurement of surface viscosity by tensiometric methods", Chem. Engng Sci.47, 931-945.

Books: -

Doraiswamy, L.K. and Sharma, M.M., 1984, "Heterogeneous Reactions- Vol 1", Wiley, New York, pp 89-90.

Edited books/Compilations/Handbooks: -

Patel, A.B., 1989, "Liquid -liquid dispersions", in Dispersed Systems Handbook, Hardy, L.C. and Jameson, P.B. (Eds.), McGraw Hill, Tokyo, pp 165-178.

Lynch, A.B. (Ed.), 1972, "Technical Writing", Prentice Hall, London.

Thesis/Dissertations: -

Pradhan, S.S., 1992, "Hydrodynamic and mass transfer characteristics of packed extraction columns", Ph.D. Thesis, University of Manchester, Manchester, U.K..

Citations from abstracts: -

Lee, S. and Demlow, B.X., 1985, US Patent 5,657,543, *Cf* C.A. 56, 845674.

Personal Communications: -

Reddy, A.R., 1993, personal communication at private meeting on 22 October 1992 at Chemistry Department, Indian Institute of Technology, Delhi.

Electronic sources (web material and the like)- For citing web pages and electronic documents, use the APA style given at:
<http://www.apastyle.org/elecsource.html>

14. **Evaluation Form:-** Three sheets of evaluation form should be attached in the report as under.

- a. Evaluation form for guide and other Internal Examiner.
- b. Evaluation form for external examiners.
- c. Summary Sheet.

15. **Evaluation form for Guide & Internal Examiners:-**

EVALUATION SHEET

(To be filled by the GUIDE & Internal Examiners only)

Name of Candidate :

Roll No :

Class and Section:

Please evaluate out of Five marks each.

S. No .	Details	Marks (5)	Marks (5)	Marks (5)
		Guide	Int. Exam. 1	Int. Exam. 2
1	OBJECTIVE IDENTIFIED & UNDERSTOOD			
2	LITERATURE REVIEW / BACKGROUND WORK (Coverage, Organization, Critical review)			
3	DISCUSSION/CONCLUSIONS (Clarity, Exhaustive)			
4	SLIDES/PRESENTATION SUBMITTED (Readable, Adequate)			
5	FREQUENCY OF INTERACTION (Timely submission, Interest shown, Depth, Attitude)			
	Total (Out of 25)			
	Average out of 50			

Signature:

Signature:

Signature:

Date:

Date:

Date:

EVALUATION SHEET FOR EXTERNAL EXAMINER

(To be filled by the External Examiner only)

Name of Candidate:

Roll No :

I. For use by **External Examiner ONLY**

Please evaluate out of Ten marks each.

S.No.	Details	Marks (10)
1	OBJECTIVE IDENTIFIED & UNDERSTOOD	
2	LITERATURE REVIEW / BACKGROUND WORK (Coverage, Organization, Critical review)	
3	DISCUSSION/CONCLUSIONS (Clarity, Exhaustive)	
4	POWER POINT PRESENTATION (Clear, Structured)	
5	SLIDES (Readable, Adequate)	
	Total (Out of 50)	

Signature:

Date:

EVALUATION SUMMARY SHEET

(To be filled by External Examiner)

Name and Roll No.	Internal Examiners (50)	External Examiner (50)	Total (100)	Result (Pass/Fail)

Note:- The summary sheet is to be completed for all students and the same shall also be compiled for all students examined by External Examiner. The Format shall be provided by the course coordinator.

16. General Points for the Seminar

1. The report should be typed on A4 sheet. The Paper should be of 70-90 GSM.
2. Each page should have minimum margins as under-
 - (i) Left 1.5 inches
 - (ii) Right 0.5 Inches
 - (iii) Top 1 Inch
 - (iv) Bottom 1 Inch (Excluding Footer, If any)
3. The printing should be only on one side of the paper
4. The font for normal text should Times New Roman, 14 size for text and 16 size for heading and should be typed in double space. The references may be printed in Italics or in a different fonts.
5. The Total Report should not exceed 50 pages including top cover and blank pages.
6. A CD of the report should be pasted/attached on the bottom page of the report.
7. Similarly a hard copy of the presentation (Two slide per page) should be attached along with the report and a soft copy be included in the CD.
8. Three copies completed in all respect as given above is to be submitted to the guide. One copy will be kept in departmental/University Library, One will be return to the student and third copy will be for the guide.
9. The power point presentation should not exceed 30 minutes which include 10 minutes for discussion/Viva.

Study & Evaluation Scheme

of

Bachelor of Science (Mathematics)

[Applicable w.e.f. Academic Session 2012-13 till revised]

(With amendments in BAS603, BAS604, as approved on 5th November, 2012 and 5th January 2013.)



TEERTHANKER MAHAVEER UNIVERSITY

N.H.-24, Delhi Road, Moradabad, Uttar Pradesh-244001

Website: www.tmu.ac.in



TEERTHANKER MAHAVEER UNIVERSITY

(Established under Govt. of U. P. Act No. 30, 2008)

Delhi Road, Bagarpur, Moradabad (U.P)

Study & Evaluation Scheme of Bachelor of Science (Hons)-Mathematics SUMMARY

Programme	: B.Sc.(Hons)- Mathematics
Duration	: Three year full time (Six Semesters)
Medium	: English
Minimum Required Attendance	: 75 %
Credit	:
Maximum Credit	: 154
Minimum credit required for the degree	: 150
Assessment	:

Assessment	:	Internal		External	Total	
		30		70	100	
Internal Evaluation (Theory Papers)		Class Test I	Class Test II	Assignment(s)	Other Activity (including attendance)	Total
		10 Marks	10 Marks	5 Marks	5 Marks	30 Marks

Evaluation of Practical	:	Internal	External	Total
		50	50	100

Evaluation of Seminar/Viva		Internal	External	Total
		100	-	100

Duration of Examination	:	External	Internal
		3 hrs.	1 ½ hrs

To qualify the course a student is required to secure a minimum of 40 % marks in aggregate including the semester end examination and teachers continuous evaluation.(i.e. both internal and external).

A candidate who secures less than of 40% of marks in a course shall be deemed to have failed in that course. The student should have at least 50% marks in aggregate to clear the semester. In case a student has more than 40% in each course, but less than 50% overall in a semester, he/she shall re-appear in courses where the marks are less than 50% to achieve the required aggregate percentage of 50% in the semester.

Question Paper Structure

1. The question paper shall consist of eight questions. Out of which first question shall be of short answer type (not exceeding 50 words) and will be compulsory. Question No. 1 shall contain 8 parts representing all units of the syllabus and students shall have to answer any five (weightage 4 marks each).
2. Out of the rest seven questions, students shall be required to attempt any five questions. There will be minimum one and maximum two questions from each unit of the syllabus. The weightage of Question No. 2 to 8 shall be of 10 marks each.

Study and Evaluation Scheme
Course: B.Sc. (Hons.) Mathematics

Semester I

S. No.	Subject Code	Subject	Periods			Credit	Evaluation Scheme		
			L	T	P		Internal	External	Total
1	BAS101	Basic Physics-I	3	2	0	4	30	70	100
2	BAS104	Algebra & Matrices	3	2	0	4	30	70	100
3	BAS105	Trigonometry & Differential Calculus	3	2	0	4	30	70	100
4	BAS106	Fundamentals of Physical Chemistry	3	2	0	4	30	70	100
5	BHM101	Foundation English-I	2	0	2	3	30	70	100
6	BAS151	Basic Physics-I Lab	0	0	4	2	50	50	100
7	BAS156	Physical Chemistry Lab	0	0	4	2	50	50	100
		Total	14	8	10	23	250	450	700

Semester II

S. No.	Subject Code	Subject	Periods			Credit	Evaluation Scheme		
			L	T	P		Internal	External	Total
1	BAS204	Vector calculus & Geometry	3	2	0	4	30	70	100
2	BAS205	Integral Calculus	3	2	0	4	30	70	100
3	BAS206	Basic Physics-II	3	2	0	4	30	70	100
4	BAS207	Fundamental of Inorganic Chemistry	3	2	0	4	30	70	100
5	BHM201	Foundation English-II	2	0	2	3	30	70	100
6	BAS256	Basic Physics-II Lab	0	0	4	2	50	50	100
7	BAS257	Inorganic Chemistry Lab	0	0	4	2	50	50	100
		Total	14	8	10	23	250	450	700

Semester III

S. No.	Subject Code	Subject	Periods			Credit	Evaluation Scheme		
			L	T	P		Internal	External	Total
1	BAS301	Numerical Analysis	3	2	0	4	30	70	100
2	BAS302	3D-Solid Geometry	3	2	0	4	30	70	100
3	BAS303	Basic Physics-III	3	2	0	4	30	70	100
4	BAS304	Fundamentals of Organic Chemistry	3	2	0	4	30	70	100
5	BCS301	Fundamentals of Computers	3	2	0	4	30	70	100
	BAS309	Environmental Science							
6	BHM301	Professional Writing	2	0	2	3	30	70	100
7	BAS353	Basic Physics-III Lab	0	0	4	2	50	50	100
8	BAS354	Organic Chemistry Lab	0	0	4	2	50	50	100
9	BCS351	Fundamentals of Computers Lab	0	0	4	2	50	50	100
	BAS359	Environmental Science Lab							
		Total	17	10	14	29	330	570	900

Semester IV

S.N.	Subject Code	Subject	Periods			Credits	Evaluation Scheme		
			L	T	P		Internal	External	Total
1	BAS401	Ordinary Differential Equations	3	2	0	4	30	70	100
2	BAS402	Real Analysis	3	2	0	4	30	70	100
3	BAS403	Algebra	3	2	0	4	30	70	100
4	BCS 402	Discrete Mathematics	3	2	0	4	30	70	100
5	BCS401	Fundamentals of Computer	3	2	0	4	30	70	100
	BAS409	Environmental Science							
6	BHM401	Technical Communication	2	0	2	3	30	70	100
7	BCS451	Fundamentals of Computers Lab	0	0	4	2	50	50	100
	BAS459	Environmental Science							

		Total	17	10	6	25	230	470	700

Semester V

S.N.	Subject Code	Subject	Periods			Credits	Evaluation Scheme		
			L	T	P		Internal	External	Total
1	BAS501	Statistics	3	2	0	4	30	70	100
2	BAS502	Partial Differential Equations	3	2	0	4	30	70	100
3	BAS503	Complex Analysis	3	2	0	4	30	70	100
4	BAS504	Operation Research	3	2	0	4	30	70	100
5	BAS505	Dynamics	3	2	0	4	30	70	100
6	BCS501	C Programming	2	1	0	2	30	70	100
7	BHM 501***	Technical Writing	2	0	2	3	30	70	100
8	BCS551	C Programming Lab	0	0	4	2	50	50	100
		Total	19	11	6	27	260	540	800

Note: *** Effective from academic year 2012-13

Semester VI

S.N.	Subject Code	Subject	Periods			Credits	Evaluation Scheme		
			L	T	P		Internal	External	Total
1	BAS601	Differential Geometry and Tensor	3	2	0	4	30	70	100
2	BAS602	Hydrodynamics	3	2	0	4	30	70	100
3	BAS603	Mathematical Modeling	3	2	0	4	30	70	100
4	BAS604	Graph theory	3	2	0	4	30	70	100
5	BAS605	Applied Statistics	3	2	0	4	30	70	100
6	BHM 601	Communication Technique	2	0	2	3	30	70	100
7	BAS699	Project /Viva-voce	0	0	8	4	50	50	100
		Total	17	10	10	27	230	470	800

L – Lecture
1L = 1Hr

T- Tutorial
1T= 1 Hr

P- Practical
1P=1Hr

C-Credits
1C=1Hr of theory
1C= 2 Hr of Practical

B.Sc. Maths (Hons) –Semester I
BASIC PHYSICS-I

Course Code: BAS-101

L	T	P	C
3	2	0	4

Unit I (Lectures 08)

Conservation of Energy and Linear Momentum

Mechanics of a particle, work-energy theorem. Conservative and non-conservation forces and their examples. Conservation force as negative gradient of potential energy. Center of mass of a system of particles. Conservation of linear momentum and energy. Systems of variable mass, single and multistage rockets. Elastic and inelastic collisions.

Unit II (Lectures 08)

Rotational Dynamics

Rigid body motion. Rotation motion, torque and angular momentum. Moment of inertia and its calculations for disc, cylinder, spherical shell and solid sphere, Body rolling down on and inclined plane. Fly wheel, Motion of Top.

Unit III (Lectures 08)

Motion under Central Forces

Concept of central force. Kepler's laws of planetary motion. Gravitational law, Gravitational Potential and fields due to spherical shell and solid sphere. Gravitational potential energy and escape velocity. Two particle central force problem and reduced mass. Motion of planets and satellites.

Unit IV (Lectures 08)

Properties of Matter:

Elasticity, small deformations, Hooke's law, Elastic constants and relation among them. Beam supported at the ends, cantilever.

Streamline and turbulent flow, equation of continuity, viscosity, Poiseuille's law critical velocity, Reynolds's number.

Surface tension and surface energy, pressure on a curved liquid surface

Unit V (Lectures 08) Nuclear Physics

Nuclear Forces, Binding Energy, Liquid Drop Model, Fission, Nuclear Reactors, Fusion and Energy Processes in Stars, Controlled Thermonuclear Reactions.

Text Books:

1. "Mechanics", D S Mathur; Khanna Publications
2. "Mechanics", Goldstein; New Age Publications.

*** Latest editions of all the suggested books are recommended.**

Semester I
ALGEBRA AND MATRICES

Course Code: BAS-104

L	T	P	C
3	2	0	4

Unit I **(Lectures 08)**

Matrices and determinants, Elementary row and column transformation, Linear transformations, Rank of matrix.

Unit II **(Lectures 08)**

Consistency of linear system of equations, Linear dependence and independence, Hermitian and skew Hermitian matrices, general form of matrices.

Unit III **(Lectures 08)**

Inverse of matrix by elementary operations, Solutions of simultaneous equations, Characteristic equation, Caley-Hamilton theorem (without proof), Eigen values and eigen vectors, Diagonalization.

Unit IV **(Lectures 08)**

Sets, Relations, Functions, Binary operations, permutation, Groups and subgroup its elementary properties.

Unit V **(Lectures 08)**

Isomorphism and Homomorphism of Groups, Caley's theorem, Order of an element, Rings, Fields and integral domains.

Text Books:

1. "Matrices" by Dr. J.K.Goel and K.P.Gupta, Students Friends & Co.
2. "Modern Algebra" by A. R. Vashisth, Krishana Prakshan Mandir

Reference Books:

1. "Matrices" by Shanti Narain, S Chand &Co.
2. "Matrices" by N. Saran and J. K. Goyal, Pragati Prakashan
3. "Modern algebra" by I N Herstein, Wiley Eastern Ltd.
4. "Modern algebra" by Surjeet Singh and Qazi Zameesuddin, Vikash Publishing House Pvt Ltd.
5. "Modern algebra" by D. C. Agarwal and H. N Nigam, Shiksha Sahitya Prakshan
6. "Modern algebra" by Harsh Swaroop Sharma and H. S. Seth, Ram Prashad & Sons
7. "Elements of Matrices" by Dr. M. Ray and S.S. Sethi Ram Prasad & Sons.
8. "Matrices" by A.R. Vashistha, Krishna Prakashan Mandir.

*** Latest editions of all the suggested books are recommended.**

Semester I
TRIGONOMETRY & DIFFERENTIAL CALCULUS

Course Code: BAS-105

L	T	P	C
3	2	0	4

Unit I (Lectures 08)

Circular and hyperbolic functions of complex quantities, Separation of real and imaginary parts of trigonometric, logarithmic, and exponential functions.

Unit II (Lectures 08)

Gregory's series, summation of series, Expansion of Functions .

Unit III (Lectures 08)

Successive differentiation, Leibnitz theorem (without proof), Euler's theorem, Mean value theorems, tangent and normal, maxima and minima, limit and its properties.

Unit IV (Lectures 08)

Mac Laurin's and Taylor's expansion of functions, errors and approximation, Asymptotes and curvature of curves in Cartesian and polar coordinates, Partial differentiation.

Unit V (Lectures 08)

Tracing of curves in Cartesian, parametric and polar coordinates (conics, asteroid, hypocycloid, Folium of Descartes, Cycloid, Circle, Cardioids, Lemniscates, equiangular spiral), Jacobian, Indeterminate forms, Envelop and Evolutes

Text Books:

1. "Differential Calculus" by Gorakh Prasad, Pothishala Pvt Ltd.
2. "Trigonometry" by A. K. Saxena, Aeykay Prakashan. Bareilly

Reference Books:

1. "Trigonometry" by J. C. Sharma, P. H. Sharma, Students Friends & Co.
2. "Trigonometry" by A.R. Vashistha and R. K. Gupta, Krishna Prakashan Mandir.
3. "Differential Calculus" by N. Pishkunor, Peace Publishers Moscow
4. "Differential Calculus" by M. Ray, Shiv Lal Agarwal & Co Agra.
5. "Differential Calculus" by Khalil Ahmed, Anamya Publication, New Delhi
6. "Differential Calculus" by A. K. Saxena, Aeykay Publication

*** Latest editions of all the suggested books are recommended.**

Semester I
FUNDAMENTALS OF PHYSICAL CHEMISTRY

Course Code: BAS-106

L	T	P	C
3	2	0	4

Unit I **(Lectures 08)**

Gaseous state: Deviation of real gases from the equation of state for an ideal gas, Vander Waals and Virial equation of state, critical phenomena, principle of corresponding states, equation for reduced state, Liquifaction of gases, distribution of molecular speed, collisions between molecules in a gas, mean free path, specific heat of gases.

Unit II **(Lectures 08)**

Phase rule and its application: Equilibrium between liquid, solid and vapours of a pure substance, Clausius-Clapeyron equation and its applications. Number of components, phases and degrees of freedom, phase rule and its applications simple systems with one (water and sulphur) and two components (lead-silver, salt hydrates), Distribution law, its modifications, limitations and application.

Unit III **(Lectures 08)**

First law of thermodynamics and their applications, thermodynamic system, states and processes work, heat and internal energy, zeroth law of thermodynamics, various types of work done on a system in reversible and irreversible process, Calorimetry and thermodynamistry, enthalpy, changes in various physical and chemical process, second law of thermodynamics and its applications.

Unit IV **(Lectures 08)**

Absorption of light, laws of photochemistry quantum yield, the excited state and its decay by radiative, nonradiative and chemical pathways, simple photochemical reactions.

Unit V **(Lectures 08)**

Colloids, the colloidal state, preparation and purification of colloids and their characteristic properties, lyophilic and lyophobic colloids and coagulation, protection of colloids, gels, emulsions, surfactants and micelles.

Text Books:

“Physical Chemistry” by Puri Sharma and Pathania.

Reference Books:

“Physical Chemistry” by Borrow

*** Latest editions of all the suggested books are recommended.**

Semester I FOUNDATION ENGLISH - I

Course code: BHM101

(Common with EHM101/BPH105/BED105/BAL101/AR107/BFS106/BCA106/BBA106/
BCH106/ BFA103)

L	T	P	C
2	0	2	3

Course

Contents: Unit I

Functional Grammar: Patterns & Parts of speech Subject, Predicate, Noun, Pronoun, Adjective, Adverb, Verb, Verb phrases, Conjunction, Interjection. **(10 Hours)**

Unit II

Vocabulary: Word formation, Prefix, Suffix, Compound words, Conversion, Synonyms, Antonyms, Homophones and Homonyms, How to look up a dictionary. **(10 Hours)**

Unit III

Communication: Meaning & importance of communication, Barriers to effective communication, Channels of communication, Language as a tool of communication. **(10 Hours)**

Unit IV

Requisites of Sentence writing: Fragmented sentences, A good sentence, expletives, Garbled sentences, Rambling sentences, Loaded sentences, Parallel Comparison, Squinting construction, Loose & periodic sentences. **(10 Hours)**

Text Books:

1. Martin & Wren - *High School English Grammar & Composition*, S.Chand & Co. Delhi.
2. Lewis Norman - *Word Power made easy*, W.R.Goyal. Publication & Distributors Delhi.
3. Better Your English- A Workbook for 1st year Students- Macmillan India, New Delhi.

Reference Books:

1. Raman Meenakshi & Sharma Sangeeta, *Technical Communication-Principles & Practice* – O.U.P. New Delhi. 2007.
2. Mohan Krishna & Banerji Meera, *Developing Communication Skills* – Macmillan India Ltd. Delhi.
3. Rosen Blum M., *How to Build Better Vocabulary* – Bloomsbury Publication. London.

NOTE:

This syllabus has been designed to improve the oral and written communication skills of students. The faculty members should put emphasis on practical (oral) activities for generating students' interest in language learning.

*** Latest editions of all the suggested books are recommended.**

Semester I
BASIC PHYSICS-I LAB

Course code: BAS-151

L	T	P	C
0	0	4	2

LIST OF EXPERIMENTS

Note: Select any ten experiments from the following list

1. To determine Ionisation potential of a gas (Soft valve)
2. To determine Plank"s constant.
3. To determine the Ionization Potential of mercury.
4. To plot the V-I characteristic of the Solar cell by Characteristics apparatus
5. To determine Moment of inertia of a Flywheel.
6. To determine Young's Modulus in case of Uniform bending using Scale, telescope and optic lever.
7. To determine Young"s Modulus in case of Cantilever using Pin and Microscope
8. To determine Modulus of Rigidity by using Torsion pendulum .
9. To determine Viscosity by the Capillary flow (Radius using Mercury pellet) .
10. To determine Surface tension by using Capillary rise (Radius using Vernier microscope).
11. To verify Bernoulli"s theorem
12. To determine the frequency of A.C. mains by means of a sonometer.

Evaluation of Practical Examination:
Internal Evaluation (50 marks)

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 5 point scale (two for experiment, two for file work and one for viva) which would include the practical conducted by the students and a Viva voce taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation scheme:

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (30 MARKS)			ATTENDANCE (5 MARKS)	QUIZ (5 MARKS)	VIVA (10 MARKS)	TOTAL INTERNAL (50 MARKS)
EXPERIMENT (10 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)				

External Evaluation (50 marks)

The external evaluation would be done by the external faculty based on the experiment conducted during the examination.

PHYSICAL CHEMISTRY LAB

Course code: BAS-156

L	T	P	C
0	0	4	2

1. To determine the surface tension of the given liquid by drop number method.
2. To determine the viscosity of a given liquid at room temperature by using Oswald's viscometer (Densities to be determined).
3. To study coefficient of iodine between carbon tetra chloride and water.
4. To study the adsorption of acetic acid on dispersed charcoal.
5. To determine the integral enthalpy of solution of $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$.
6. To determine the reaction rate constant of acid catalyzed hydrolysis of ester- titrimetry.
7. To find out the rate constant for the inversion of cane sugar in acid medium and to show that inversion follows the first order kinetics.
8. To study the kinetics of acetone-iodine reaction.
9. To determine the rate of reaction of iodine with hydrogen peroxide (H_2O_2) at room temperature (clock reaction).
10. To determine the enthalpy of neutralization of hydrochloric acid with sodium hydroxide.

Evaluation of Practical Examination: Internal Evaluation (50 marks)

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 5 point scale (two for experiment, two for file work and one for viva) which would include the practical conducted by the students and a Viva voce taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation scheme:

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (30 MARKS)			ATTENDANCE (5 MARKS)	QUIZ (5 MARKS)	VIVA (10 MARKS)	TOTAL INTERNAL (50 MARKS)
EXPERIMENT (10 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)				

External Evaluation (50 marks)

The external evaluation would be done by the external faculty based on the experiment conducted during the examination.

Semester I/II/III/IV/V/VI
DISCIPLINE & GENERAL PROFICIENCY

Course code: BGP101/BGP201/BGP301/BGP401/BGP501/BGP601

L	T	P	C
0	0	0	1

There shall be continuous evaluation of the student on the following broad parameters:

1. Observance of dress code.
2. Participation in Conferences /Workshops / Seminars.
3. Attendance in guest lectures, invited talks and special technical sessions organized from time to time.
4. Participation in community projects including NCC and NSS.
5. Exhibiting team spirit in different activities of the University and College organized from time to time.
6. Observance of rule & regulations in the College/University.
7. Behaviour in hostel mess and hostel.
8. Performance and awards received in different events (sports/ co-curricular activities) organized at College / University and other level.
9. General behaviour

The above is an indicative list of parameters on which the students shall be continuously evaluated. The college may evaluate the student on the specific parameters by informing them through a notice displayed on the notice board before evaluation. There shall be no external examination for this course; however the marks shall be included for calculation of cumulative Performance Index (CPI).

Semester II
VECTOR CALCULUS AND GEOMETRY

Course code: BAS-204

L	T	P	C
3	2	0	4

Unit I (Lectures 08)

Scalar and vector product, multiple product of vectors, simple geometrical application of plane straight line and spheres

Unit II (Lectures 08)

Differentiation and Integration of vectors, gradient divergence and curl operators, Gauss divergence theorem, Stoke and Green's theorem (without proof), simple applications.

Unit III (Lectures 08)

2-dimensional coordinate geometry. Tracing of conics, Polar equations of conics

Unit IV (Lectures 08)

(3- dimensional coordinate geometry). System of coordinates in three dimensions, Straight lines in symmetrical and nonsymmetrical forms, coplanar lines, Shortest distance between two skew lines, Equation of plane in different forms, Intersection of three planes, Volume of tetrahedron.

Unit V (Lectures 08)

Equation of Sphere, tangent plane, Radical plane, Equation of cylinder, enveloping cylinder, rigid circular cylinder, tangent plane with given vertex and given conic, enveloping, rigid circular cone, tangent planes.

Text Books:

1. "Co ordinate Geometry of 2D" by P.K. Jain and Khalid Ahemad, Wiley Eastern Co
2. "Analytic Solid Geometry" by A.R Vashisth and S. C. Agarwal, Krishana Prakashan Mandir
3. "Vector Analysis" by H. S. Sharma and G. C. Sharma, Students Friends & Co.

Reference Books:

1. "Co ordinate Geometry of 2D" by S. L. Loney, Maemillan and Co
2. "Co ordinate Geometry of 2D" by S. C. Gupta, B. M. L. Tiwari and P.C. Jain, Pragati Prakashan
3. "Co ordinate Geometry of 2D" by N. Saran and R. S. Gupta, Pothishala Pvt Ltd.
4. "Co ordinate Geometry of 2D" by A. K. Saxena, Aeykay Publication Bareilly
5. "Co ordinate 3D Geometry" by R. J. T Bell, Maemillan & Co.
6. "Co ordinate 3D Geometry" by Gorakh Prasad and H. C. Gupta, Pothishala Pvt Ltd.
7. "Co ordinate Geometry of 3D" by S. C. Mittal and S. K. Mittal, Pragati Prakashan
8. "Co ordinate Geometry of 3D" by P. K. Jain and Khalid Ahemad, New Age International New Delhi
9. "Vector Analysis" by M. R. Speegel, Schaum Publishing Co .New Delhi
10. "Vector Analysis" by Shanti narayan, S Chand & Co
11. "Vector Analysis" by N. Saran and S. N. Nigam, Pothishala Pvt Ltd

*** Latest editions of all the suggested books are recommended.**

Semester II
INTEGRAL CALCULUS

Course code: BAS-205

L	T	P	C
3	2	0	4

Unit I (Lectures 08)

Definite integration (Miscellaneous Examples), integration as the limit of sum, Reduction Formula.

Unit II (Lectures 08)

Multiple integration, Beta and gamma functions and applications, length of curves, Areas bounded by the curves.

Unit III (Lectures 08)

Dirichlet's integral, Volume and surfaces of revolutions

Unit IV (Lectures 08)

Differential equation of first order and first degree, Differential equation of first order but not of first degree. Miscellaneous differential equations.

Unit V (Lectures 08)

Linear differential equation of second order with constant coefficient, Linear differential equation of other types.

Text Books:

1. "Integral Calculus" by Gorakh Prasad, Pothishala Pvt. Ltd.
2. "Integral Calculus" by M. Ray, Shiv Lal Agarwal & Co Agra
3. "Integral Calculus" by P. V. Pishkuno, Peace Publishers Moscow

Reference Books:

1. "Integral Calculus" by Shanti Narayan and P.K Mittal, S.Chand & Company Ltd
2. "Integral Calculus" by Brahmanand, B. S. Tyagi, and B. D. Sharma, Kedarnath Ram Nath.
3. "Integral Calculus by" Shani Narayan, S.Chand & Company Ltd

*** Latest editions of all the suggested books are recommended.**

Semester I
BASIC PHYSICS-II

Course code: BAS-206

L	T	P	C
3	2	0	4

Unit I (Lectures 08)

FIELDS: Vector and scalar fields, gradient, divergence and curl (Cartesian coordinates only), Gauss's theorem and Stokes' theorem (Statements only).

Unit II (Lectures 08)

ELECTROMAGNETIC THEORY: Gauss's law in integral and differential form, electric potential and relation with E, capacitance and electric energy density, dielectrics, three electric vectors, dielectric susceptibility, boundary conditions on E and D. Ampere's law in integral and differential form, applications, Hall effect, three magnetic vectors magnetic permeability and susceptibility, boundary conditions on B and H

Unit III (Lectures 08)

Electro-magnetics:

Faraday's law in integral and differential form, continuity equation for charge, displacement current, Maxwell's equations in free space, electromagnetic wave equation for plane waves in dielectric medium and free space, relation between E, B and k, Poynting vector.

Unit IV (Lectures 08)

PHYSICAL OPTICS: Interference: two-beam interference, interference in thin films and wedge-shaped layers, reflection and anti-reflection coatings, applications of interferometry: Newton's rings, Michelson's interferometer.

Diffraction: Fraunhofer diffraction by single slit, double slit and grating, limit of resolution, Rayleigh criterion and Fresnel diffraction.

Unit V (Lectures 08)

Polarization: polarization of light, Malus's law, Brewster's law, double refraction), analysis of linearly and circularly polarized light, Fresnel's Theory.

Lasers And Applications: Spontaneous and Stimulated Emission, Einstein's A and B Coefficients, Laser: Population-Inversion, Properties of laser radiation, Ruby & He-Ne Lasers, Applications of Lasers-Elementary Ideas of Holography and Fiber Optics.

Reference

1. Mathew N.O. Sadiku, Elements of Electromagnetics, Oxford Univ. Press (2001).
2. A. Ghatak ,Optics, 3rd edition, Tata McGraw Hill (2005).
3. Resnick, Halliday and Krane, Physics Part-I & II, 5th edition, John Wiley (2002).
4. M. R. Srinivasan, Physics for Engineers, New Age International (1996).

*** Latest editions of all the suggested books are recommended.**

Semester II
FUNDAMENTALS OF INORGANIC CHEMISTRY

Course code: BAS-207

L	T	P	C
3	2	0	4

Unit I **(Lectures 09)**

Dual nature of matter and idea of De Broglie matter waves and equations, Wave mechanical model, Heisenberg uncertainty principle, Schrodinger wave equation, quantum numbers shapes of s, p, d orbitals, Aufbau and Pauli exclusion principles, Hund's multiplicity rule, electronic configuration of elements.

Unit II **(Lectures 08)**

Atomic and ionic radii, ionization energy, electron affinity and electronegativity-definition, methods of determination or evaluation, trends in periodic table and applications in predicting and explaining the chemical behaviour, chemical bonding, ionic solids

Unit III **(Lectures 07)**

Disintegration theory, group displacement law, rate of disintegration, half life period, average life period, disintegration series, Radioactive equilibrium, Artificial radioactivity, types of nuclear reactions, Nuclear fission and fusion, application of radioactivity.

Unit IV **(Lectures 08)**

Arrhenius, Bronsted Lowry and Lewis and Usanovich concepts of acids and bases, Classification of acid and bases as hard and soft Pearson's HSAB concept, acid-base strength and hardness and softness, Sympoiosis, theoretical basis of hardness and softness, electronegativity and hardness and softness.

Unit V **(Lectures 08)**

Definition of Organometallic chemistry, nomenclature and classification of organometallic compounds, Preparation properties bonding application of alkyls and aryls of Li, Al, Hg, Sn, and Pb, a brief account of metal-ethylenic complexes and homogeneous hydrogenation mononuclear carbonyls and the nature of bonding in metal carbonyls.

Text Books:

Inorganic Chemistry "Puri Sharma & Kalia"

Reference Books:

"Inorganic Chemistry" by J. D Lee.

*** Latest editions of all the suggested books are recommended.**

Semester-II
FOUNDATION ENGLISH - II

Course code: BHM201

(Common with EHM201/BPH206/BBA206/BCA206/AR207/BCH206/ BFA203)

L	T	P	C
2	0	2	3

Unit I

Functional Grammar: Articles, Preposition, Tenses: Functions, Synthesis, Transformation, Spotting errors and correction of sentences. **(10 Hours)**

Unit II

Pre- Requisites of Technical written Communication: One word substitution, Spelling rules, Words often confused & misused, Phrases. **(10 Hours)**

Unit III

The Structure of sentences/ clauses: Adverb clause, Adjective clause, Noun clause. Sentences: Simple, Double, Multiple and complex, Transformation of sentences: simple to complex & vice versa, simple to compound & vice-versa, Interrogative to assertive & to negative & vice-versa. **(10 Hours)**

Unit IV

Technical Communication: Nature, Origin and Development, Salient features, Scope & Significance, Forms of Technical Communication, Difference between Technical Communication & General writing, Objective Style vs. Literary Composition. **(10 Hours)**

Text-Books:

1. Wren & Martin, *High School English Grammar & Composition* – S. Chand & Co. Delhi.
2. Raman Meenakshi & Sharma Sangeeta, *Technical Communication-Principles & Practice* – O.U.P. New Delhi. 2007.
3. Mitra Barum K., *Effective Technical Communication* – O.U.P. New Delhi. 2006.
4. Better Your English- A Workbook for 1st year Students- Macmillan India, New Delhi.

Reference Books:

1. Horn A.S., *Guide to Patterns & Usage in English* – O.U.P. New Delhi.

NOTE:

This syllabus has been designed to improve the oral and written communication skills of students. The faculty members should put emphasis on practical (oral) activities for generating students' interest in language learning.

*** Latest editions of all the suggested books are recommended.**

Semester II
BASIC PHYSICS-II LAB

Course code: BAS-256

L	T	P	C
0	0	4	2

LIST OF EXPERIMENTS

Note : Select any ten experiments from the following list

1. To determine the wavelength of Sodium light by Newton's rings.
2. To determine the wavelength of Sodium light by Fresnel's biprism.
3. To determine the specific rotation of the cane sugar solution with the help of Polarimeter.
4. To study the forward characteristics of a light emitting diode.
5. To determine the resolving power and dispersive power by a prism.
6. To determine the resolving power of grating.
7. To study the elliptically polarised light.
8. To determine slit width using He-Ne laser.
9. To determine the Flashing & Quenching of Neon bulb.
10. To determine the Resolving power of a telescope
11. To determine the wavelength of the sodium lamp by Michelson interferometer.
12. To determine the wave form and frequency of a given signal using C.R.O.

Evaluation of Practical Examination:

Internal Evaluation (50 marks)

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 5 point scale (two for experiment, two for file work and one for viva) which would include the practical conducted by the students and a Viva voce taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation scheme:

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (30 MARKS)			ATTENDANCE (5 MARKS)	QUIZ (5 MARKS)	VIVA (10 MARKS)	TOTAL INTERNAL (50 MARKS)
EXPERIMENT (10 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)				

External Evaluation (50 marks)

The external evaluation would be done by the external faculty based on the experiment conducted during the examination.

Semester-II
INORGANIC CHEMISTRY LAB

Course code: BAS-257

L	T	P	C
0	0	4	2

LIST OF EXPERIMENTS

1. Determination of strength of given HCL solution by titrating against N/10 Standard sodium hydroxide solution.
2. Determination of temporary and permanent hardness in water sample using EDTA as standard solution.
3. Determination of free chloride content in the given water sample by Mohr's method.
4. To determine the Ferrous content in the given sample of Iron ore by titremetric analysis against standard $K_2Cr_2O_7$ using $K_3Fe(CN)_6$ as an external indicator.
5. Determination of Equivalent weight of Iron by the chemical displacement Method (equivalent weight of copper is 63.5).
6. To synthesis copper ammonia complex.
7. To prepare tris (thiourea) copper (I) sulphate complex.
8. Group test of given inorganic sample.
9. To determine the concentration of $KMnO_4$ solution spectrophotometrically.
10. To determine the element (N, S and halogens) in given inorganic samples.
- 11.

Evaluation of Practical Examination:

Internal Evaluation (50 marks)

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 5 point scale (two for experiment, two for file work and one for viva) which would include the practical conducted by the students and a Viva voce taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation scheme:

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (30 MARKS)			ATTENDANCE (5 MARKS)	QUIZ (5 MARKS)	VIVA (10 MARKS)	TOTAL INTERNAL (50 MARKS)
EXPERIMENT (10 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)				

External Evaluation (50 marks)

The external evaluation would be done by the external faculty based on the experiment conducted during the examination.

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Semester III
NUMERICAL ANALYSIS

Course code: BAS-301

L	T	P	C
3	2	0	4

Unit I **(Lectures 08)**

Calculus of finite differences, Finite differences and difference formulae operators E , Δ , ∇ , properties and relation between operators, difference table, Factorial Notation.

Unit II **(Lectures 08)**

Interpolation with equal intervals and Unequal Intervals; Newton Gregory Forward and Backward Formula, Newton's divide difference Formula, Lagrange's Interpolation Formula, Hermit Interpolation formulas using differences. Different interpolation methods, curve fittings use of calculus of finite difference, divided difference. Newton's formula of unequal intervals, Lagranges interpolation formula for unequal intervals. Iterative Methods.

Unit III **(Lectures 06)**

Central difference formulae, Gaussian formula Bessel's and Stirling formula, Gauss Evertt formula.

Unit IV **(Lectures 08)**

Numerical differentiation and Integration, derivative using forward and backward difference interpolation formula, Trapezoidal Formulae, Simpson's Formula, Cotes formula.

Unit V **(Lectures 10)**

Numerical solution of first order differential equation using Kutta & Runge Kutta method and solution of algebraic and Transcendental Equations using Newton Raphson method & Graff's squaring method.

Text Books:

1. "Numerical analysis", by Burden, Cengage Learning
2. "Numerical Analysis" by B. S. Grewal, Khanna Publishing
3. "Numerical Analysis" by Pradeep Niyosi, Tata Mcgraw Hell

Reference Books:

1. "Numerical Analysis" by P.P. Gupta and Sanjay Gupta, Krishana Prakashan Mandir
2. "Numerical Analysis" by S.S. Sastry, Prentice Hall Of India.
3. "Introduction to Numerical Analysis" by C. E. Froberg, Addition –Welly Publishing Co.

*** Latest editions of all the suggested books are recommended.**

Semester III
3-D SOLID GEOMETRY

Course code: BAS-302

L	T	P	C
3	2	0	4

Unit I **(Lectures 09)**

Standard form of equation of surfaces, Central Conicoids, direction plane, Tangent line and direction sphere and normal, Tangent Line & Plane

Unit II **(Lectures 10)**

Central Conicoid, Ellipsoid, Hyperboloid of 1 sheet and 2 sheet, Tangent plane etc;

Unit III **(Lectures 07)**

Generating lines; Hyperboloid of one sheet and Hyperbolic Paraboloid,

Unit IV **(Lectures 06)**

Paraboloid, Tangent and Normal Planes, paraboloid.

Unit V **(Lectures 08)**

Reduction of 2nd degree equation to standard forms, Reduction of General form $ax^2 + by^2 + cz^2 + 2d_1x + 2d_2y + 2d_3z + d_4 = 0$ to standard form and $ax^2 + by^2 = 2cz$ etc..

Text Books:

1. "Co ordinate Geometry of 3D" by S. C. Mittal and S. K. Mittal Pragati Prakashan.
2. "Co ordinate Geometry of 3D" by P. K. Jain and Khalid Ahemad, New Age International
3. "Analytic Solid Geometry" by A.R Vashisth and S. C. Agarwal, Krishina Prakashan Mandir

Reference Book

1. "Co ordinate 3D Geometry" by R. J. T Bell, Maemillan India Ltd.
2. "Co ordinate 3D Geometry" by Gorakh Prasad and H. C. Gupta, Pothishala Pvt. Ltd.

*** Latest editions of all the suggested books are recommended.**

**Semester III
BASIC PHYSICS-III**

Course code: BAS-303

L	T	P	C
3	2	0	4

Unit I (Lectures 08)

Special Theory Of Relativity: Postulates, Galilean Transformations, Lorentz Transformations, Length Contraction, Time Dilation, Velocity Addition, Mass Change and Einstein's Mass Energy Relation.

Unit II (Lectures 08)

Quantum Mechanics: Wave Particle Duality, De Broglie Waves, Davisson and Germer's Experiment, Uncertainty Principle, Physical Interpretation of Wave Function and its Normalization.

Schrodinger Equation in One Dimension and its Application (particle in one dimensional potential box)

Unit III (Lectures 08)

Capacitors: Spherical capacitor, Cylindrical capacitor, Parallel plate capacitor, Energy in Electrostatic field, Dielectrics: polar and non- polar Three electric vectors: Electric field vector, Polarization Vector and Displacement Vector, dielectric susceptibility, boundary conditions on E and D

Unit IV (Lectures 08)

Biot-Savart's Law: Calculation of B for - Straight current carrying conductor & Solenoid; Ampere's circuital Law and its applications.

B-H Hysteresis and its application, Comparison between diamagnetic, paramagnetic and ferromagnetic materials, Langevin's Theory of dia-magnetism

Unit V (Lectures 08)

Electro-magnetic Induction, Faraday's law, Lenz's law, Self Inductance, Mutual Inductance, Reciprocity Theorem, Study of LCR circuits with d.c. and a.c. sources (both series and parallel), Phase impedance Conditions for resonance and its graphical interpretation, Q-factor, Power factor, wattless current, Transformer and its magnetic susceptibility

Text Book

1. Engineering Physics by V S Yadav, TMH

*** Latest editions of all the suggested books are recommended.**

Semester III
FUNDAMENTALS OF ORGANIC CHEMISTRY

Course code: BAS-30

L	T	P	C
3	2	0	4

Unit I **(Lectures 08)**

Hybridization, bond lengths and bond angles, bond energy, vander waals integrations, resonance, hyper-conjugation, aromaticity inductive and field electrometric, hydrogen bonding.

Curved arrow notation, drawing electron movements with arrows, halfheaded and double headed arrows hemolytic and heterolytic bond breaking

Unit II **(Lectures 08)**

Concept of isomerism, Types of isomerism, optical isomerism, Geometrical isomerism, conformational isomerism, Newman projection, Alkenes, dienes and alkynes

Unit III **(Lectures 08)**

Alcohols:

Monohydric alcohol: Nomenclature, methods of formation by reduction of alcohols, Ketones, carboxylic acid and esters, Hydrogen bonding, Acidic nature, Reaction of alcohols, dihydric alcohols, trihydric alcohols, phenols

Unit IV **(Lectures 08)**

Ether and Epoxides, Nomenclature of ethers and methods of their formation physical properties, chemical reactions-cleavage and autoxidation, Ziesel's method, Aldehyde and Ketones, Nomenclature and structure of the carbonyl group.

Unit V **(Lectures 08)**

Organometallic Compounds

Organomagnesium compounds the Grignard reagents-formation, structure and chemical reactions.

Organozinc Compounds: Formation and chemical reactions.

Organolithium: Compounds formation and chemical reactions

Text Books:

“Organic Chemistry” by Bahel & Bahel.

Reference Books:

“Organic Chemistry” by Morrison & Boyd

*** Latest editions of all the suggested books are recommended.**

Semester III/IV
FUNDAMENTALS OF COMPUTERS

Course code: BCS-301/BCS-401

L	T	P	C
3	2	0	4

Objective: The objective is to know the fundamentals of computer.

Course Contents:

Unit I

(Lecture 08)

Concepts in Computer Application: Definition of Electronic Computer, History, Generations, Characteristic and Application of Computers, Classification of Computers, Functional Component of Computer: CPU, I/O devices, Type of Memory & Memory Hierarchy, Firmware and Human ware.

Unit II

Programming Language Classification & Number System: Generation of Languages, Introduction to 4GLs. Translators: Assembler, Compiler, and Interpreter. Number System: Decimal, Octal, Binary and Hexadecimal & their Conversions. Various Codes: BCD, ASCII and EBCDIC and Gray Code.

Unit III

Concepts in Operating System, Office Tools and Data Management: Elementary Concepts in Operating System, textual Vs GUI Interface, Introduction to DOS, MS Windows, MS office Tools, MS WORD, MS EXCEL, MS Power Point.

Unit IV

Data Communication & Networks: Basic Concepts in Computer Networks, Networking of computers- Introduction of LAN and WAN, Network Topologies.

Internet and Web Technologies: Hypertext Markup Language, DHTML, WWW, Gopher, FTP, Telnet, Web Browsers, Net Surfing, Search Engines, Email.

Unit V

(Lectures 08)

IT Industry Trends: Careers and Applications in India Basic Awareness of NICNET and ERNET. Application of IT to Areas like E Commerce, electronic governance, Multimedia, and Entertainment.

Information Representation: Introduction to Information representation in Digital Media, Text, image, graphics, Animation, Audio, Video etc., Introduction to JPEG, MPEG, MHEG, MP3 & AVI.

Text Books

1. Sinha P.K., Computer Fundamentals
2. Yadav, D S, *Foundations of IT*, New Age, Delhi
3. Rajaraman, *Introduction to Computers*, Prentice-Hall India

Reference Books

1. Peter Nortans, *Introduction to Computers*, TME
2. Leon & Leon, *Fundamental of Information Technology*, Vikas Publishing
3. Lehngart, *Internet* 101, Addison Wesley

Semester III/IV
ENVIRONMENTAL SCIENCE

Course code: BAS-309/BAS-409

L	T	P	C
3	2	0	4

Objective: To create awareness among students about environment protection

Unit I (Lectures 08)

General: Definition, Scope, Segments of Environment and its Multidisciplinary Nature, Some Major Environmental Problems, Definition and Scope of Ecology.

Unit II (Lectures 08)

Ecology And Environment: Concept of an Ecosystem- its components and functions, Trophic Levels- Producer, Consumer and Decomposer, Energy Flow in an Ecosystem, Biogeochemical Cycles, Food Chain, Food Web and Ecological Pyramid

Unit III (Lectures 08)

Air pollution: Various segments of Atmosphere and their Significance, Sources and Effects of Air Pollution, Classification of Air Pollutants, Stationary and Mobile Sources of Air Pollution, Photochemical Smog, Acid Rain, Global Warming (Greenhouse Effect), Ozone Layer - Its Depletion and Control Measures, El-Nino.

Unit IV (Lectures 08)

Water pollution: Water Resources of the Earth and Indian Scenario, Point and non-Point sources of Water Pollution, Treatment of Water Pollution, Eutrophication, Bio-Diversity- Hot Spots of Biodiversity in India and World, Conservation, Importance and Factors Responsible for Loss of Biodiversity, Deforestation- causes and effects, Biogeographical Classification of India.

Unit V (Lectures 08)

Soil pollution-Sources and Consequences, Noise, Thermal - sources and consequences, Sustainable Development, Dams and Reservoirs- Their Benefits and Problems, Solid Wastes - Pollution, Treatment & Disposal, Environment Conservation Movement in India (Chipko Movement, Appiko Movement), Bioremediation, Biological Magnification

Text Books:

1. "Environmental Chemistry", De,A.K., New Age Publishers Pvt. Ltd.
2. "Introduction to Environmental Engineering and Science", Masters,G.M., Prentice Hall India Pvt.Ltd.
3. "Fundamentals of Ecology", Odem,E.P., W.B.Sannders Co.

Reference Books:

1. "Biodiversity and Conservation", Bryant,P.J., Hypertext Book
2. "Textbook of Environment Studies", Tewari, Khulbe & Tewari, I.K. Publication

*** Latest editions of all the suggested books are recommended.**

Semester-III
PROFESSIONAL WRITING

Course code: BHM301

(Common with EHM 301/BBA306/BCA305/AR307/BCH306/BFA303)

L	T	P	C
2	0	2	3

Course Contents:

Unit I

Functional Grammar: Active and passive voice, Conditional sentences, Syntax, Concord, Common errors. **(10 Hours)**

Unit II

Requisites of Paragraph writing: Structure of Paragraph, Coherence & Unity, Development of paragraph, Inductive order, Deductive order, Spatial order, Linear, Chronological orders, Expository writing, and Argumentative writing, Factual description of objects, process, experiments. **(10 Hours)**

Unit III

Précis Writing: Techniques of Précis writing, Writing a précis. **(10 Hours)**

Unit IV

Comprehension skills: Role of listening, Reading comprehension; Reasons for poor comprehension, Improving comprehension skills. **(10 Hours)**

Text Books:

1. Rutherford A., *Basic Communication Skills* – Pearson Education, New Delhi.

References Books:

1. Raman Meenakshi & Sharma Sangeeta, *Technical Communication-Principles & Practice* – O.U.P. New Delhi. 2007.
2. Mohan Krishna & Banerji Meera, *Developing Communication Skills* – Macmillan India Ltd. Delhi.

NOTE:

This syllabus has been designed to improve the oral and written communication skills of students. The faculty members should put emphasis on practical (oral) activities for generating students' interest in language learning.

*** Latest editions of all the suggested books are recommended.**

Semester III
BASIC PHYSICS-III LAB

Course code: BAS-353

L	T	P	C
0	0	4	2

LIST OF EXPERIMENTS

Note : Select any ten experiments from the following list

1. To study the PN junction characteristic Apparatus
2. To determine the High resistance by Leakage method.
3. To determine the Energy Band gap by four probe method.
4. To study the Magnetic field using Stewart and Gee's apparatus.
5. To determine the internal resistance of a Laclanche cell by using potentiometer.
6. To convert a galvanometer into voltmeter of a given range.
7. To determine the specific resistance of a given wire by using Carey Foster's bridge.
8. To verify Stefan's law by electrical method.
9. To calibrate a voltmeter with a potentiometer.
10. To calibrate an ammeter with a potentiometer.
11. To draw the B-H curve.
12. To determine the magnetic susceptibility of given Para magnetic materia

Evaluation of Practical Examination:

Internal Evaluation (50 marks)

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 5 point scale (two for experiment, two for file work and one for viva) which would include the practical conducted by the students and a Viva voce taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation scheme:

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (30 MARKS)			ATTENDANCE (5 MARKS)	QUIZ (5 MARKS)	VIVA (10 MARKS)	TOTAL INTERNAL (50 MARKS)
EXPERIMENT (10 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)				

External Evaluation (50 marks)

The external evaluation would be done by the external faculty based on the experiment conducted during the examination.

Semester III
ORGANIC CHEMISTRY LAB

Course code: BAS-354

L	T	P	C
0	0	4	2

1. To detect the functional groups in organic compounds.
2. To detect elements (N, S and halogens) in organic compounds.
3. To prepare Aspirin.
4. To prepare methyl orange.
5. To prepare phenolphthalein.
6. To synthesize p-nitroaniline from acetanilide.
7. To determine the ion exchange capacity of the given ion exchange.
8. To find out the R_f values and identify amino acids present in a given mixture by thin layer chromatography.
9. To find out the saponification value of a given oil.
10. To prepare the phenol formaldehyde resin.

Evaluation of Practical Examination:
Internal Evaluation (50 marks)

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 5 point scale (two for experiment, two for file work and one for viva) which would include the practical conducted by the students and a Viva voce taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation scheme:

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (30 MARKS)			ATTENDANCE (5 MARKS)	QUIZ (5 MARKS)	VIVA (10 MARKS)	TOTAL INTERNAL (50 MARKS)
EXPERIMENT (10 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)				

External Evaluation (50 marks)

The external evaluation would be done by the external faculty based on the experiment conducted during the examination.

Semester III/IV
FUNDAMENTALS OF COMPUTERS LAB

Course code: BCS-351/BCS-451

L T P C
0 0 4 2

LIST OF EXPERIMENTS:

1. Fundamentals of computer system, with its functional components.
2. Create a formatted WORD document.
3. Create a WORD document using different fonts.
4. Create a table & perform operations in it.
5. Create a WORD document, using the functions page set up, & page preview, and then print that document.
6. Implement Mail Merge.
7. Collect the information of any company & perform the below operation in it:
 - (a) Insert the data into Row/Column of Excel, worksheet
 - (b) Create a worksheet in Excel, perform alignment, text wrapping & sort the data.
8. Collect the information of any company & perform the below operation in it:
 - (a) Generate the graph in Excel.
 - (b) Create a Hyperlink to a word document.
- (e) Create a worksheet using the functions- page set up, print preview & then print the worksheet.
9. Create, save & print the power point presentation
10. Create a power point presentation using clipart, Word art gallery & then add transition & Animation effects.

Evaluation of Practical Examination:
Internal Evaluation (50 marks)

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 5 point scale (two for experiment, two for file work and one for viva) which would include the practical conducted by the students and a Viva voce taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation scheme:

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (30 MARKS)			ATTENDANCE (5 MARKS)	QUIZ (5 MARKS)	VIVA (10 MARKS)	TOTAL INTERNAL (50 MARKS)
EXPERIMENT (10 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)				

External Evaluation (50 marks)

The external evaluation would be done by the external faculty based on the experiment conducted during the examination.

Semester III/IV
ENVIRONMENTAL SCIENCE (LAB)

Course code: BAS-359/BAS-459

L	T	P	C
0	0	4	2

List of Experiment

1. To determine total alkalinity in the given water sample.
2. To determine the temporary and permanent hardness in water sample.
3. To determine the pH of the given solution using pH meter.
4. To determine the turbidity in given water sample.
5. To determine the dissolved oxygen present in a water sample.
6. To determine the conductivity in water sample.
7. To determine the carbon-di-oxide content in polluted water sample.
8. To find chemical oxygen demand of waste water sample by potassium dichromate.
9. To determine the TDS and TSS in water sample.
10. To determine the noise level in ambient air.

Evaluation of Practical Examination:

Internal Evaluation (50 marks)

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 5 point scale (two for experiment, two for file work and one for viva) which would include the practical conducted by the students and a Viva voce taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation scheme:

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (30 MARKS)			ATTENDANCE (5 MARKS)	QUIZ (5 MARKS)	VIVA (10 MARKS)	TOTAL INTERNAL (50 MARKS)
EXPERIMENT (10 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)				

External Evaluation (50 marks)

The external evaluation would be done by the external faculty based on the experiment conducted during the examination.

Semester IV
ORDINARY DIFFERENTIAL EQUATIONS

Course code: BAS-401

L	T	P	C
3	2	0	4

Unit I **(Lectures 10)**

Linear Equation of second order finding general solution of $\frac{d^2 y}{dx^2} + P \frac{dy}{dx} + Qy = 0$ by removing first derivative; changing Independent variable; Method of Variation of parameters, Normal form and Method of operational operators.

Unit II **(Lectures 08)**

Ordinary Simultaneous linear differential Equation. Linear differential Equation of the form $\frac{dy}{dx} = \frac{P}{Q} \frac{dz}{dz} + \frac{R}{R}$

Unit III **(Lectures 08)**

Pfaffian differential forms and equations. Necessary and sufficient condition for Integrability of $Pdx + Qdy + Rdz = 0$

Unit IV **(Lectures 07)**

Integration in series

Unit V **(Lectures 07)**

Picards' Iteration method. Uniqueness and existence theorems.

Text Books:

1. "Differential Equation" by Zill, Cengage Learning.
2. "Differential Equation" by R. K. Gupta and J. N. Sharma, Krishana Prakashan Mandir
3. "Differential Equation" by Zafar Ahsan, Prentice Hall of India

Reference Books:

1. "Differential Equation" by M. D. Raisinghania, S. Chand & co.
2. "A Treatise on diff. Equation" by A. R. Forsyth, Macmillan & company Ltd.
3. "Introduction on Differential Equation" by D.A. Murray, Orient Longman India.

*** Latest editions of all the suggested books are recommended.**

**Semester IV
REAL ANALYSIS**

Course code: BAS-402

L	T	P	C
3	2	0	4

Unit I (Lectures 08)

Limits, left and right hand limit, Theorems on limit, Concept of Continuity and discontinuity, Types of continuity and discontinuity, properties of continuous function, A necessary and sufficient conditions of discontinuity, Darboux's theorem, Mean Value theorems, differentiability.

Unit II (Lectures 08)

Sequence of real numbers convergent and non-convergent, Sequence algebra of sequences, Theorem on limit on limit of sequence, Monotone Sequence, Real sequence, Bounded sequence, convergent sequence, Least upper bound and greatest lower bound, limit of a sequence, theorem on convergent sequence, Subsequence.

Unit III (Lectures 08)

Infinite Series and its convergences, Test for convergences of positive term series, comparison test, Ratio test, Cauchy's Root test, Raab's test, Logarithmic test, Integral test.

Unit IV (Lectures 08)

Definition existence and properties of Riemann integral of a bounded function, Darboux theorem, Condition of integrability, Integral as limit of sum, Fundamental Theorem of Calculus.

Unit V (Lectures 08)

Definition of uniform convergence, Cauchy's criterion for uniform convergence Weirstress test, M-test, Uniform convergence and continuity, Definition of improper integral and convergence of improper integral.

Text Books:

1. "A course of Mathematical Analysis" by Shanti Narayan, S.Chand.& Co.
2. "Mathematical Analysis" by S. C. Malik, Willy. Eastern Co.
3. "Real Analysis" by M. L. Khanna and L. S. Varshney, Jay Prakash Nath & Co.

Reference Books:

1. "Real Analysis" by P. K. Mittal, S.J.Prakashan.
2. "Real Analysis" by P. K. Gupta and Sharada Gupta, S. Chand &Co

*** Latest editions of all the suggested books are recommended.**

**Semester IV
ALGEBRA**

Course code: BAS-403

L	T	P	C
3	2	0	4

Unit I (Lectures 10)

Groups, sub-groups, Costes, Lagranges theorem, permutation group, Cayley's theorem, Isomorphism of groups.

Unit II (Lectures 10)

Basic concepts of Rings, Subrings, Integral domain and fields

Unit III (Lectures 08)

Automorphism, Normaliser, Centre of a group, Syllabus theorem

Unit IV (Lectures 06)

Homomorphism of rings and its properties, Rings of Polynomials etc.

Unit V (Lectures 06)

Vector Space, properties and theorem of vector space

Text Books:

1. "Algebra" by I. N. Hertein, Wiley and Company.
2. "Modern Algebra" by Shanti Narayan, S.Chand and Company.
3. "Algebra" J. K. Goyal and K. P. Gupta, Pragati Prakashan

Reference Books:

1. "Algebra" by M. Jacobson, Banz, W.H.Erconma New Delhi.
2. "Abstract Algebra" by D. S. Malic, J. N Mordesas and M. K. Sen, Pragati Prakashan
3. "Modern Algebra" by Saran and Goyal, Pothishala Publication
4. "Modern Algebra" by A. R. Vasistha, Krishana Prakashan Mandir.

*** Latest editions of all the suggested books are recommended.**

Semester IV
DISCRETE MATHEMATICS

Course code: BCS-402

L	T	P	C
3	2	0	4

Unit 1: (Lectures 08)

Definition of set, countable and uncountable sets, venn diagrams, proof of some general identity of sets, relation, types of relation , composition of relation, pictorial representation of relation , equivalence relation, function , types of function, one to one, into and onto function, inverse function, composition of function, mathematical induction(simple and strong).

Unit 2: (Lectures 08)

Introduction to algebraic structure, properties, semi-grouped, monoid ,groups, abelian groups, properties of groups, subgroups, cyclic groups, cosets, factor group, normal subgroups, homomorphism and isomorphism of groups, ring and fields, definition and standard results.

Unit 3: (Lectures 08)

Posets, hasse diagram of posets, isomorphism of ordered sets, well ordered sets, properties of lattice, Boolean algebra, SOP and POS form, logic gates, K-maps.

Unit 4: (Lectures 08)

Propositional logic, basic logic operator, truth tables, tautology, contradiction, algebra of proposition, logical implications, logical equivalence, predicates.

Unit 5: (Lectures 08)

Recurrence relations, generating function, graph definition, types of graphs, representation of graphs, graph coloring, chromatic number, isomorphism and homomorphism of graphs.

Text books:

Discrete mathematics by Vinaya Rawol and bhakti Raul.(Techmax publications)

Reference books:

Discrete mathematics and its applications by Kenneth H Rosen

*** Latest editions of all the suggested books are recommended.**

Semester III/IV
FUNDAMENTALS OF COMPUTERS

Course code: BCS-301/BAS-401

L	T	P	C
3	2	0	4

Unit I (Lectures 08)

Concepts in Computer Application: Definition of Electronic Computer, History, Generations, Characteristic and Application of Computers, Classification of Computers, Functional Component of Computer: CPU, I/O devices, Type of Memory & Memory Hierarchy, Firmware and Human ware.

Unit II (Lectures 08)

Programming Language Classification & Number System: Generation of Languages, Introduction to 4GLs. Translators: Assembler, Compiler, and Interpreter. Number System: Decimal, Octal, Binary and Hexadecimal & their Conversions. Various Codes: BCD, ASCII and EBCDIC and Gray Code.

Unit III (Lectures 08)

Concepts in Operating System, Office Tools and Data Management: Elementary Concepts in Operating System, textual Vs GUI Interface, Introduction to DOS, MS Windows, MS office Tools, MS WORD, MS EXCEL, MS Power Point.

Unit IV (Lectures 08)

Data Communication & Networks: Basic Concepts in Computer Networks, Networking of computers- Introduction of LAN and WAN, Network Topologies.

Internet and Web Technologies: Hypertext Markup Language, DHTML, WWW, Gopher, FTP, Telnet, Web Browsers, Net Surfing, Search Engines, Email.

Unit V (Lectures 08)

IT Industry Trends: Careers and Applications in India Basic Awareness of NICNET and ERNET. Application of IT to Areas like E Commerce, electronic governance, Multimedia, and Entertainment.

Information Representation: Introduction to Information representation in Digital Media, Text, image, graphics, Animation, Audio, Video etc., Introduction to JPEG, MPEG, MHEG, MP3 & AVI.

Text Books

1. Sinha P.K., Computer Fundamentals
2. Yadav, D S, *Foundations of IT*, New Age, Delhi
3. Rajaraman, *Introduction to Computers*, Prentice-Hall India

Reference Books

1. Peter Nortans, *Introduction to Computers*, TME
2. Leon & Leon, *Fundamental of Information Technology*, Vikas Publishing
3. Lehngart, *Internet 101*, Addison Wesley

*** Latest editions of all the suggested books are recommended.**

Semester III/IV
ENVIRONMENTAL SCIENCE

Course code: BAS-309/BAS-409

L	T	P	C
3	2	0	4

Unit I **(Lectures 08)**

General: Definition, Scope, Segments of Environment and its Multidisciplinary Nature, Some Major Environmental Problems, Definition and Scope of Ecology.

Unit II **(Lectures 08)**

Ecology And Environment: Concept of an Ecosystem- its components and functions, Trophic Levels- Producer, Consumer and Decomposer, Energy Flow in an Ecosystem, Biogeochemical Cycles, Food Chain, Food Web and Ecological Pyramid

Unit III **(Lectures 08)**

Air pollution: Various segments of Atmosphere and their Significance, Sources and Effects of Air Pollution, Classification of Air Pollutants, Stationary and Mobile Sources of Air Pollution, Photochemical Smog, Acid Rain, Global Warming (Greenhouse Effect), Ozone Layer - Its Depletion and Control Measures, El-Nino

Unit IV **(Lectures 08)**

Water pollution: Water Resources of the Earth and Indian Scenario, Point and non-Point sources of Water Pollution, Treatment of Water Pollution, Eutrophication, Bio-Diversity- Hot Spots of Biodiversity in India and World, Conservation, Importance and Factors Responsible for Loss of Biodiversity, Deforestation- causes and effects, Biogeographical Classification of India.

Unit V **(Lectures 08)**

Soil pollution-Sources and Consequences, Noise, Thermal - sources and consequences, Sustainable Development, Dams and Reservoirs- Their Benefits and Problems, Solid Wastes - Pollution, Treatment & Disposal, Environment Conservation Movement in India (Chipko Movement, Appiko Movement), Bioremediation, Biological Magnification

Text Books:

1. "Environmental Chemistry", De,A.K., New Age Publishers Pvt. Ltd.
2. "Introduction to Environmental Engineering and Science", Masters,G.M., Prentice Hall India Pvt.Ltd.
3. "Fundamentals of Ecology", Odem,E.P., W.B.Sannders Co.

Reference Books:

1. "Biodiversity and Conservation", Bryant,P.J., Hypertext Book
2. "Textbook of Environment Studies", Tewari, Khulbe & Tewari, I.K. Publication

*** Latest editions of all the suggested books are recommended.**

Semester-IV TECHNICAL COMMUNICATION

Course code: BHM401

(Common with EHM 401/BPH406/BBA406/BCA406/ /BCH406/BFA403)

L	T	P	C
2	0	2	3

Course

Contents: Unit I

Communication: Objectives of Communication, Need for Communication, Types of communication, written & Verbal communication, Formal and informal communication (The grapevine), upward and downward communication. (10 Hours)

Unit II

Business communication: Importance of written business correspondence, General principles and essentials of good commercial correspondence, Different types of commercial correspondence & their drafting, Types of Business letters, Official letters, electronic communication process. (10 Hours)

Unit III

Project, Thesis and Dissertation writing: Project Report, Thesis & Dissertation writing
Structure of Thesis writing. (10 Hours)

Unit IV

Modern Technology and Communication: Globalization of Business, Role of Information Technology, Tele- communication, Internet, Tele-conferencing and Video-conferencing. (10 Hours)

Text Books:

1. Mishra Sunita & Muraliksishra C., *Communication Skills for Engineers* – Pearson Education, New Delhi.
2. Raman Meenakshi & Sharma Sangeeta, *Technical Communication-Principles & Practice* – O.U.P. New Delhi. 2007.
3. Chabbra T N, *Business Communication*, Sun India Pub. New Delhi.

Reference Books:

1. Mohan Krishna & Banerji Meera, *Developing Communication Skills* – Macmillan India Ltd. Delhi.
2. Mitra Barum K., *Effective Technical Communication* – O.U.P. New Delhi. 2006.

NOTE:

This syllabus has been designed to improve the oral and written communication skills of students. The faculty members should put emphasis on practical (oral) activities for generating students' interest in language learning.

*** Latest editions of all the suggested books are recommended.**

Semester III/IV
FUNDAMENTALS OF COMPUTERS LAB

Course code: BCS-351/BCS-451

L	T	P	C
0	0	4	2

LIST OF EXPERIMENTS

1. Fundamentals of computer system, with its functional components.
2. Create a formatted WORD document.
3. Create a WORD document using different fonts.
4. Create a table & perform operations in it.
5. Create a WORD document, using the functions page set up, & page preview, and then print that document.
6. Implement Mail Merge.
7. Collect the information of any company & perform the below operation in it:
 - (a) Insert the data into Row/Column of Excel, worksheet
 - (b) Create a worksheet in Excel, perform alignment, text wrapping & sort the data.
8. Collect the information of any company & perform the below operation in it:
 - (a) Generate the graph in Excel.
 - (b) Create a Hyperlink to a word document.
 - (e) Create a worksheet using the functions- page set up, print preview & then print the worksheet.
9. Create, save & print the power point presentation
10. Create a power point presentation using clipart, Word art gallery & then add transition & Animation effects.

Evaluation of Practical Examination:

Internal Evaluation (50 marks)

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 5 point scale (two for experiment, two for file work and one for viva) which would include the practical conducted by the students and a Viva voce taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation scheme:

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (30 MARKS)			ATTENDANCE (5 MARKS)	QUIZ (5 MARKS)	VIVA (10 MARKS)	TOTAL INTERNAL (50 MARKS)
EXPERIMENT (10 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)				

External Evaluation (50 marks)

The external evaluation would be done by the external faculty based on the experiment conducted during the examination.

Semester III/IV
ENVIRONMENTAL SCIENCE (LAB)

Course code: BAS-359/BAS-459

L	T	P	C
0	0	4	2

LIST OF EXPERIMENT

1. To determine total alkalinity in the given water sample.
2. To determine the temporary and permanent hardness in water sample.
3. To determine the pH of the given solution using pH meter.
4. To determine the turbidity in given water sample.
5. To determine the dissolved oxygen present in a water sample.
6. To determine the conductivity in water sample.
7. To determine the carbon-di-oxide content in polluted water sample.
8. To find chemical oxygen demand of waste water sample by potassium dichromate.
9. To determine the TDS and TSS in water sample.
10. To determine the noise level in ambient air.

Evaluation of Practical Examination:
Internal Evaluation (50 marks)

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 5 point scale (two for experiment, two for file work and one for viva) which would include the practical conducted by the students and a Viva voce taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation scheme:

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (30 MARKS)			ATTENDANCE (5 MARKS)	QUIZ (5 MARKS)	VIVA (10 MARKS)	TOTAL INTERNAL (50 MARKS)
EXPERIMENT (10 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)				

External Evaluation (50 marks)

The external evaluation would be done by the external faculty based on the experiment conducted during the examination.

**Semester V
STATISTICS**

Course code: BAS-501

L	T	P	C
3	2	0	4

Unit I **(Lectures 08)**

Methods of least squares, and its use for Curve Fitting and fitting of straight lines and parabola, Normal equations, Most plausible lines.

Unit II **(Lectures 08)**

Bivariate distribution, Karl's Pearson's coefficient of Correlation, Rank Correlation and Line of Regression, Proof of $-1 < r < 1$.

Unit III **(Lectures 08)**

Consistency and Association of attributes, Theory of Attributes and their combination, class frequency. Association of datas, dependent and independent attributes

Unit IV **(Lectures 08)**

Finite difference and interpolation, various methods of interpolations Newton's Gregory formula, finite difference and factorial Notation.

Unit V **(Lectures 08)**

Properties of χ^2 distribution, calculation of theoretical frequencies, problem of χ^2 distribution at significant level.

Text Books:

1. "Statistics" by M. Ray and H. S. Sharma, Ram prashad & Sons
2. "Statistics" by J. N. Kapoor and H. C. Saxena, S.Chand & Company
3. "Statistics" by B. D. Gupta and O. P. Gupta, Krishana Prakashan Mandir

Reference Books:

1. "Statistics" by O. P. Gupta, Kedar Nath Ram Nath
2. "Statistics" by J.K. Goyal and J. N. Sharma, Krishana Prakashan Mandir
3. "Statistics" by V. K. Kapur and S. C. Gupta, Sultan Chand & Sons

*** Latest editions of all the suggested books are recommended.**

Semester V
PARTIAL DIFFERENTIAL EQUATIONS

Course code: BAS-502

L	T	P	C
3	2	0	4

Unit I (Lectures 10)

Partial differential equation of I order and I degree, Origin of partial differential equation, Lagranges method for $P.p + Q.q = R$.

Unit II (Lectures 08)

Partial differential equation of II order, Linear partial differential equation, its complete integral, particular integral and general solution, general solution of linear partial differential equation with constant coefficients.

Unit III (Lectures 10)

Monge's form of solution of form $Rr + Ss + Tt = V$

Unit IV (Lectures 06)

Classification of Partial differential Equation

Unit V (Lectures 06)

Application of Partial differential Equation

Text Books:

1. "Partial differential Equation" by M. D. Raisinghania, S.Chand&Company
2. "Partial differential Equation" by P. P. Gupta, G. S. Malik and S. K. Mittal, Pragati Prakshan

Reference Books:

1. "Partial differential Equation" by I. N. Sneddon, Mc graw Hill&Company
1. 2 "Partial Differential With Boundary value Problems" S Singh ,J .P.Chauhan Shikaha Sahitiya Prakasha

*** Latest editions of all the suggested books are recommended.**

Semester V
COMPLEX ANALYSIS

Course code: BAS-503

L	T	P	C
3	2	0	4

Unit I **(Lectures 07)**

Analytic functions, conjugate function, Harmonic function, N.S.C. for Cauchy Riemann equations, construct conjugate analytic functions.

Unit II **(Lectures 10)**

Complex Integration, Complex line integral, Cauchy integral function, Poisson integral, Liouville's theorem, Taylor theorem, Laurent theorem.

Unit III **(Lectures 07)**

Zero's & Singularity, Zero's of a function, singular point, poles and different types of singularities, limiting point of zero's and poles, Weierstrass theorem.

Unit IV **(Lectures 08)**

The Calculus of Residue, Residue of a pole at infinity, Residue theorem, Integration around

unit circle, evaluation of integral $\int_{-\infty}^{\infty} f(z) dz$.

Unit V **(Lectures 08)**

Conformal mappings, transformation $w = z^2$, $w = z^{1/2}$, $z = c \sin w$

Text Books:

1. "Complex Variable" by T. Pati, Pothishala Pvt Ltd
2. "Complex Variable" by J. K. Goyal and K. P. Gupta, Pragati Prakashan
3. "Complex Variable" by J. C. Chaturvedi and S.S. Seth, Student Friends & Co.

Reference Books:

1. "Complex Variable" by L. V. Ahlfors, McGraw-Hill & Co,
2. "Complex Variable" by R. K. Gupta, R. V. Churchill and J. W. Brown, McGraw-Hill & Co,
3. Complex Variable by Shanti Narayan, S. Chand & Company

*** Latest editions of all the suggested books are recommended.**

Semester V
OPERATION RESEARCH

Course code: BAS-504

L	T	P	C
3	2	0	4

Unit I **(Lectures 06)**

History and Back ground of subject, Different meaning of O.R. and Phases, characteristic and Models of O.R.

Unit II **(Lectures 10)**

Linear Programming, Mathematical formation of LPP, Graphical solution of LPP, general linear programming problem, simplex methods, duality.

Unit III **(Lectures 08)**

Transportation Problem, Assignment Problem, matrix form of: Transportation Problem. Initial basic physibale solution, Optimality and transportation algorithms, balanced and unbalanced transportation problem and assignment problem.

Unit IV **(Lectures 08)**

Job sequencing, Replacement model, sequencing method of two machine three machine and n amachine problem, graphic solution, Replacement of item deteriorating with time, Replacement of item that fails continuously, and general replacement problem.

Unit V **(Lectures 08)**

Game Theory, two person zero sum game, sadle point maximin and minimax, game of type 2×2 , $n \times 2$ game graphic solution and with dominance property.

Text Books:

1. "Operation Research" by Winston, Cengage Learning
2. "Operation Research" by S. D. Sharma, Kedarnath Ramnath&Company
3. "Operation Research" by Kanti Swroop, P. K. Gupta and Man Mohan, SultanChand & Sons

Reference Books:

1. "Operation Research" by H.A Tata, Maemillar & Company
2. "Operation Research" by P. K. Gupta and D.S. Hira, S Chand & Company
3. "Operation Research" by R. K. Gupta, Krishna Prakasha

*** Latest editions of all the suggested books are recommended.**

**Semester V
DYNAMICS**

Course code: BAS-505

L	T	P	C
3	2	0	4

Unit I (Lectures 08)

Kinematics in two dimensions, velocity, acceleration, angular velocity and relation between angular velocity and linear velocity, radial and transversal velocity and acceleration, tangential and normal velocity and acceleration.

Unit II (Lectures 08)

Rectilinear motion, Motion in a straight line with constant acceleration, simple Harmonic motion. Motion under inverse square law, Motion of a particle on a smooth vertical plane curve under gravity, simple pendulum circular motion, cycloidal motion.

Unit III (Lectures 08)

Constrained motion.

Unit IV (Lectures 08)

Central forces, differential equation of central orbit, Apse, velocity in a circle, velocity at infinity, Kapalar's law, etc, definition and properties of D'alembert's principle, general equation of a motion of a bodies.

Unit V (Lectures 8)

Moments of Inertia and Product of Inertia, Momental ellipsoid, and equimomental system, D'Alembert principal.

Text Books:

1. "Dynamics" by P. K. Mittal and S. D. Sharma, Pragati Prakashan
2. "Dynamics" by A. R. Vasistha and D. C. Agarwal, Krishana Prakashan
3. "Dynamics of a particle" by S. L. Loney, Maemillan& Company

Reference Books:

1. "Dynamics" by M. Ray and G. C. Sharma, S.Chand & Company
2. "Dynamics" by P. K. Mittal and P. K. Shukla, S.J. Prakashan

*** Latest editions of all the suggested books are recommended.**

Semester V
‘C’ PROGRAMMING

Course code: BCS-501

L	T	P	C
2	1	0	2

Unit I (Lectures 08)

Elementary data types: Definitions, data, data types, integer, character, float, string, etc., constants and variables. Declaration, statement, integer, constant, variable, integer, expression, assignment, Boolean type, tokens, keywords, identifiers.

Unit II (Lectures 08)

Control Structure: While statement, if statement, else statement. Nested logic: for loop, do-while loop, loop inside a loop structure, operators and expressions.

Unit III (Lectures 08)

Arrays and Strings: declaration, initialization. String handling: comparison, concatenation, copy, finding length of string.

Unit IV (Lectures 08)

Sequence Control: user defined functions, library functions. Functions: definition, declaration, returns values and their types. Function calls. Recursion, pointers.

Unit V (Lectures 08)

Structure data type: Structures and union, enumerations. File and file structure: opening, closing, input/output operations on file.

Text Books

1. Balaguru Swamy E., *Programming with ANSI C*, TMH Publications.
2. Yashwant Kantikar, *Let Us C*, BPB Publications.

Reference Book

1. John Pratt, *Principle of Programming Languages*, PHI Publications.

*** Latest editions of all the suggested books are recommended.**

Semester-V

TECHNICAL WRITING

Course code: BHM501

(Common with EHM 501/BPH506)

L	T	P	C
2	0	2	3

Course

Contents: Unit I

Forms of Technical Communication: Report writing, Definition and characteristics, Steps towards report writing, Structure, style of Report writing, Types & forms of Reports, Presentation of Reports, Importance of Report writing. (10 Hours)

Unit II

Technical Paper writing: Definition and purpose, Essentials of a good technical paper/Article, Scientific Article writing, Difference between Technical paper/Article and scientific article, Methods of writing technical paper & Scientific article. (10 Hours)

Unit III

Technical Proposal: Definition and meaning of Technical Proposal, Significance of Proposal, Characteristics of a good Proposal, Format of Proposal, Uses of Proposals. (10 Hours)

Unit IV

Writing Skills: Reporting events, Writing newspaper reports, Essentials of essay writing – writing an essay of about 300 words on a given topic. Bio-Data Making, Writing of CV & Resumes, Difference between CV and Resume, Writing Job application etc. (10 Hours)

Text Books:

1. Raman Meenakshi & Sharma Sangeeta, *Technical Communication- Principles & Practice* – O.U.P. New Delhi. 2007.

Reference Books:

1. Monippally Matthukutty M., *Business Communication Strategies* – Tata- Mc Graw Hill Publications Company, New Delhi.
2. Mohan K. & Sharma R.C., *Business Correspondence of Report Writing* –TMH, New Delhi.

NOTE:

This syllabus has been designed to improve the oral and written communication skills of students. The faculty members should put emphasis on practical (oral) activities for generating students' interest in language learning.

*** Latest editions of all the suggested books are recommended.**

Semester V
‘C’ PROGRAMMING LAB

Course code: BCS-551

L	T	P	C
0	0	4	2

LIST OF EXPERIMENTS:

1. WAP to calculate Sum & average of N numbers.
2. WAP to convert integer arithmetic to a given number of day and month.
3. WAP to find maximum and minimum out of 3 numbers a, b & c.
4. WAP to find factorial of positive integer.
5. WAP to find sum of series up to n number, 2+5+8+.....+n.
6. WAP to print all the number between 1 to 100 which are dividing by 7.
7. WAP to generate Fibonacci series up to n.
8. Write a function to calculate area of circle.
9. Write a recursive function to calculate factorial of given number.
10. WAP to find whether number is prime or not.
11. WAP to find that the enter character is a letter or digit.
12. WAP to find addition of two matrix of n*n order.
13. WAP to find multiplication of two matrix of n*n order.
14. WAP to add 6 digit numbers in even case & multiple 6 digit number in odd case.
15. WAP to find even or odd up to a given limit n.
16. WAP to find whether a given no is palindrome or not.
17. WAP to joining & Comparing the 2 string.

Evaluation of Practical Examination:

Internal Evaluation (50 marks)

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 5 point scale (two for experiment, two for file work and one for viva) which would include the practical conducted by the students and a Viva voce taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation scheme:

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (30 MARKS)			ATTENDANCE (5 MARKS)	QUIZ (5 MARKS)	VIVA (10 MARKS)	TOTAL INTERNAL (50 MARKS)
EXPERIMENT (10 MARKS)	FILE WORK (10 MARKS)	VIVA (10 MARKS)				

External Evaluation (50 marks)

The external evaluation would be done by the external faculty based on the experiment conducted during the examination.

Semester VI
DIFFERENTIAL GEOMETRY AND TENSOR

Course code: BAS-601

L	T	P	C
3	2	0	4

Unit I **(Lectures 8)**

Curves in space, space curves, arc lengths, tangent plane lines, osculating plane, normal plane, unit vectors t , n , b , Serret-Frenet formula, curvature and torsion of curves helix, osculating circle and osculation sphere.

Unit II **(Lectures 8)**

Fundamentals of surfaces, definition of surface, class of a surface, regular and singular point, tangent and normal planes, fundamental form and relation between E , F , G , Fundamental magnitude of a surface.

Unit III **(Lectures 8)**

Envelopes and Developable surfaces, characteristics envelop, edge of regression, developable surface, envelopes of a plane etc.

Unit IV **(Lectures 8)**

Contra variant & Covariant Vectors & Tensors, Contraction, Tensor algebra, Associated Vectors and Tensors.

Unit V **(Lectures 8)**

Christoffel Symbols, Tensor law of transformation, Covariant derivative of Tensors. Riemann Christoffel Tensor.

Text Books:

1. "Differential Geometry" by A. R. Vasistha and J. N. Sharma, Kedarnath Ramnath
2. "Tensor Calculus" by G. C. Sharma and S.K. Singh Laxmi Narayan Publisher Agra

Reference Books:

1. "Differential Geometry" by A.B. Chandra Moule and J. B. Chauhan, Siksha Sahitya Prakashan
2. "Differential Geometry" by P. P. Gupta and G. S. Malik, Pragati Prakashan
3. "Differential Geometry" by S. C. Mittal and D. C. Agarwal, Krishna Prakashan
4. "Differential Geometry" by T. J. Willmore Oxford University Press, New Delhi

*** Latest editions of all the suggested books are recommended.**

**Semester VI
HYDRODYNAMICS**

Course code: BAS-602

L	T	P	C
3	2	0	4

Unit I **(Lectures 08)**

Equation of continuity, Equation of continuity in cartesian, cylindrical and polar form, acceleration of a fluid particle, boundary surfaces, Lagranges & Euler methods relation between, Lagranges & Euler methods.

Unit II **(Lectures 8)**

Equation of motion, Lagranges & Euler's equation of motion, conservative field of force, equation of motion under impulsive force, Bernoulli's Equation, Cauchy's equation.

Unit III **(Lectures 8)**

Motion in Two dimensions, stream function and current function, complex potential function, source, sink, doublet, image in two and three dimensions, Circle theorem and Blasius theorem.

Unit IV **(Lectures 8)**

Motion of sphere through infinite mass of liquid, liquid streaming past a fixed sphere, Stokes stream function.

Unit V **(Lectures 8)**

Vortices, some theorem and properties of vortex motion, vortex line, tube filament, Rectilinear vortices, Helmholtz's vorticity theorem, Kármán vortex theorem,

Text Books:

1. "Fluid Mechanics" by A.S. Ramsay and W. H. Besant, C.B.S. Publisher's Pvt Ltd. Agra
2. "Fluid Dynamics" by F. Chorlton, E.L.B.S. Van Nostrand Co.
3. "Fluid Dynamics" by J. K. Goyal and K. P. Gupta, Pragati Prakashan

Reference Books:

1. "Fluid Dynamics" by B.D. Gupta, Pragati Prakashan
2. "Fluid Dynamics" by M.D. Rai Singhania, S. Chand and Co.
3. "Fluid Dynamics" by P.P Gupta, S. Chand and Co.

*** Latest editions of all the suggested books are recommended.**

B.Sc. Maths (Hons) –Semester VI
MATHEMATICAL MODELING

Amended vide approval dated November 5 2012 and 5th January 2013.

Course Code: BAS 603

L	T	P	C
3	2	0	4

Unit I

(Lectures 08)

Mathematical Modeling and its Need, Different Techniques involve in Modelling, Classification of Mathematical Modelling and simple illustrations.

Unit II

(Lectures 08)

Mathematical Modelling through Ordinary Differential Equation's(ODE) of First order and system of ODE's of first order, Mathematical Modelling through ODE of 2nd order, Mathematical Modelling through difference equation.

Unit III

(Lectures 08)

Mathematical Modeling through Partial differential equations: Mass balance Equation, Momentum balance equation and variational principle, Mathematical Modeling through Directed Graph, signed Graph, Unoriented Graph and weighted diagraph.

Unit IV

(Lectures 08)

Mathematical Modelling through Functional Integral, Delay Differential and differential difference equation.

Unit V

(Lectures 08)

Mathematical Modelling through Calculus of variation and dynamic Programming, Mathematical Modelling through Principle and Maximum entropy principle.

Text Books:

1. "Mathematical Modeling", Frank R. Giordano, Etall Cengage learning.
2. "Mathematical Modelling" by J.N.Kapoor, Estern Willey and sons

Reference Books:

1. "Differtential Equation Model" by Eds Martin Barew and C. S. Colen
2. "Political and relative Model" by D.A. Saw and W. Flucas
3. "Discreet System Model" by W. F. Lucas & Stebe. J. Bans
4. "Life Science Model' by H.M. Robert & M. Thomson

*** Latest editions of all the suggested books are recommended.**

Semester VI
GRAPH THEORY

Amended vide approval dated November 5 2012 and 5th January 2013.

Course code: BAS-604

L	T	P	C
3	2	0	4

Unit I

(Lectures 08)

Definition of Graph and their properties, types of graph, homomorphism, isomorphism, automorphism of graph, subgraph, Walk, trail and path, connected and disconnected graph Euler's Graph, Operation on graph.

Unit II

(Lectures 08)

Definition of Trees, Pendent vertex, center of a tree, binary tree, spanning tree, Fundamental Circuits, Connectivity and separability, preorder and post order.

Unit III

(Lectures 08)

Planar and dual graphs, Kuratowski's two graphs, different representations of planer graphs, detection of planarity, Geometric dual, Combinatorial dual, Thickness and Crossing.

Unit IV

(Lectures 08)

Vectors and vector spaces, Vector space associated with a graph, Basis vectors of a graph, circuit and cut-set subspace, Orthogonal vectors and spaces, Intersection and join of w and w_s .

Unit V

(Lectures 08)

Matrix representation of graphs, Incidence matrix, Sub matrix of $A(G)$, Circuit matrix, Fundamental circuit matrix and Rank of B , Cut-set matrix, Path matrix, Adjacency Matrix.

Text Books:

1. "Graph Theory" by Narsingh Deo, Printice Hall of India
2. "Graph Theory" by P.k.Mittal & P.K. Shukla, S. J. publication

Reference Books:

1. "Graph Theory" by S.B. Singh, Khanna book Publishing co.

*** Latest editions of all the suggested books are recommended.**

Semester VI
APPLIED STATISTICS

Course code: BAS-605

L	T	P	C
3	2	0	4

Unit I **(Lectures 8)**

Statistical Quality control: General theory of control charts, causes of variation in quality, control limits, sub-grouping, summary of out of control criteria, charts for attributes np chart, pchart, c chart, Chart for variables X R and sigma charts.

Unit II **(Lectures 8)**

Time Series: Introduction, components of time series, models of time series, measurement of Trend-graphic, semi-average, least square and moving average methods, Measures of seasonal variation –Simple average, Ratio to M. A., Ratio to trend, link relative method.

Unit III **(Lectures 8)**

Demographic Methods: Sources of demographic data-census, register, adhoc survey, hospital records, demographic profile of Indian census, Rates & ratios of vital events, Measurements of mortality and life tables-crude, death rates, Infant mortality rates, death rate by cause, standardized death rate, complete life table-its main features, mortality rate and probability of dying, use of survival tables, Measurement fertility-crude birth rate, general fertility rate, total fertility rate, gross reproduction rate, net reproduction rate.

Unit IV **(Lectures 8)**

Index Number: Its definition, application of index numbers, price quantity and value relatives, link and chain relatives, problems involved in computation of index numbers, use of averages, simple and weighted aggregative and average methods, Laspeyre's Passche's, Marshall Edgeworth and Fisher's index numbers, time and factor resersal tests of index numbers, Consumer price Index.

Unit V **(Lectures 8)**

Decision Theory: Different kind of decision theory, inventory control, CPM, PERT.

Text Books:

1. "Mathematical Statistics" by S.C. Gupta, S. Chand & co.
2. "Operation Research" by D. S. Hira, S. Chand & co.

Reference Books:

1. "Operation Research" by Winston, Cengage Learning
2. "Operation Research" by H. A. Taha
3. "Statistics" by J. N. Kapoor and H. C. Saxena, S.Chand & Company.

*** Latest editions of all the suggested books are recommended.**

Semester-VI COMMUNICATION TECHNIQUE

Course code: BHM601

(Common with EHM601/BPH606/BBA603/BCA604/BCH606)

L	T	P	C
2	0	2	3

Course Contents:

Unit I

Oral Communication: Principles of effective oral communication, Features, Vitals of communication, Interpersonal communication, Persuasive communication. **(10 Hours)**

Unit II

Presentation Strategies: Purpose, Audience & Locale, Organizing contents, Preparing outlines. Audio- Visual aids, Body Language, Voice dynamics. **(10 Hours)**

Unit III

Listening Skills: The Listening process, Hearing & listening, Types of listening, Listening with a purpose, Barriers to listening, Telephonic conversation. **(10 Hours)**

Unit IV

Speaking Skills: Improving voice & speech, Art of public speaking, Using visual aids, Job interview being interviewed by the media, Dealing with the boss. Dealing with subordinates, How to run a meeting. **(10 Hours)**

Text Book:

1. Raman Meenakshi & Sharma Sangeeta, *Technical Communication-Principles & Practice* – O.U.P. New Delhi. 2007.

Reference Books:

1. Rutherford A., *Basic Communication Skills* – Pearson Education, New Delhi.
2. Mitra Barun K., *Effective Technical Communication* – O.U.P. New Delhi. 2006.

NOTE:

This syllabus has been designed to improve the oral and written communication skills of students. The faculty members should put emphasis on practical (oral) activities for generating students' interest in language learning.

*** Latest editions of all the suggested books are recommended.**

Mathematics SEMINAR

Course code: BAS699

L	T	P	C
0	0	4	2

Selection of Topic:

1. All students pursuing B.Sc. shall select and propose a topic of the seminar in the first week of the semester. Care should be taken that the topic selected is not directly related to the subjects of the course being pursued or thesis work, if any. The proposed topic should be submitted to the course coordinator.
2. The course coordinator shall forward the list of the topics to the coordinator of concerned department, who will consolidate the list including some more topics, in consultation with the faculty of the department. The topics will then be allocated to the students along with the name of the faculty guide and also forwarded to the director for approval.
3. On approval by the Director, the list shall be displayed on the notice board and the students will also be accordingly informed by the course coordinator within three weeks of the commencement of the semester.

Preparation of the Seminar

1. The student shall meet the guide for the necessary guidance for their preparation for the seminar.
2. During the next two to four weeks the student will read the primary literature related to the topic under the guidance of supervisor.
3. After necessary collection of data and literature survey, the students must prepare a report. The report shall be arranged in the sequence as per following format & lay out plan :-
 - a. Top Sheet of transparent plastic.
 - b. Top cover.
 - c. Preliminary pages.
 - (i) Title page
 - (ii) Certification page.
 - (iii) Acknowledgment.
 - (iv) Abstract.
 - (v) Table of Content.
 - (vi) List of Figures and Tables.
 - (vii) Nomenclature.
 - d. Chapters (Main Material).
 - e. Appendices, If any.
 - f. Bibliography/ References.
 - g. Evaluation Form.
 - h. Back Cover (Blank sheet).
 - i. Back Sheet of Plastic (May be opaque or transparent).

1. **Top Cover-** The sample top cover shall be as Under:

TITLE OF THE SEMINAR

NAME OF THE STUDENT WITH COURSE, STREAM, SEMESTER & SECTION.

Department of Applied Science



**College of Engineering
Teerthanker Mahaveer University
Moradabad-244001**

MONTH AND YEAR

2. **Title Page:-** The Title Page cover shall be as Under

Title of the seminar

(Submitted in Partial fulfillment of the requirement for the degree of

BACHELOR OF SCIENCE in

Mathematics (Hons.)

by

Name of Student in capital Letters

(Roll No.)



COLLEGE OF ENGINEERING

TEERTHANKAR MAHAVEER UNIVERSITY

N.H. 24, BAGARPUR,

MORADABAD-244001

MONTH AND YEAR

3. **Certification page:-** This shall be as under

Department of Applied Science
College of Engineering
Teerthankar Mahaveer University
Moradabad-244001

The seminar Report and Title “Name of the Topic of the Seminar.” Submitted by
Mr./Ms. (Name of the student) (Roll No.) may be accepted for being evaluated-

Date

Signature

re

**Place
guide)**

(Name of

Note:

For Guide If you choose not to sign the acceptance certificate above, please indicate reasons for the same from amongst those given below:

- i) The amount of time and effort put in by the student is not sufficient;
- ii) The amount of work put in by the student is not adequate;
- iii) The report does not represent the actual work that was done / expected to be done;
- iv) Any other objection (Please elaborate)

4. **Abstract:-** A portion of the seminar grade will be based on the abstract. The abstract will be graded according to the adherence to accepted principles of English grammar and according to the adherence to the format described below.

The seminar abstract is an important record of the coverage of your topic and provides a valuable source of leading references for students and faculty alike. Accordingly, the abstract must serve as an introduction to your seminar topic. It will include the key hypotheses, the major scientific findings and a brief conclusion. **The abstract will be limited to 500 words, excluding figures, tables**

and references. The abstract will include references to the research articles upon which the seminar is based as well as research articles that have served as key background material.

5. **Table of Content:-** This shall be as under

SAMPLE SHEET FOR TABLE OF CONTENTS

<u>TABLE OF CONTENTS</u>		
Chapter No.	Title	Page No.
	Certificate	ii
	Abstract	iii
	Acknowledgement	iv
	List of Figures	v
	List of Tables	vi
1	Introduction	I
	1.1	
	1.2	
	1.3	
2		
3		
4	References/ Bibliography	
52	Evaluation Sheets	

6. List of Figures and Tables :- This will be as under

List of Figures and Tables - sample entries are given below:

List of Figures

Figure No. Page No.	Caption / Title	
2.1 21	Schematic representation of a double layered droplet	..
.....		
3.2 32	Variation in rate versus concentration	..

List of Tables - sample entries are given below:

List of Tables

Table No. No.	Caption / Title	Page
2.1	Thickness of a double layered droplet	... 22
.....		
3.2	Variation in rate versus concentration	... 34

(7). **Main Pages-** The Main report should be divided in chapters (1, 2, 3 etc.) and

Structured into sections (1.1, 1.2 etc) and subsections (1.2.1, 1.2.2, ... etc).

Suitable title should be given for sections and subsections, where necessary.

Referencing style- wherever reference is given in the main pages it should have the following format.

The values of thermal conductivities for a variety of substances have been reported by Varma (1982). For polymers, however, the information is more limited and some recent reviews have attempted to fill the gaps (Batchelor and Shah, 1985).

For two authors -
1985)

(Batchelor and Kapur,

For more than two authors -

(Batchelor et al., 1986)

By same author/combination of authors in the same year -

(Batchelor, 1978*a*; Batchelor, 1978*b*; Batchelor et al., 1978)

(8) . **Bibliography/References-** In the bibliography/ references list standard formats must be used. The typical formats are given blow-

Journal articles: -

David, A.B., Pandit, M.M. and Sinha, B.K., 1991, "Measurement of surface viscosity by tensiometric methods", Chem. Engng Sci.47, 931-945.

Books: -

Doraiswamy, L.K. and Sharma, M.M., 1984, "Heterogeneous Reactions- Vol 1", Wiley, New York, pp 89-90.

Edited books/Compilations/Handbooks: -

Patel, A.B., 1989, "Liquid -liquid dispersions", in Dispersed Systems Handbook, Hardy, L.C. and Jameson, P.B. (Eds.), McGraw Hill, Tokyo, pp 165-178.

Lynch, A.B. (Ed.), 1972, "Technical Writing", Prentice Hall, London.

Theses/Dissertations: -

Pradhan, S.S., 1992, "Hydrodynamic and mass transfer characteristics of packed extraction columns", Ph.D. Thesis, University of Manchester, Manchester, U.K..

Citations from abstracts: -

Lee, S. and Demlow, B.X., 1985, US Patent 5,657,543, *Cf* C.A. 56, 845674.

Personal Communications: -

Reddy, A.R., 1993, personal communication at private meeting on 22 October 1992 at Physics Department, Indian Institute of Technology, Delhi.

Electronic sources (web material and the like)-

For citing web pages and electronic documents, use the APA style given at:

<http://www.apastyle.org/elecsources.html>

(9). Evaluation Form:- Three sheets of evaluation form should be attached in the report as under.

- a. Evaluation form for guide and other Internal Examiner.
- b. Evaluation form for external examiners.
- c. Summary Sheet.

(10). Evaluation form for Guide & Internal Examiners:-

EVALUATION SHEET

(To be filled by the GUIDE & Internal Examiners only)

Name of Candidate:

Roll No:

Class and Section:

Please evaluate out of Five marks each

S. No	Details	Marks (5)	Marks (5)	Marks (5)
		Guide	Int. Exam. 1	Int. Exam. 2
1.	OBJECTIVE IDENTIFIED & UNDERSTOOD			
2.	LITERATURE REVIEW / BACKGROUND WORK (Coverage, Organization, Critical review)			
3.	DISCUSSION/CONCLUSIONS (Clarity, Exhaustive)			
4.	SLIDES/PRESENTATION SUBMITTED (Readable, Adequate)			
5.	FREQUENCY OF INTERACTION (Timely submission, Interest shown, Depth, Attitude)			
	Total (Out of 25)			
	Average out of 50			

Signature:

Signature:

Signature:

Date:

Date:

Date:

EVALUATION SHEET FOR EXTERNAL EXAMINER

(To be filled by the External Examiner only)

Name of Candidate:

Roll No:

I. For use by **External Examiner ONLY**

Please evaluate out of Ten marks each

S.No.	Details	Marks (5)
1.	OBJECTIVE IDENTIFIED & UNDERSTOOD	
2.	LITERATURE REVIEW / BACKGROUND WORK (Coverage, Organization, Critical review)	
3.	DISCUSSION/CONCLUSIONS (Clarity, Exhaustive)	
4.	POWER POINT PRESENTATION (Clear, Structured)	
5.	SLIDES (Readable, Adequate)	
	Total (Out of 50)	

Signature:

Date:

EVALUATION SUMMARY SHEET

(To be filled by External Examiner)

Name and Roll No.	Internal Examiners (50)	External Examiner (50)	Total (100)	Result (Pass/Fail)

Note:- The summary sheet is to be completed for all students and the same shall also be Compiled for all students examined by External Examiner. The Format shall be provided by the course coordinator.

(11). General Points for the Seminar

1. The report should be typed on A4 sheet. The Paper should be of 70-90 GSM.
2. Each page should have minimum margins as under-
 - (i) Left 1.5 inches
 - (ii) Right 0.5 Inches
 - (iii) Top 1 Inch
 - (iv) Bottom 1 Inch (Excluding Footer, If any)
3. The printing should be only on one side of the paper
4. The font for normal text should Times New Roman, 14 size for text and 16 size for heading and should be typed in double space. The references may be printed in Italics or in different fonts.
5. The Total Report should not exceed 50 pages including top cover and blank pages.
6. A CD of the report should be pasted/ attached on the bottom page of the report.
7. Similarly a hard copy of the presentation (Two slides per page) should be attached along with the report and a soft copy be included in the CD.
8. Three copies completed in all respect as given above is to be submitted to the guide. One copy will be kept in departmental/University Library, One will be return to the student and third copy will be for the guide.
9. The power point presentation should not exceed 30 minutes which include 10 minute for discussion/Viva.

Study & Evaluation Scheme

of

Bachelor of Science (Hons.)

Computer Science

[Applicable for the Batch 2012-13 till revised]



TEERTHANKER MAHAVEER UNIVERSITY

Delhi Road, Moradabad, Uttar Pradesh-244001.

Website: www.tmu.ac.in



TEERTHANKER MAHAVEER UNIVERSITY

(Established under Govt. of U. P. Act No. 30, 2008)

Delhi Road, Moradabad (U.P)

Study & Evaluation Scheme of Bachelor of Science (Hons)-Computer Science SUMMARY

Programme	: B.Sc. (Hons) - Computer Science
Duration	: Three year full time (Six Semester)
Medium	: English
Minimum Required Attendance	: 75 %
Maximum Credits	: 191
Minimum credits required for the degree:	185

Assessment	:	<table><tr><th>Internal</th><th>External</th><th>Total</th></tr><tr><td>30</td><td>70</td><td>100</td></tr></table>	Internal	External	Total	30	70	100
Internal	External	Total						
30	70	100						

Internal Evaluation (Theory :
Papers)

Class Test I	Class Test I	Class Test I	Assignment(s)	Other activity including Attendance	Total
Best two out of the three					
10	10	10	5	5	30

Evaluation of Practical/Dissertations & Project Reports	:	<table><tr><th>Internal</th><th>External</th><th>Total</th></tr><tr><td>50</td><td>50</td><td>100</td></tr></table>	Internal	External	Total	50	50	100
Internal	External	Total						
50	50	100						

Duration of Examination	:	External	Internal
		3 hrs.	1.5 hrs.

To qualify the course a student is required to secure a minimum of 40% marks in aggregate including the semester end examination and teachers continuous evaluation.(i.e. both internal and external). A candidate who secures less than 40% of marks in a course shall be deemed to have failed in that course. The student should have secured at least 50% marks in aggregate to clear the semester. In case a student has secured more than 40% in each course, but less than 50% overall in a semester, he/she shall re-appear in courses where the marks are less than 50% to achieve the required aggregate percentage (50%) in the semester.

Question Paper Structure

1. The question paper shall consist of eight questions. Out of which first question shall be of short answer type (not exceeding 50 words) and will be compulsory. Question No. 1 shall contain 8 parts representing all units of the syllabus and students shall have to answer any five (weightage 4 marks each).
2. Out of the remaining seven questions, student shall be required to attempt any five questions. There will be minimum one and maximum two questions from each unit of the syllabus. The weightage of Question No. 2 to 8 shall be 10 marks each.

Study & Evaluation Scheme
B.Sc. Computer Science Honours
Semester-I

S. NO.	Course Code	Subject	Periods			Credit	Evaluation Scheme		
			L	T	P		Internal	External	Total
1	CSC-101	Computer Fundamentals, Internet, & MS-Office	6	0	0	6	30	70	100
2	CSC-102	Circuit Theory & Basic Electronics	6	0	0	6	30	70	100
3	CSC-103	Digital System Design	6	0	0	6	30	70	100
4	CSC-104	Principles of Management	6	0	0	6	30	70	100
5	CSC-105	Foundation English	3	0	0	3	30	70	100
6	CSC-151	Software Lab : PC S/W & C Programming and Usage of MS office	0	0	6	3	50	50	100
7	CSC-152	Hardware Lab : Digital – 1	0	0	4	2	50	50	100
Total			27		10	32	250	450	700

Semester-II

S. NO.	Course Code	Subject	Periods			Credit	Evaluation Scheme		
			L	T	P		Internal	External	Total
1	CSC-201	Computer Organization	6	0	0	6	30	70	100
2	CSC-202	C-Programming	6	0	0	6	30	70	100
3	CSC-203	Mathematics	6	0	0	6	30	70	100
4	CSC-204	Operating System	6	0	0	6	30	70	100
5	CSC-205	Foundation English-II	3	0	0	3	30	70	100
6	CSC-251	Software Lab : C-Programming Lab	0	0	6	3	50	50	100
7	CSC-252	Hardware Lab : Digital - 2	0	0	4	2	50	50	100
Total			27		10	32	250	450	700

Semester-III

S. NO.	Course Code	Subject	Periods			Credit	Evaluation Scheme		
			L	T	P		Internal	External	Total
1	CSC-301	Software Engineering and UML	6	0	0	6	30	70	100
2	CSC-302	Data Communication & Computer Network	6	0	0	6	30	70	100
3	CSC-303	Linux Internals	6	0	0	6	30	70	100
4	CSC-304	Data Structures	6	0	0	6	30	70	100
5	CSC-305	Professional Writing	3	0	0	3	30	70	100
6	CSC-351	Data Structure Lab	0	0	6	3	50	50	100
7	CSC-352	Linux & Shell Programming Lab	0	0	4	2	50	50	100
		Total	27		10	32	250	450	700

Semester-IV

S. NO.	Course Code	Subject	Periods			Credit	Evaluation Scheme		
			L	T	P		Internal	External	Total
1	CSC-401	Theory of DBMS	6	0	0	6	30	70	100
2	CSC-402	Object-Oriented Programming Concepts – C++	6	0	0	6	30	70	100
3	CSC-403	Algorithm Design	6	0	0	6	30	70	100
4	CSC-404	Formal Language & Automata Theory	6	0	0	6	30	70	100
5	CSC-405	Technical Writing	3	0	0	3	30	70	100
6	CSC-451	DBMS-Lab : SQL, PL-SQL, Forms & Reports	0	0	6	3	50	50	100
7	CSC-452	Object Oriented Programming Lab through C++	0	0	6	3	50	50	100
		Total	27		12	33	250	450	700

Semester-V

S. NO.	Course Code	Subject	Periods			Credit	Evaluation Scheme		
			L	T	P		Internal	External	Total
1	CSC-501	Numerical and Optimizing Techniques	6	0	0	6	30	70	100
2	CSC-502	Computer Graphics	6	0	0	6	30	70	100
3	CSC-503	Microprocessor	6	0	0	6	30	70	100
4	CSC-504	Compiler Design	6	0	0	6	30	70	100
5	CSC-505	Vb.Net	3	0	0	3	30	70	100
6	CSC-551	Vb.Net Lab	0	0	6	3	50	50	100
7	CSC-552	Microprocessor Lab	0	0	4	2	50	50	100
		Total	27		10	32	250	450	700

Semester-VI

S. NO.	Course Code	Subject	Periods			Credit	Evaluation Scheme		
			L	T	P		Internal	External	Total
1	CSC-601	Internet and Java Programming	6	0	0	6	30	70	100
2	CSC-602	Web technologies & Multimedia	6	0	0	6	30	70	100
3	CSC-603(1-5)	Mobile Computing, Artificial Intelligence, Image Processing, Data Mining, Embedded System, Distributed Computing.	6	0	0	6	30	70	100
4	CSC-651	Java & Web Technologies –Lab	0	0	6	3	50	50	100
5	CSC-652	MATLAB	0	0	6	3	50	50	100
6	CSC-653	Project Lab-Under the Super vision of Project Guide(In house Development)	0	0	6	3	50	50	100
7	CSC-654	Comprehensive Viva-Voce	0	0	6	3	50	50	100
		Total	18	0	24	30	290	410	700

- **CSC-653 will not be replaced by any special course this is mandatory for a student to pass.**

COMPUTER FUNDAMENTALS AND PROGRAMMING CONCEPTS

Course Code: BCA103/ CSC-101

L-6, T-0, P-0, C-6

Course Contents

Unit I:

Introduction and Definition of Computer: Computer Generation, Characteristics of Computer, Advantages and Limitations of a computer, Classification of computers, Functional components of a computer system (Input, CPU, Storage and Output Unit), Types of memory (Primary and Secondary) Memory Hierarchy. Hardware: a) Input Devices- Keyboard, Mouse, Scanner, Bar Code Reader b) Output Devices – Visual Display Unit (VDU), Printers, Plotters etc. Software: Introduction, types of software with examples, Introduction to languages, Compiler, Interpreter and Assembler. Number System: Decimal, Octal, Binary and Hexadecimal Conversions, BCD, ASCII and EBCDIC Codes.

(Lecture 08)

Unit II:

MS – DOS: Getting Started on DOS with Booting the System, Internal Commands: CHDIR(CD), CLS, COPY, DATE, DEL(ERASE), DIR, WILD CARD CHARACTER, EXIT, MKDIR(MD), PROMPT, REM, RENAME(REN), RMDIR(RD), TIME, TYPE, VER, VOL, External Commands: APPEND, ATTRIB, CHKDSK, COMMAND, DOSKEY, EDIT, FORMAT, HELP, LABEL, MORE, REPLACE, RESTORE, SORT, TREE, UNDELETE, UNFORMAT, XCOPY.

(Lecture 08)

Unit III:

MS Word: Starting MS WORD, Creating and formatting a document, Changing fonts and point size, Table Creation and operations, Autocorrect, Auto text, spell Check, Word Art, Inserting objects, Page setup, Page Preview, Printing a document, Mail Merge.

(Lecture 08)

Unit IV:

MS Excel: Starting Excel, Work sheet, cell inserting Data into Rows/ Columns, Alignment, Text wrapping, Sorting data, Auto Sum, Use of functions, Cell Referencing form, Generating graphs, Worksheet data and charts with WORD, Creating Hyperlink to a WORD document, Page set up, Print Preview, Printing Worksheets.

MS Power Point: Starting MS–Power Point., Creating a presentation using auto content Wizard, Blank Presentation, creating, saving and printing a presentation, Adding a slide to presentation, Navigating through a presentation, slide sorter, slide show, editing slides, Using Clipart, Word art gallery, Adding Transition and Animation effects, setting timings for slide show, preparing note pages, preparing audience handouts, printing presentation documents. **MS – Access:** creating table and database.

(Lecture 08)

Unit V:

C Programming: Variables, Constants, Keywords and Identifiers, Operators and Expression, Type Conversion, Arithmetic Expression, Logical Expression Operator Precedence, Sequencing, Applying if statement, if.....else statements, nested if.....else and else if ladder statements. Program Loops and Iteration: Use of Loops (while, do and for), Nested Loops.

(Lecture 08)

Text Books:

1. Sinha P.K., Computer Fundamentals, BPB Publishing.
2. Bill Bruck., The Essentials Office 2000 Book, BPB Publishing.
3. Kanitkar Yashwant, Let Us C, BPB Publishing.

Reference Books:

1. Leon A. & Leon M., Introductions to Computers, Vikas Publications.
2. Balaguruswamy E., Programming in ANSI C, Tata McGraw Hill.
3. Peter Norton's, Introductions to Computers, Tata McGraw Hill.

***Latest editions of all the suggested books are recommended.**

B.Sc. Computer Science Honours-Semester I

Circuit Theory & Basic Electronics

Course Code: CSC-102

L-6, T-0, P-0, C-6

Course Contents

Unit I:

Passive circuit: parameters, Kirchhoff's law, impedance and reactance, superposition, reciprocity, Thevenin, Norton, maximum power transfer.

LCR Circuits: Resonance, Natural frequency, Damping, Bandwidth, Qfactor, Scaled parameters Series RLC circuit :Transient response ,Overdamped Response, Underdamped Response, Critically Damped Response, Laplace domain :Laplace admittance, Poles and zeros, General solution, Sinusoidal steady state. **(Lecture 08)**

Unit II

Semiconductor Diodes: Semiconductor materials- intrinsic and extrinsic types, Ideal Diode, Terminal characteristics of diodes: p-n junction under open circuit condition, p-n junction under forward bias and reverse bias conditions, p-n junction in breakdown region, Diode small signal model, Zener diode and applications. **(Lecture 08)**

Unit III

Bipolar Junction Transistors (BJTs): Physical structure and operation modes, Active region operation of transistor, D.C. analysis of transistor circuits, Transistor as an amplifier, Biasing the BJT: fixed bias, emitter feedback bias, collector feedback bias and voltage divider bias, Basic BJT amplifier configuration: common emitter, common base and common collector amplifiers, Transistor as a switch: cut-off and saturation modes, High frequency model of BJT amplifier. **(Lecture 08)**

Unit IV

Field Effect Transistor (FET): Enhancement-type MOSFET: structure and physical operation, current-voltage characteristics, Depletion-type MOSFET, D.C. operation of MOSFET circuits, MOSFET as an amplifier, Biasing in MOSFET amplifiers, Basic MOSFET amplifier configuration: common source, common gate and common drain types, High frequency model of MOSFET amplifier, Junction Field-Effect Transistor (JFET). **(Lecture 08)**

Unit V

Operation Amplifier (Op-amps): Ideal Op-amp, Differential amplifier: differential and common mode operation common mode rejection ratio (CMRR), Practical op-amp circuits: inverting amplifier, non-inverting amplifier, weighted summer, integrator, differentiator, Large signal operation of op-amps, Other applications of op-amps: instrumentation circuits, active filters, controlled sources, logarithmic amplifiers, waveform generators, Schmitt triggers, comparators. **(Lecture 08)**

Text Books:

1. Theory Of Electronics: V.K. Mehta
2. Electronic Devices and Circuit Theory : Robert L. Boylestad, Louis Nashelsky
3. Electronics Circuits, Amplifiers and Gates. : D.V. Bugg, Adam Hilger

Reference Books:

1. Basic Electronics for Scientists.: J. Brophy, McGraw Hill
2. Electromagnetism - Principles and Applications. : Lorrain and Corson Freeman
3. Integrated electronics : Analog and digital circuits and systems. Milliman Halikias

***Latest editions of all the suggested books are recommended.**

B.Sc. Computer Science Honours-Semester I

Digital System Design

Course Code: CSC-103

L-6, T-0, P-0, C-6

Course Contents

Unit I:

Introduction to Digital Design: Digital System, Specification and Implementation of digital design, Structured and Trial-Error methods in design, Digital Computer, Review of number systems, Number base conversions, Binary Addition and Subtraction, floating point representation of numbers, Error detecting and Correcting Codes. **(Lecture 08)**

Unit II:

Boolean algebra: Fundamentals of Boolean algebra, Laws of Boolean Algebra, switching function and Boolean function, Demorgan's Theorem, Truth Table, Sum of Products (SOP), Product of Sum (POS), Minterm, Maxterm, Don't care condition, Simplification of Boolean Functions - Karnaugh Map (two, three, four and five variable K-map), Tabular method, Logic Gates- AND, OR, NOT, NAND, NOR, Universal Gates, Exclusive-OR (Ex-OR) Gate, Exclusive-NOR (Ex-NOR) Gate, Multilevel Gating Networks. **(Lecture 08)**

Unit III:

Combinational Circuits: Design procedure of Combinational Circuits, Adders, Subtractors, Design of Comparators, Decoders, Demultiplexers, Data selectors/multiplexer, Encoder, Seven segment display unit, Multiplexed display, Keyboard encoder, Combinational Logic Optimization's and Tradeoff's. **(Lecture 08)**

Unit IV:

Sequential Circuits: Introduction, Flip-Flop (1 bit) SR, JK, D, T, Shift Register, Counter, Synchronous Sequential Circuits(SSC), SSC Design using Algorithmic State Machine (ASM), Asynchronous Sequential Circuits, Problems in Asynchronous Circuits, Finite State Machines (FSM) and Controller, Sequential Logic Optimization and Tradeoff's, Basic ladder circuits, D/A and A/D converter, Counter Ramp, ROM & PLA (basic idea). **(Lecture 08)**

Unit V:

Integrated Circuits : The Integrated Circuit, Characteristics, IC packaging and nomenclature, Logic Circuit design using TTL, MOS and CMOS circuits, Relative comparison of SSI, MSI, LSI, VLSI designs. **(Lecture 08)**

Text Books:

1. S Salivahanan, "Digital Circuits and Design", Vikas Publication
2. M. Morris Mano, "Digital Logic and Computer Design"

Reference Books:

1. Mark Balch, "Complete Digital Design", Mc-Graw Hill
2. Frank Vahid, "Digital Design", John Wiley Sons Publishers

***Latest editions of all the suggested books are recommended.**

B.Sc. Computer Science Honours-Semester I

PRINCIPLES OF MANAGEMENT

Course Code: BCA104/CSC-104

L-6, T-0, P-0, C-6

Course Contents

Unit I

Introduction: Concepts, Nature, Scope, Functions and Significance of Management, Evolution of Management thought, Contribution Taylor, Weber and Fayol to Management, CASE STUDY based on Scientific Management. **(Lecture 08)**

Unit II

Planning: Concept, Objectives, Nature, Limitation, Process of Planning, Importance. Forms, Techniques and Process of decision making, CASE STUDY based on Decision Making. **(Lecture 08)**

Unit III

Organizing: Concept, Objectives, Nature of Organizing, Types of Organization. **Communication:** Concept, Process and Barriers of Communication, Case Study based on Communication Barriers. **(Lecture 08)**

Unit IV

Staffing: Concept, Recruitment & Selection, Training & Development. **Directing:** Concept, Principles & Techniques of directing. **(Lecture 08)**

Unit V

Leadership: Meaning, Importance, Styles, Functions of good leader, Case Study based on Leadership. **Motivation:** Concept, Maslow Motivational Theory. **Controlling:** Concept, Principles, process and techniques of controlling. **(Lecture 08)**

Text Books

1. Prasad L.M., Principles and Practice of Management, Sultan Chand
2. Murugan and Shaktivel, Management Principles and Practices, New Age

Reference Books

1. Srivastava & Chunawalla, Management Principles and Practices, Macmillan
2. Koontz, Principles of Management, Tata McGraw Hill, 2008
3. Robbins & Coulter, Management, Prentice Hall of India.

***Latest editions of all the suggested books are recommended.**

B.Sc. Computer Science Honours-Semester I
FOUNDATION ENGLISH - I

Course code: CSC-105

**(Common with EHM101/BPH105/BED105/BAL101/AR107/BHM101/BFS106//BBA106/
BCH106/ BFA103/ BCA106)**

Course Contents:

L-3, T-0, P-0, C-3

Unit I

Functional Grammar: Patterns & Parts of speech Subject, Predicate, Noun, Pronoun, Adjective, Adverb, Verb, Verb phrases, Conjunction, Interjection. **(Lecture 10)**

Unit II

Vocabulary: Word formation, Prefix, Suffix, Compound words, Conversion, Synonyms, Antonyms, Homophones and Homonyms, How to look up a dictionary. **(Lecture 10)**

Unit III

Communication: Meaning & importance of communication, Barriers to effective communication, Channels of communication, Language as a tool of communication. **(Lecture 10)**

Unit IV

Requisites of Sentence writing: Fragmented sentences, A good sentence, expletives, Garbled sentences, Rambling sentences, Loaded sentences, Parallel Comparison, Squinting construction, Loose & periodic sentences. **(Lecture 10)**

Text Books:

1. Martin & Wren - High School English Grammar & Composition, S.Chand& Co. Delhi.
2. Lewis Norman - Word Power made easy, W.R.Goyal. Publication & Distributors Delhi.
3. Better Your English- A Workbook for 1st year Students- Macmillan India, New Delhi.

Reference Books:

1. Raman Meenakshi& Sharma Sangeeta, Technical Communication-Principles & Practice – O.U.P. New Delhi. 2007.
2. Mohan Krishna & Banerji Meera, Developing Communication Skills – Macmillan India Ltd. Delhi.
3. Rosen Blum M., How to Build Better Vocabulary – Bloomsbury Publication. London.

***Latest editions of all the suggested books are recommended.**

B.Sc. Computer Science Honours-Semester I
Software Lab : PC S/W & C Programming and Usage of MS office

Course Code CSC-151

L-0, T-0, P-6, C-3

Course Content

C programming : Core Concepts of programming on Data types, simple arithmetic and logical operation. Decision control, Iteration control, Sequencing, and case control.

MS Office:

MS-WORD

Creating, Editing, Formatting: Font name, size, color, alignment, changing, paragraph settings, change case, spell checker, Mail Merge, Creating Tables, editing tables, alignment settings in tables

MS-EXCEL

Creating, Editing, Formatting: font name, size, color, alignment, changing, entering data, Sorting Data, Inserting, renaming and deleting Sheet, Inserting row, column, cell ,picture, background, graph, symbol, hyperlink ,object, diagram.

MS-POWERPOINT

Creating, Editing, Formatting: font name, size, color, alignment, changing, Inserting table,picture, background, graph, symbol, hyperlink, object, diagram.

MS-ACCESS

Creating database and editing data base

B.Sc. Computer Science Honours-Semester I

DIGITAL LAB-1

Course Code CSC-152

L-0, T-0, P-4, C-2

Course Content

4. Design a full-subtractor using a suitable MUX.
5. Design a 2x4 decoder using NAND gates only.
6. Design proper logic circuits to prove that a NOR gate is a universal gate.
7. Design a logic circuit to convert a 2-bit binary number to excess 3 code.
8. Design a circuit to check whether two 4-bit binary numbers are equal or not.
9. Design an XOR gate using NAND gates only.
10. Design an 4x1 MUX using basic logic gates.
11. Design a 4-bit adder-subtractor using IC-7483 and other suitable logic gate(s).
12. Design a 3 bit binary code to gray code converter.
13. Design a full-adder using suitable MUX.
14. Design proper logic circuits to prove that a NAND gate is a universal gate.
15. Realize the following Boolean function using suitable MUX:- $f(A,B,C)=\Pi(0,1,3)$
16. Design a 1-bit magnitude comparator using NAND gates only.
17. Design a 3-bit gray code to binary code converter.
18. Design a half-adder and a half-subtractor using basic logic gates.
19. Design a 2x4 decoder using NAND gate only.
20. Design proper logic circuits to prove that NOR gate is an universal gate.
21. Design a half-adder using NAND gates.
22. Design a full-adder using suitable MUX.
23. Design a logic circuit to convert a 3-bit binary to excess 3 code.
24. Design a circuit to check whether two 4-bit binary numbers are equal or not.
25. Design a 2x4 decoder using NAND gate only.
26. Design a full-subtractor using suitable MUX.
27. Design a circuit for a 2-line to 4 line demultiplexer using NAND gate.
28. Design a BCD to excess-3 code converter.
29. Obtain the NAND logic diagram of a full-adder from the Boolean function.
30. Design and implement a 4-bit 2's complement adder/subtractor.
31. Design a full-subtractor using NAND gates.
32. Design a circuit with four inputs and one output, such that the output goes to '1' whenever two or more of inputs are '1'. For other cases the output remains at '0'.

B.Sc. Computer Science Honours-Semester II
Computer Organization

Course Code: CSC 201

L-6, T-0, P-0, C-6

UNIT -1:

Basic Building Blocks and Circuit Design: Arithmetic circuits; flip-flops, counters; shift registers; encoder, decoder, multiplexer, de multiplexer circuits.

Register transfer and Micro-operations: Register Transfer Language, Bus and memory. Transfers, Arithmetic. Logic Micro-operations, Shift Micro-operations
(8 Lectures)

UNIT-2:

Basic Computer Organization and Design: Instruction and instructions Codes, Computer instructions, Timing and Control, Instruction Cycle, Memory Reference Instructions, Input-Output and Interrupts; Complete Computer Description.

Programming the Basic Computer: Machine Language, Assembly Language, The assembler, program loops, programming Arithmetic and Logic, Subroutines, Inputs-Outputs programming.

(Lecture 08)

UNIT-3:

Central Processing Unit: General Register Organization ,Stack Organization ,Instruction Formats, Addressing Modes, Data and Transfer Manipulation, Program Control.

(Lecture 08)

UNIT-4:

Computer Arithmetic: Addition and Subtraction, Multiplication Algorithms, Division algorithm, Floating-Point Arithmetic Operations, decimal arithmetic Unit, Decimal Arithmetic Operations.

(Lecture 08)

UNIT-5:

Input-Output Organization: Peripheral Devices, Input-Output interface, Asynchronous Data Transfer, Modes of transfer, Priority interrupt, Direct Memory Access(DMA), input-output processors(IOP), serial communication multi-processors, characteristics of multi-processors, Inter-connection structures, Inter-processor Arbitration, Inter-processor Communication and Synchronization, cache memory ,Cache Coherence.

(Lecture 08)

Text Books:

1. Computer Systems Architecture – M.Moris Mano, IIIrd Edition, Pearson/PHI
2. Computer Organization – Carl Hamacher, ZvonksVranesic, SafeaZaky, Vth Edition, McGraw Hill.

Reference Books:

1. Computer Organization and Architecture – William Stallings Sixth Edition, Pearson/PHI
2. Structured Computer Organization – Andrew S. Tanenbaum, 4th Edition PHI/Pearson
3. Fundamentals or Computer Organization and Design, - SivaraamaDandamudi Springer Int. Edition.
4. Computer Architecture a quantitative approach, John L. Hennessy and David A. Patterson, Fourth
5. Edition Elsevier Computer Architecture: Fundamentals and principles of Computer Design, Joseph D. Dumas II, BS

***Latest editions of all the suggested books are recommended.**

B.Sc. Computer Science Honours-Semester II Programming In C

Course Code: CSC 202

L-6, T-0, P-0, C-6

Course Content

Unit I

Introduction: Flow charts, Tracing flow charts, Problem solving methods, Need for computer Languages, Sample Programs written in C, C character set, Identifiers and keywords, Data types, Declarations, Expressions, statements and symbolic constants, Operators and expressions: Arithmetic, unary, logical, bit-wise, assignment and conditional operators.

(Lecture 08)

Unit II

Control statements: While, do-while, for statements, nested loops, if else, switch, break, Continue, and goto statements, comma operators, Storage types: Automatic, external, register and static variables.

(Lecture 08)

Unit III

Functions: Defining and accessing, passing arguments, Function prototypes, Recursion, Library functions, Static functions Arrays: Defining and processing, Passing arrays to a function, Multi dimensional arrays. Strings: Defining and operations on strings.

(Lecture 08)

Unit IV

Pointers: Declarations, Passing pointers to a function, Operations on pointers, Pointer Arithmetic, Pointers and arrays, Arrays of pointers function pointers. Structures: Defining and processing, Passing to a function, Unions, typedef, array of structure, and pointer to structure

(Lecture 08)

Unit V

File structures: Definitions, concept of record, file operations: Storing, creating, retrieving, updating Sequential, relative, indexed and random access mode, Files with binary mode (Low level), performance of Sequential Files,

(Lecture 08)

Text Books:

1. "Problem Solving and Program Design in C", Jeri R. Hanly, Elliot B. Koffman, Pearson Addison-Wesley.
2. "ANSI C", E. Balagurusamy.

References Books:

1. "Schaum Series – Programming in C", TMH publication
2. "Let us C", Yashvant Kanitkar
3. "Computer Concepts with Programming in C", Forouzan
4. "Computer Concepts & Programming in C", Amit Kumar Mishra – Katson Books

***Latest editions of all the suggested books are recommended.**

**B.Sc. Computer Science Honours-Semester II
Mathematics**

Course Code: CSC203

L-6,T-0,P-0,C-6

Course Content:

Unit I:

Counting Theory:

Pigeon Hole Principle, Permutations and Combinations, Recurrence Relation, Generating Function, Principle of mathematical induction.

(Lecture 08)

Unit II:

Graphs: Definition, Finite and Infinite graphs. Directed and undirected graphs, Degree, Isolated vertex, Pendant vertex. Null graphs.

Walks: Paths and circuits. Connected and disconnected graphs, Euler's graphs, Hamiltonian paths and circuits.

(Lecture 08)

Unit III:

Trees: Definition and basic properties, Distance and contents. Matrix representation of graphs. Incidence, Adjacency and Circuit matrices.

Graph Search: BFS, DFS, Spanning Trees, Shortest Path Problems.

(Lecture 08)

Unit IV:

Introduction to probability: Probability Axioms, Law of Total Probability, Conditional Probability, Bayes' Rule, Probability Density Functions and Probability Mass Functions, Conditional probability, Binomial, Poisson and normal distributions.

(Lecture 08)

Unit V:

Set Theory: Sets, subsets, union, intersection, Venn diagrams. Relations as a subset of a product.

Functions: Functions and partial functions.

Relation: Equivalence Relation, Binary relations. Relations on a set. Reflexive, symmetric and transitive properties of a relation on a set.

(Lecture 08)

Text Books:

1. Swapan Kumar Sarkar "Discrete Mathematics", - S Chand
2. Narsingh Deo, "Graph Theory with Applications to Engineering and Computer Science", Prentice Hall of India.
3. Seymour Lipschutz and Marc Lipson, "Discrete Mathematics", Schaum Outline series – Tata McGraw Hill

Reference Books:

1. Liu C.L., "Elements of Discrete Mathematics"
2. Neville Dean, "Essence of Discrete Mathematics Prentice Hall"

***Latest editions of all the suggested books are recommended.**

B.Sc. Computer Science Honours-Semester II
OPERATING SYSTEM

Course Code: CSC304

L-6, T-0, P-0, C-6

Course Contents

Unit I

Introduction: Introduction to the Operating System (OS), Types of OS: Batch System, Time Sharing System, Real Time System. Multi Programming, Multiprocessor System, Functions and Services of OS. **(Lecture 08)**

Unit II

Process Management: Process Concept, Process State, Process Control Block, Process Scheduling, CPU Scheduling - CPU Scheduling, Scheduling Criteria, Scheduling Algorithms, Preemptive & Non Preemptive Scheduling. **(Lecture 08)**

Unit III

Concepts of Synchronization: Semaphores, Critical Regions, Inter Process Communication Mechanism. Deadlocks-System model, Characterization, Deadlock Prevention, Deadlock Avoidance and Detection, Recovery from deadlock. **(Lecture 08)**

Unit IV

Memory Management: Logical Address, Physical Address Contiguous Allocation, External and Internal Fragmentation, Paging & Segmentation, Page Replacement Algorithms **(Lecture 08)**

Unit V

Information Management: File Concept, Access Methods, Directory Structure. Device Management: Disk Structure, Disk Scheduling Algorithms. **(Lecture 08)**

Text Books:

1. Silbershatz and Galvin, "Operating System Concept", Addison Wesley, 2002.
2. Nutt, G., "Operating Systems", Addison-Wesley.
3. GodboleAhyut, "Operating System", PHI, 2003.

Reference Books:

1. Flynn, Mchoes, "Understanding Operating System", Thomson Press, Third Edition, 2003
2. Tannenbaum, "Operating System Concept", Addison Weseley, 2002.
3. Joshi, R. C. and Tapaswi, S., "Operating Systems", Wiley Dreamtech.

***Latest editions of all the suggested books are recommended.**

B.Sc. Computer Science Honours-Semester II
FOUNDATION ENGLISH - II

Course code: CSC205

(Common with EHM 201/BPH206/BBA206/BHM201/AR207/BCH206/BFA203/BCA205)

L-3, T-0, P-0, C-3

Unit I

Functional Grammar: Articles, Preposition, Tenses: Functions, Synthesis, Transformation, Spotting errors and correction of sentences.

(Lecture 10)

Unit II

Pre- Requisites of Technical written Communication: One word substitution, Spelling rules, Words often confused & misused, Phrases.

(Lecture 10)

Unit III

The Structure of sentences/ clauses: Adverb clause, Adjective clause, Noun clause. Sentences: Simple, Double, Multiple and complex, Transformation of sentences: simple to complex & vice versa, simple to compound & vice-versa, Interrogative to assertive & to negative & vice-versa.

(Lecture 10)

Unit IV

Technical Communication: Nature, Origin and Development, Salient features, Scope & Significance, Forms of Technical Communication, Difference between Technical Communication & General writing, Objective Style vs. Literary Composition.

(Lecture 10)

Text-Books:

1. Wren & Martin, High School English Grammar & Composition – S. Chand & Co. Delhi.
2. Raman Meenakshi & Sharma Sangeeta, Technical Communication-Principles & Practice –
3. O.U.P. New Delhi. 2007.
4. MitraBarum K., Effective Technical Communication – O.U.P. New Delhi. 2006.
5. Better Your English- A Workbook for 1st year Students- Macmillan India, New Delhi.

Reference Books:

1. Horn A.S., Guide to Patterns & Usage in English – O.U.P. New Delhi.

NOTE:

This syllabus has been designed to improve the oral and written communication skills of students. The faculty members should put emphasis on practical (oral) activities for generating students' interest in language learning.

*** Latest editions of all the suggested books are recommended.**

B.Sc. Computer Science Honours-Semester II
Software Lab : C-Programming Lab

Course Code CSC-251

L-0, T-0, P-6, C-3

Course Content

Programs based on data Types
Programs to calculate factorial, Fibonacci series.
Programs on Arrays – Maximum, Minimum, Sum of the elements, etc
Basic Sorting Algorithms
Function based programs
Returning from Functions
Static data handling examples
Pointers based address manipulations programs
Programs to handle data through the use of structures.
Filing based programs – create, read, append etc

B.Sc. Computer Science Honours-Semester II
Hardware Lab : Digital - 2

Course Code CSC-252

L-0, T-0, P-4, C-2

Course Content

1. Design a JK Master slave flip-flop using IC 7473 and other necessary logic gates.
2. Design & implement a clocked JK flip-flop using NAND gates and other basic gates. Then convert the
3. flip-flop into a T flip-flop and verify its truth table.
4. Design a synchronous counter which will count the sequence: 3 1 2 0 3.....
5. Verify IC 74194 for serial-in-serial-out operation using clock.
6. Design a debouncing switch using 555 timer. Sign a clocked D flip-flop using this.
7. Design a 2-bit right shift-register using D flip-flops.
8. Design a 2-bit parallel load register using D flip-flops.
9. Design a 3-bit Down counter using J-K flip-flops.
10. Design a 3-bit left shift register using J-K flip flops.
11. Design a clocked D flip-flop using NAND gates.
12. Design a synchronous counter to count the following sequence:
13. 11 10 00 ...
14. Design a MOD-8 synchronous counter using necessary gate(s).
15. Design a clocked master-slave flip-flop using J-K flip flops.
16. Design a 2-bit right shift register with parallel load.
17. Design a counter to count the following sequence: 2,1,0,3,2,...
18. Design an asynchronous 3-bit up counter.
19. Design a 2-bit UP-DOWN counter (asynchronous).
20. Design the necessary sequential logic circuits to generate the following sequence:
21. 0,2,1,3,...
22. Design a J-K flip-flop using NAND gates.
23. Design a MOD-8 asynchronous counter using J-K flip-flops.
24. Design a 4-bit right shift register.

B.Sc. Computer Science Honours-Semester III

SOFTWARE ENGINEERING and UML

Course Code: CSC 301

L-6, T-0, P-0,C-6

Course Contents

Unit I

Introduction: Software Engineering approach, SDLC, Software Crisis, Software Process, Process models (Waterfall, Prototype, Iterative, Evolutionary and Spiral model). Overview of Quality Standards like ISO 9001, SEI – CMM.

(Lecture 08)

Unit II

Software Requirement: Analysis and Specifications DFDs, Software Requirement Specifications, steps for constructing good SRS.

Software Project Planning: Size Estimation like lines of Code & Function Count, Cost Estimation Models, Static single & Multivariable Models, COCOMO,

(Lecture 08)

Unit III

Software Design: Design Concepts & Principle, Cohesion & Coupling, Function Oriented Design, Object Oriented Design. Coding Structured programming, Programming style, Software Testing Software Metrics: Software measurements: What & Why, Token Count, Halstead Software Science Measures, Design Metrics, Data Structure Metrics, Information Flow Metrics

(Lecture 08)

Unit IV

Software Maintenance: Software Maintenance Process and its types, Introduction to Reverse Engineering, Software Reliability & Quality Assurance, Software Reliability issues, Software quality measurements

(Lecture 08)

Unit V

UML : What is UML, What is Modeling, UML Diagrams, Use Case Diagram, Class Diagram, Activity Diagram, Package Diagram, State-Transition Diagram, Sequence Diagram, Collaboration Diagram Component Diagram

(Lecture 08)

Text Books:

1. Jalote P., An Integrated approach to Software Engineering, Narosa, 1991.
2. Mall Rajib, Software Engineering, Prentice Hall of India.
3. Pressman R.S., Software Engineering – A Practitioner's Approach, McGraw Hill Int.Ed., 1992.
4. "UML Distilled: A Brief Guide to the Standard Object Modeling Language" by Martin Fowler (ISBN-13: 978-0321193681)

Reference Books:

1. Sommerville Ian, Software Engineering, Pearson Education
2. Agrawal K.K. & Yogesh Singh, Software Engineering, New Age Publication
3. Waman S. Jawadkar, Software Engineering-Principles and Practice, McGraw Hill
4. "Applying UML and Patterns: An Introduction to Object-Oriented Analysis and Design and the Unified Process" by Craig Larman (ISBN-13: 978-0130925695).

***Latest editions of all the suggested books are recommended.**

B.Sc. Computer Science Honours-Semester III

DATA COMMUNICATIONS AND COMPUTER NETWORK

Course Code: CSC-302

L-6, T-0, P-0, C-6

Course Contents

Unit I

Concepts of Data Communications: Introduction, Communication Systems, Signals (Analog, Digital, Periodic and Non-Periodic), D/A and A/D Encoding, Channel Characteristics, Transmission modes, Synchronous and asynchronous transmission, Guided Media (Twisted pair, Co-axial cable, Optical fiber), Unguided Media (Radio, VHF, microwave, satellite), Infrared Transmission, Fiber Optics Communication - Components (Source, Channel Detector), Classification of Modems, Standards and Protocols, establishing a Connection

(Lectures 08)

Unit II

Introduction to Computer Networks

Goals and Applications of Networks, Types of Connections, Concept of LAN and WAN, Topologies (Mesh, Bus, Star, Ring, Tree, Hybrid), Comparison of Topologies, Protocols and Standards, ISO-OSI and TCP/IP model

Medium Access Sub Layer

Channel Allocations, ALOHA protocols, Error – detection and correction, Parity bits, CRC, Hamming code, flow Control, Error control, ARQ(stop and wait , go back-N, selective repeat), sliding window protocol

(Lectures 08)

Unit-III

Network Layer

Internetworks, Packet Switching, Datagram approach, IP addressing, Classful and Classless addressing, Introduction to Routing (Distance Vector Routing and Link State Routing), Role of Routers

(Lectures 08)

Unit IV

Transport Layer

Functions of transport layer, Multiplexing Demultiplexing, Sockets, User Datagram Protocol (UDP), Transmission Control Protocol (TCP), Internet Protocol (IP), Congestion Control, Quality of Services (QoS), Integrated Services.

(Lectures 08)

Unit V

Application Layer: Domain Name Space (DNS), File Transfer Protocol, Telnet, SNMP, SMTP, Electronic mail, Virtual Terminals, WWW, Network Security, Introduction to Cryptography. Study of Simple PC based Network with illustrative block diagram including mode of operations and characteristic features.

(Lectures 08)

Text Books:

1. Forouzan, Data Communication and Networking, TMH
2. Achyut S Godbole, Data Communications & Networks, TMH
3. Behrouz A.Forouzan, TCP/IP Protocol Suit

Reference Books:

1. Stallings W. Data and Computer Communication, Macmillan Press
2. A.S. Computer Networks, Prentice Hall India, 1997.
3. Keshav S., An Engineering Approach on Computer Networking, Addison Wesley

***Latest editions of all the suggested books are recommended.**

B.Sc. Computer Science Honours-Semester III

Linux Internals

Course Code:CSC-303

L-6,T-0,P-0,C-6

UNIT – I

Linux utilities –1 : Introduction to Linux file system, vi editor, file handling utilities, security by file permissions, process utilities, disk utilities, networking commands, cp, mv, ln, rm, unlink, mkdir, rmdir, du, df, mount, umount, find, umask, ulimit, ps, who, wc.

(Lecture 08)

UNIT – II

Linux utilities –2:Text processing utilities and backup utilities , detailed commands to be covered are cat, tail, head , sort, ln, uniq, grep, egrep, fgrep, cut, paste, join, tee, pg, comm, cmp, diff, tr, awk, tar, cpio.

(Lecture 08)

UNIT - III

Problem solving approaches in Linux: Using single commands, using compound. Commands, shell scripts, C programs, building own command library of programs.

Working with the Bourne shell : What is a shell, shell responsibilities, pipes and input Redirection, output redirection, here documents, the shell as a programming language, shell meta characters, shell variables, shell commands, the environment, control structures, shell script examples.

(Lecture 08)

UNIT - IV

Linux Internals - 1 : Linux file structure, directories, files and devices, System calls, library functions, low level file access, usage of open, create, read, write, close, lseek, stat, fstat, ioctl, umask, dup and dup2, the standard i/o (fopen, fopen, fclose, fflush, fseek, fgetc, getc, getchar, fputc, putc, putchar, fgets, gets), formatted I/O, stream errors, streams and file descriptors, file and directory maintenance (chmod, chown, unlink, link, symlink, mkdir, rmdir, cd), Directory handling system calls (opendir, readdir, closedir, rewinddir, seekdir, telldir).

(Lecture 08)

UNIT - V

Linux Internals – 2 : Process and Signals : What is process, process structure, starting new process, Waiting for a process, zombie process, process control, process identifiers, fork, exit, wait, exec, Signal functions, unreliable signals, interrupted system Calls, kill and raise functions, alarm, pause functions, abort, system, sleep functions.

(Lecture 08)

Text books :

1. Linux the Ultimate Guide, Sumitabha Das, TMH.
2. Linux Network Programming, W.R.Stevens Pearson/PHI.

Reference Books :

1. Advanced programming in the Linux environment, W.R.Stevens, Pearson education.
2. Linux system programming using C++, T.Chan, PHI.
3. Linux programming environment, Kernighan and Pike, PHI. / Pearson Education
4. Linux Internals The New Frontiers, U.Vahalia, Pearson Education.
5. Linux for programmers and users, 3rd edition, Graham Glass, King Ables, Pearson Education.

***Latest editions of all the suggested books are recommended.**

B.Sc. Computer Science Honours-Semester III

Data Structures

Course Code: CSC-304

L-6, T-0, P-0, C-6

Unit-I

Introduction: Basic Terminology, Elementary Data Organization, Data Structure operations, Algorithm Complexity and Time-Space trade-off. Arrays: Array Definition, Representation and Analysis, Single and Multidimensional Arrays, address calculation, application of arrays, Character String in C, Character string operation, Array as Parameters. Stacks: Array Representation and Implementation of stack, Operations on Stacks: Push & Pop, Array Representation of Stack, Linked Representation of Stack, Operations associated with Stacks, Applications of stack: Conversion of Infix to prefix and Postfix Expressions, Evaluation of postfix expression using stack. Recursion: Recursive definition and processes, recursion in C, example of recursion.

(Lecture 08)

Unit-II

Queues: Array and linked representation and implementation of queues, Operations on Queue: Create, Add, Delete, Full and Empty. Circular queue, double ended queue and priority queue. Linked list: Representation and Implementation of Singly Linked Lists, Two-way Header List, Traversing and Searching of Linked List, Overflow and Underflow, Insertion and deletion to/from Linked Lists, Insertion and deletion Algorithms, Doubly linked list, Linked List and Array, Polynomial representation and addition, Generalized linked list, Garbage Collection and Compaction.

(Lecture 08)

Unit-III

Trees: Basic terminology, Binary Trees, Binary tree representation, algebraic Expressions, Complete Binary Tree. Extended Binary Trees, Array and Linked Representation of Binary trees, Traversing Binary trees, Threaded Binary trees. Traversing Threaded Binary trees, Huffman algorithm. Searching and Hashing: Sequential search, binary search, comparison and analysis, Hash Table, Hash Functions, Collision Resolution Strategies, Hash Table Implementation.

(Lecture 08)

Unit-IV

Sorting: Insertion Sort, Bubble Sorting, Quick Sort, Two Way Merge Sort, Heap Sort, Binary Search Trees: Binary Search Tree (BST), Insertion and Deletion in BST, Path Length, AVL Trees, B-trees.

(Lecture 08)

Unit-V

Graphs: Terminology & Representations, Graphs & Multi-graphs, Directed Graphs, Representations of Graphs, Adjacency Matrices, Traversal

(Lecture 08)

Text Books:

1. Lipschutz, "Data Structure", TMH
2. A M Tenenbaum et. al., "Data Structures using C & C++", PHI
3. Yashwant Kanitkar "Data Structure using C "

Reference Books:

1. Horowitz and Sahani, "Fundamentals of data Structures", Galgotia
2. R. Kruse et al., "Data Structures and Program Design in C" Pearson Education
3. T. H. Cormen "Introduction to Algorithms " PHI
4. K Loudon, "Mastering Algorithms With C", Shroff Publisher & Distributors

***Latest editions of all the suggested books are recommended.**

B.Sc. Computer Science Honours-Semester III

PROFESSIONAL WRITING

Course code: CSC 305

L-3, T-0, P-0, C-3

(Common with EHM 301/BBA306/BHM301/AR307/BCH306/BFA303/BCA 305)

Course Contents:

Unit I

Functional Grammar: Active and passive voice, Conditional sentences, Syntax, Concord, Common errors.

(Lecture 08)

Unit II

Requisites of Paragraph writing: Structure of Paragraph, Coherence & Unity, Development of paragraph, Inductive order, Deductive order, Spatial order, Linear, Chronological orders, Expository writing, and Argumentative writing, Factual description of objects, process, experiments.

(Lecture 10)

Unit III

Précis Writing: Techniques of Précis writing, Writing a précis.

(Lecture 10)

Unit IV

Comprehension skills: Role of listening, Reading comprehension; Reasons for poor comprehension, Improving comprehension skills.

(Lecture 10)

Text Books:

1. Rutherford A., Basic Communication Skills – Pearson Education, New Delhi.

References Books:

1. Raman Meenakshi & Sharma Sangeeta, Technical Communication-Principles & Practice O.U.P. New Delhi. 2007.
2. Mohan Krishna & Banerji Meera, Developing Communication Skills – Macmillan India Ltd. Delhi.

NOTE:

This syllabus has been designed to improve the oral and written communication skills of students. The faculty members should put emphasis on practical (oral) activities for generating students' interest in language learning.

*** Latest editions of all the suggested books are recommended.**

B.Sc. Computer Science Honours-Semester III

Software Lab : Data Structure Lab

Course Code CSC-351

L-0, T-0, P-6, C-3

Course Content

Programs to implement Linear data structures in C

Implement various sorting techniques.

Implement Recursive Heap Sort

Implement Fibonacci Heap.

Implement Recursive algorithms – Tower of Hanoi, recursive maximum & minimum etc

Implementing Linked list through structures

Implement a Generalised Link List with all possible operations.

Implementing BST

Implementing Stacks & Queues using Linked List

Implementing Priority Heap

Write a program which creates an Adjacency matrix for directed and undirected graph.

Write a program which performs DFS search for a graph.

Write a program which finds the Adjacency nodes for a particular node in a graph.

Write a program which calculates the degree of a node in an undirected graph and also calculate the indegree&outdegree of a node in the directed graph.

Write a program which implements Prim's algorithm for MCST.

Write a program which implements Kruskal's algorithm for MCST.

Write a program which implements Dijkstra's algorithm for shortest path.

B.Sc. Computer Science Honours-Semester III

Software Lab : Linux & Shell Programming Lab

Course Code CSC-352

L-0, T-0, P-4, C-2

Course Content

Use of different commands cd, ls, cp, md, rm, mkdir, rmdir, more, less, creating and viewing files, using cat, file comparisons, View files, disk related commands, checking disk free spaces.

batch commands, kill, ps, who, sleep, Printing commands, grape, fgrep, find, sort, Cal, banner, touch, file, file related commands-ws, sat, cut, grep, dd, etc. Mathematical commands-bc, expr, factor, units. vi editor.

Shell Programming conditional and looping statements, case statements, parameter passing and arguments, Shell variables, shell keywords, Creating Shell programs , low level file access, usage of open, create, read, write, close, lseek, stat, fstat, ioctl, umask, dup and dup2, the standard i/o (fopen, fopen, fclose, fflush, fseek, fgetc, getc, getchar, fputc, putc, putchar, fgets, gets), formatted I/O, stream errors, streams and file descriptors, file and directory maintenance (chmod, chown, unlink, link, symlink, mkdir, rmdir, cd), Directory handling system calls (opendir, readdir, closedir, rewinddir, seekdir, telldir).

B.Sc. Computer Science Honours-Semester IV

Theory of DBMS

Course Code: CSC-401

L-6, T-0, P-0,C-6

Course Contents

Unit I

Introduction: An overview of database management system, Database System Vs File System, Database system concepts and architecture, data models schema and instances, data independence and data base language and interfaces, Data definitions language, DML, Overall Database Structure.

(Lecture 08)

Unit II

Data modeling using the Entity Relationship Model: ER model concepts, notation for ER diagram, mapping constraints, keys, Concepts of Super Key, candidate key, primary key, Generalization, aggregation, reduction of an ER diagrams to tables, extended ER model.

Relational data Model and Language: Relational data model concepts, integrity constraints: entity integrity, referential integrity, Keys constraints, Domain constraints, relational algebra.

(Lecture 08)

Unit III

SQL: Characteristics of SQL, Advantages of SQL, SQL data types and literals, Insert, update and delete operations ,sub queries, Aggregate functions, Joins, Unions, Intersection, Minus operations. Roles and Privileges.

(Lecture 08)

Unit IV

Data Normalization: Functional dependencies, Normal form up to 3rd normal form & BCNF

Transaction Processing Concepts: Transaction system, testing of serializability, Serializability of schedules, conflict & view serializable schedule, recoverability, Recovery from transaction failures.

(Lecture 08)

Unit V

Concurrency Control Techniques: Concurrency control, locking Techniques for concurrency control, Time stamping protocols for concurrency control, validation based protocol, multiple granularity. Overview of recovery techniques and Database Security.

(Lecture 08)

Text books:

1. Silberschatz Abraham, Korth Henry &Sudarshan S., Database Systems Concepts, McGraw Hill, 1997.
2. Elmarsri R. &Navathe S.B., Fundamentals of Database Systems, Addison Wesley, 2004
3. Date C.J., An Introduction to Database Systems, Addition Wiley.

Reference Books:

1. Melton Jim& Simon Alan, Understanding the New SQL: A Complete Guide, Morgan Kaufmann Publishers, 1993.
2. Majumdar A. K. &Battacharya P., Data Base Management Systems, Tata McGraw Hill, 1996.
3. Bipin Desai, An Introduction to Database Systems, Galgotia Publications, 1991

***Latest editions of all the suggested books are recommended.**

Course Contents

Unit –I

Principles of object-oriented programming:-Object-Oriented Programming Paradigm, Basic Concepts of Object- Oriented Programming, Benefits of OOPs, Object-Oriented Languages, Applications of OOP, C++ Statements, Class, Structure of C++ Program, structure verses objects oriented. Tokens, expressions and control structures:-Introduction, Tokens, Keywords, Identifiers Basic Data types, User Defined Data Types, Derived Data Types, Symbolic Constants, Type Compatibility, Declaration of Variables, Dynamic Initialization of Variables, Reference Variables, Operators in C++, Scope Resolution Operator, Member Dereferencing Operators, Manipulators, Type Cast Operator, Expressions and Implicit Conversions, Operator Precedence, Control Structures.

(Lecture 08)

Unit-II

Classes and objects:-Specifying a Class, Defining Member Functions, Making an Outside Function Inline, Nesting of Member Functions, Private Member Function, Arrays within a Class, Memory Allocation for Objects, Static Data Member, Static Member Functions, Arrays of Objects, Object as Function Arguments. Constructors and destructors:-Introduction, Constructors, Parameterized Constructors, Multiple Constructors with Default Arguments, Dynamic Initialization of Objects, Copy Constructors, Dynamic Constructors, Destructor.

(Lecture 08)

Unit-III

Functions in C++:-The Main Function, Function Prototyping, Call by Reference, Return by Reference, Inline Functions, Default Argument, Const. Arguments, Function Overloading, Friend and Virtual Function.

(Lecture 08)

Unit - IV

Operator overloading and type conversions :-Introduction, Defining Operator Overloading, Overloading Unary Operators, Overloading Binary Operators Using Friends, Manipulation of strings using Operators, Rules for Overloading Operators, Type conversions.

Inheritance: extending classes Introduction, Defining Derived Classes, Single Inheritance, Making a Private Member Inheritable, Multilevel Inheritance, Multiple Inheritance, Hierarchical Inheritance, Hybrid Inheritance. Pointers, virtual functions.

(Lecture 08)

Unit-V

Polymorphism: - Compile time Polymorphism, run time polymorphism, Pointers to Objects, This Pointer, and Pointers to Derived Classes, Virtual Functions, and Pure Virtual Functions.

Managing Console & I/O operations and stream computations, working with files, Generic programming with templates, Exception Handling & manipulating strings.

(Lecture 08)

Text Books:

1. Lafore R., Object Oriented Programming using C++, Galgotia
2. Venugopal A.R. & Rajkumar, T. Ravishanker, Mastering C++, Tata McGraw Hill, 1997.
3. Lippman S. B. & Lajoie J., C++ Primer, Addison Wesley, 3rd Edition, 2000.

Reference Books:

1. Parsons D., Object Oriented Programming with C++, BPB Publication.
2. Steven C. Lawlor, The Art of Programming Computer Science with C++, Vikas Publication.
3. Schildt Herbert, C++: The Complete Reference, Tata McGraw Hill, 1999.
4. Tony Gaddis, Watters, Muganda, Object-Oriented Programming in C++, Dreamtech, 2004.

***Latest editions of all the suggested books are recommended.**

Course Contents

Unit-I

Introduction: Algorithms, Analysis of Algorithms, Design of Algorithms, Complexity of Algorithms, Asymptotic Notations, Growth of function, Recurrences and their solution methods.

Sorting in polynomial Time: Insertion sort, Merge sort, Heap sort, and Quick sort
Sorting in Linear Time: Counting sort, Radix Sort, Bucket Sort, Medians and order statistics **(Lecture 08)**

Unit-II

Advanced Data Structure: Red Black Tree, Augmenting Data Structure, Binomial Heap, B-Tree, Fibonacci Heap, and Data Structure for Disjoint Sets.

(Lecture 08)

Unit-III

Advanced Design and Analysis Techniques: Dynamic programming, Greedy Algorithm, Backtracking, Branch-and-Bound, Amortized Analysis

(Lecture 08)

Unit-IV

Graph Algorithms: Elementary Graph Algorithms, Breadth First Search, Depth First Search, Minimum Spanning Tree, Kruskal's Algorithms, Prim's Algorithms.

(Lecture 08)

Unit-V

Shortest path and Pattern Matching: Single Source Shortest Path, All pair Shortest Path, Maximum flow and Traveling Salesman Problem, String Matching, NP-Hard and NP-Completeness, Sorting Network.

(Lecture 08)

Text Books:

1. Introduction to Algorithms by Thomas H Cormen, Leiserson et al, PHI
2. Fundamentals of Computer Algorithms by Horowitz and Sahani, Galgotia

Reference Books:

1. Design and Analysis of Computer Algorithms, Aho, Pearson Education.
2. Computer Algorithms : Introduction to Design and Analysis by Sara Baase and Allen Van Gelder, Pearson Education.
3. Algorithm Design by Jon Kleinberg and Eva Tardos, Pearson Education.
4. Fundamental of Algorithms by Brassard, Bratley, PHI.
5. Algorithms Design by M T Goodrich et al, John Wiley.

***Latest editions of all the suggested books are recommended.**

Course Contents

Unit I :

Fundamentals : Strings, Alphabet, Language, Operations, Finite state machine, definitions, finite automaton model, acceptance of strings, and languages, deterministic finite automaton and non-deterministic finite automaton, transition diagrams and Language recognizers. Finite Automata: NFA with λ transitions - Significance, acceptance of languages.

(Lecture 08)

Unit II:

Conversions and Equivalence: Equivalence between NFA with and without λ transitions, NFA to DFA conversion, minimisation of FSM, equivalence between two FSM's, Finite Automata with output- Moore and Melay machines. Regular Languages: Regular sets, regular expressions, identity rules, Constructing finite Automata for a given regular expressions, Conversion of Finite Automata to Regular expressions. Pumping lemma of regular sets, closure properties of regular sets (proofs not required).

(Lecture 08)

Unit III:

Grammar Formalism: Regular grammars-right linear and left linear grammars, equivalence between regular linear grammar and FA, inter conversion, Context free grammar, derivation trees, and sentential forms. Right most and leftmost derivation of strings.

(Lecture 08)

Unit IV:

Context Free Grammars : Ambiguity in context free grammars. Minimisation of Context Free Grammars. Chomsky normal form, GNF, Pumping Lemma for Context Free Languages. Enumeration of properties of CFL (proofs omitted).

(Lecture 08)

Unit V:

Push Down Automata : Push down automata, definition, model, acceptance of CFL, Acceptance by final state and acceptance by empty state and its equivalence. Equivalence of CFL and PDA, interconversion. (Proofs not required). Introduction to DCFL and DPDA.

(Lecture 08)

1. Text Books :

Theory of Computer Science – Automata languages and computation -Mishra and Chandrashekar, 2nd edition, PHI

2. Introduction to Theory of Computation –Sipser 2nd edition Thomson

Reference Books:

1. Introduction to Computer Theory, Daniel I.A. Cohen, John Wiley.

2. Introduction to languages and the Theory of Computation ,John C Martin, TMH

3. “Elements of Theory of Computation”, Lewis H.P. & Papadimitriou C.H. Pearson /PHI.

4. “Introduction to Automata Theory Languages and Computation”.Hopcroft H.E. and Ullman J. D.Pearson Education

***Latest editions of all the suggested books are recommended.**

B.Sc. Computer Science Honours-Semester IV

TECHNICAL COMMUNICATION

Course code: CSC-405

L-3,T-0,P-0,C-3

(Common with EHM 401/BPH406/BBA406/ /BHM401/BCH406/BFA403/BCA406)

Course Contents:

Unit I

Communication: Objectives of Communication, Need for Communication, Types of communication, written & Verbal communication, Formal and informal communication (The grapevine), upward and downward communication. **(Lecture 10)**

Unit II

Business communication: Importance of written business correspondence, General principles and essentials of good commercial correspondence, Different types of commercial correspondence & their drafting, Types of Business letters, Official letters, electronic communication process. **(Lecture 10)**

Unit III

Project, Thesis and Dissertation writing: Project Report, Thesis & Dissertation writing Structure of Thesis writing. **(Lecture 10)**

Unit IV

Modern Technology and Communication: Globalization of Business, Role of Information Technology, Tele- communication, Internet, Tele-conferencing and Video-conferencing. **(Lecture 10)**

Text Books:

1. Mishra Sunita&Muraliksishra C., Communication Skills for Engineers – Pearson Education, New Delhi.
2. Raman Meenakshi& Sharma Sangeeta, Technical Communication-Principles & Practice – O.U.P. New Delhi. 2007.
3. Chhabra T N, Business Communication, Sun India Pub. New Delhi.

Reference Books:

1. Mohan Krishna &BanerjiMeera, Developing Communication Skills – Macmillan India Ltd. Delhi.
2. MitraBarum K., Effective Technical Communication – O.U.P. New Delhi. 2006.

NOTE:

This syllabus has been designed to improve the oral and written communication skills of students. The faculty members should put emphasis on practical (oral) activities for generating students' interest in language learning.

***Latest editions of all the suggested books are recommended.**

B.Sc. Computer Science Honours-Semester IV

Software Lab : DBMS-Lab : SQL, PL-SQL, Forms & Reports
Course Code CSC-451

L-0, T-0, P-6, C-3

Course Content

DBMS Lab

Course Code: MCA-352 L-0, T-0, P-6 C-3

Introduction to ANSI SQL

Introduction various DBMS – Oracle 9i, MySQLServer, MS-SQL Server

Implementing the following on any one of the above servers.

Description of Data Types

Using Select queries , where clause, order by clause, distinct keywords,etc on a sample database

Create a sample Relational Database

Using DDL to create Tables, Alter Tables, Drop Tables

Using DML to update tables and insert data.

Use constraints to define Primary Keys, Foreign Keys, Cascade Operations and check Constraints.

Using DCL to grant & revoke permissions to users

Taking backup on Hard Drive.

Design a Complete Database for a Bank with at least 2-NF conformity.

B.Sc. Computer Science Honours-Semester IV

Software Lab : Course Content Object Oriented Programming Lab through C++

Course Code CSC-452

L-0, T-0, P-4, C-2

Course Content

Using iostream.h functions in C++

Implementing a basic class in C++

Creation of Objects and parameter passing.

Implementing basic programs using object oriented approach

A sample marksheet generator in C++.

Implementing friend functions, inline functions.

Implementing Inheritance

Implementing Virtual Functions & Virtual Base classes.

Implementing Function Overloading, constructor overloading, operator Overloading

Using Container Classes.

Passing Objects by reference.

Implementing a Linked List using new & delete.

Filing operations using fstream.h

B.Sc. Computer Science Honours-Semester V

Numerical and Optimizing Techniques

Course Code:CSC-501

L-6, T-0, P-0, C-6

Course Content

Unit I

System of Linear Equations: Solution of systems of linear equations – Direct method, Gauss Jordan and Gauss Elimination methods, Iterative methods – Jacobi and Gauss Seidel methods. **(Lecture 08)**

Unit II

Matrix Inversion Nonlinear Equation: Solution of systems of nonlinear equations – Bisection method, Regula -Falsi method, Newton-Raphson method, Rate of convergence. **(Lecture 08)**

Unit III

Equation:Euler, Runge-Kutta. Curve Fitting, Romberg Integration.Numerical integration and differentiation: Trapezoidal and Simpson's rule. **(Lecture 08)**

Unit IV

Linear Programming: Definition of LPP, Graphical Solutions of Linear Programming Problems, Simplex Method and Artificial Variable Method, Two Phase Method, Duality. **(Lecture 08)**

Unit V

Transportation Problems: Introduction to Transportation Model, Matrix Form of TP, Applications of TP Models, Basic Feasible Solution of a TP, Degeneracy in TP, Solution Techniques of TP, Different Methods for Obtaining Initial Basic Feasible Solutions viz. Matrix Minima Method, Row Minima Method, Column Minima Methods, Vogel's Approximation Method, Techniques for Obtaining Optimal Basic Feasible Solution.Assignment Problems: Definition, Hungarian Method for AP. **(Lecture 08)**

Text books:

1. "Computer oriented Numerical methods" By "Raja Raman V", PrenticeHall.
2. "Numerical methods in Engineering and Science" By "Grewal B. S",Khanna Publishers, Delhi.
3. S.D.Sharma, "Introduction To Operation Research", KedarNath and Ram Nath& Co., Meerut

Reference Books:

1. H.A TAHA,"Operational Research-An Introduction", Macmillan1976
2. Hiller and Libermann,"Introduction to Operational Research", (1990) McGraw Hill, Company.
3. K.Swarup, P.K Gupta & A.Manmohan,"Operational Research".S.Chand 1978.
4. T. Veerarajan, T Ramachandran, "Theory and Problems in Numerical Methods", TMH
5. PradipNiyogi, "Numerical Analysis and Algorithms", TMH
6. Francis Scheld, "Numerical Analysis", TMH.

***Latest editions of all the suggested books are recommended.**

B.Sc. Computer Science Honours -Semester – V
COMPUTER GRAPHICS

Course Code:CSC-502

L-6,T-0,P-0,C-6

Course Content

Unit I

Introduction, Application areas of Computer Graphics, overview of graphics systems, video-display devices, raster-scan systems, random scan systems, graphics monitors and work stations and input devices. Output primitives : Points and lines, line drawing algorithms, mid-point circle and ellipse algorithms. Filled area primitives: Scan line polygon fill algorithm, boundary-fill and flood-fill algorithms. **(Lecture 08)**

Unit II

2-D geometrical transforms : Translation, scaling, rotation, reflection and shear transformations, matrix representations and homogeneous coordinates, composite transforms, transformations between coordinate systems. 2-D viewing : The viewing pipeline, viewing coordinate reference frame, window to view-port coordinate transformation, viewing functions, Cohen-Sutherland and Cyrus-beck line clipping algorithms, Sutherland –Hodgeman polygon clipping algorithm. **(Lecture 08)**

Unit III :

3-D object representation : Polygon surfaces, quadric surfaces, spline representation, Hermite curve, Bezier curve and B-Spline curves, Bezier and B-Spline surfaces. Basic illumination models, polygon rendering methods. **(Lecture 08)**

Unit IV :

3-D Geometric transformations : Translation, rotation, scaling, reflection and shear transformations, composite transformations. 3-D viewing : Viewing pipeline, viewing coordinates, view volume and general projection transforms and clipping **(Lecture 08)**

Unit V :

Visible surface detection methods : Classification, back-face detection, depth-buffer, scan-line, depth sorting, BSP-tree methods, area sub-division and octree methods. Computer animation : Design of animation sequence, general computer animation functions, raster animation, computer animation languages, key frame systems, motion specifications. **(Lecture 08)**

Text Books :

1. “Computer Graphics C version”, Donald Hearn and M. Pauline Baker, Pearson Education.
2. “Computer Graphics Principles & practice”, second edition in C, Foley, VanDam, Feiner and Hughes, Pearson Education.

Reference Books :

1. Procedural elements for Computer Graphics, David F Rogers, Tata McGraw hill, 2nd edition.
2. “Principles of Interactive Computer Graphics”, Neuman and Sproul, TMH.
3. Principles of Computer Graphics, Shalini Govil, Pai, 2005, Springer.
4. Computer Graphics, Steven Harrington, TMH

***Latest editions of all the suggested books are recommended.**

MICROPROCESSOR

Course Code: CSC 503

L-6,T-0,P-0,C-6

Course Content

Unit I

Microprocessor Concepts: Overview of Microcomputer Structure and Operation, Evolution of Microprocessor and different Microprocessor Family, Microcontroller, Microprocessor Architecture and its basic operation, Microprocessor applications – Microprocessor based system design aids and troubleshooting techniques. **(Lecture 08)**

Unit II

Microprocessor Structure and Design, 8085 Microprocessor Architecture, Register Structure, Instruction Set, Interrupt Structure, Bus Organization. Introduction to 16-bit Microprocessors: Architecture of 8086, Register Organization, Addressing Modes, Instruction Set, Interrupts and Interrupt Service Routines (ISR's), 8086 pin functions, Bus operation, Memory segmentation, Clock generator, Memory Buffer. **(Lecture 08)**

Unit III

Assembly Language Programming: Basic syntax of 8086 Assembly language, Instruction templates, Assembly language program development tools, Arithmetic and Logic instructions, Program Control Instructions (jumps, conditional jumps), Loops, Instruction timing and delay loops, Handling Strings, Procedures, Assembler Directives. **(Lecture 08)**

Unit IV

Microprocessor based Interfacing: Programmed I/O, Interrupt Driven I/O, DMA, Parallel I/O, (8255-PPI, Parallel port), 8253/8254 programmable Timer/Counter Interfacing with ADC. 8259 Programmable Interrupt controller, 8257 DMA controller **(Lecture 08)**

Unit V

Advanced Microprocessor: Introduction to bit slice processor, signal processing processor, Overview of the Pentium Processor, Hyper Threading, Core-2-duo, RISC architecture Of IBM, CISC architecture of SUN SPARC. **(Lecture 08)**

Text Books:

1. "Microprocessor Architecture, Programming, and Applications with the 8085", Gaonkar, Ramesh S., Pen Ram International Publishing.
2. "Advanced Microprocessors and Peripherals: Architecture Programming and Interfacing", Ray, A.K. & Burchandi, K.M. Tata McGraw Hill.
3. "Microprocessors Interfacing", Hall D.V., Tata McGraw Hill.
4. "Microprocessors and Microcontrollers", B.P. Singh & Renu Singh, New Age International.
5. "Advance Microprocessor", Deniel Tabak, TMH
6. "The 8088 and 8086 Microprocessors", Triebel & Singh, Pearson Education.
7. "IBM PC Assembly Language & Programming", Peter Abel, PHI.

Reference Books:

1. "Microcomputer Systems: The 8086/8088 Family", Liu and Gibson G.A., Prentice Hall (India).
2. "INTEL microprocessors", Brey, Barry B., Prentice Hall (India).
3. "Advanced Microprocessor & Interfacing", Ram B., Tata McGraw Hill.
4. "Microprocessors and Interfacing & Applications", Renu Singh & B.P. Singh, New Age International.

***Latest editions of all the suggested books are recommended.**

COMPILER DESIGN

Course Code:CSC-504
Course Content

L-6,T-0,P-0,C-6

UNIT-I

Formal Language and Regular Expressions : Languages, Definition Languages regular expressions, Finite Automata – DFA, NFA. Conversion of regular expression to NFA, NFA to DFA.Applications of Finite Automata to lexical analysis, lex tools.

(Lecture 08)

UNIT-II

Context Free grammars and parsing : Context free grammars, derivation, parse trees, ambiguity LL(K) grammars and LL(1) parsing , Bottom up parsing handle pruning LR Grammar Parsing, LALR parsing, parsing ambiguous grammars, YACC programming specification.

(Lecture 08)

UNIT-III

Semantics : Syntax directed translation, S-attributed and L-attributed grammars, Intermediate code – abstract syntax tree, translation of simple statements and control flow statements., Context Sensitive features – Chomsky hierarchy of languages and recognizers. Type checking, type conversions, equivalence of type expressions, overloading of functions and operations.

(Lecture 08)

UNIT-IV

Run time storage :Storage organization, storage allocation strategies scope access to now local names, parameters, language facilities for dynamics storage allocation.Code optimization : Principal sources of optimization, optimization of basic blocks, peephole optimization, flow graphs, Data flow analysis of flow graphs.

(Lecture 08)

UNIT-V

Code generation :Machine dependent code generation, object code forms, generic code generation algorithm, Register allocation and assignment. Using DAG representation of Block.

(Lecture 08)

TEXT BOOKS :

1. Introduction to Theory of computation.Sipser,2nd Edition,Thomson.
2. Compilers Principles, Techniques and Tools Aho, Ullman, Ravisethi, Pearson Education.

REFERENCE BOOKS :

1. Modern Compiler Construction in C , Andrew W.Appel Cambridge University Press.
2. Compiler Construction, LOUDEN, Thomson.

***Latest editions of all the suggested books are recommended.**

B.Sc. Computer Science Honours -Semester-V

VB.NET

Course Code: CSC-505
Course Contents

L-6,T-0,P-0,C-6

Unit I

The NET Framework: Introduction, Common Language Runtime, Common Type System, Common, Language Specification, The Base Class Library, The .NET class library Intermediate language, Just in-Time compilation, Garbage Collection, Application installation & Assemblies. The VB.NET IDE: The VB.NET IDE: The Start Page, Menu and Tool Bar, Toolbox, Solution Explorer, Properties Window, Task List and Output Window, Server Explorer.

(Lecture 08)

Unit II

Programming Concepts: Variables, Constants, Keywords, Data types, Operators, Decisions with if statement, Select Case statements, Loops, Arrays. String: Substring Method, Trim Method, Equals, Replace and Insert Methods, Split and Join Method, InStr Method.

Working with Text Files: An Introduction to Text File, Open a Text File, Read a Text File Line by Line, Write to a Text File in VB .NET, Appending Text to a File, Copy a File, Move a File, Delete a File.

(Lecture 08)

Unit III

An Introduction to Functions and Subs, Create your own Subs , Create a Function , Standard Module ,Class and Objects, Create Properties in your Classes, Error Handling, Working with Textbox, Buttons, Labels, Checkbox, Radio Buttons, List box, Combo Box, Picture Box, Menu, The Open File Dialogue Box, Filter files with the Open File Dialogue Box, implement Cut, Copy, Paste and Undo menus, The Save File Dialogue Box, Events: The Click Event, The MouseDown Event, The KeyDown Event, The Form Load Event

(Lecture 08)

Unit IV

ADO.NET: ADO.NET Data Namespaces, SqlConnection, SqlCommand, SqlDataAdapter, DataSet Class, Data Binding, Data View. ASP.NET: Introduction to ASP.NET Web Forms, State Management: Session, Application, Query String, Implementation of ASP.NET controls: Dropdown List, Gridview, ASP.NET validation controls.

(Lecture 08)

Unit V

Building Forms, GDI+ (Graphics Handling), Windows Services, Web Services. Case study based on Chat applications.

(Lecture 08)

Text Books:

1. Blair Richard & Crosland Jonathan, Beginning VB.NET (2 Edition), WROX
2. Steven Holzner, Visual Basic NET 2003, Pearson Education
3. Shouish Chavan, Visual Basic NET, Pearson Education

Reference Books:

1. Jeffrey Richter, Applied Microsoft Net Framework Programming, Microsoft
2. Blair Richard & Crosland Jonathan Professional VB.NET, Willy
3. Fergal Grimes, Microsoft Net for Programmers, SPD

***Latest editions of all the suggested books are recommended.**

B.Sc. Computer Science Honours -Semester V

Software Lab : Vb.Net Lab

Course Code CSC-551

L-0, T-0, P-6, C-3

Course Content

1. Installing Visual Studio 2010
2. Creating a VB project within Visual Studio
3. Basic Programs to demonstrate the working of basic data types.
4. Programs to implement the use of Objects.
5. Programs to implement multithreading
6. Programs to implements String handling
7. Programs to implement file handling
8. Using ADO.Net to handle data, connecting to a database, firing queries to display data
9. Using XML Libraries to export data from a database to an XML file
10. Developing windows forms
11. Using various controls on Windows forms.
12. Microprocessor Lab

B.Sc. Computer Science Honours -Semester V

Software Lab : Microprocessor Lab

Course Code CSC-552

L-0, T-0, P-4, C-2

Course Content

1. Write a program to multiply two 8-bit binary numbers. Result should be stored in consecutive location(s).
2. Write a program to convert a 16-bit Hexa-Decimal number into a 4-digit Binary Coded Decimal number.
3. Write a program to Add two 16-bit numbers, sum along with carry, if any, should be stored in consecutive memory locations.
4. Write a program to arrange a list of numbers in descending order. Length of the list is available in a memory location.
5. Store a 16 bit number into two consecutive locations and find out its 1's & 2's complements and store the result in consecutive locations.
6. Write a program to arrange a list of numbers in ascending order. Length of a list is available in a memory location.
7. Write a program to divide a 8-bit number by another 8-bit number. Quotient and remainder should be stored in separate memory locations.
8. Store two 16-bit numbers in consecutive locations. Subtract the smaller from the larger and store the difference in other consecutive locations.
9. 16-bytes of data are stored in memory locations at XX50H to XX5FH. Transfer the entire block of data to new memory locations starting at XX70H.
10. Write a program to generate the square of an 8-bit number.
11. Write a program to convert a 2-digit BCD number to its binary equivalent.
12. Write a program to add two unsigned BCD numbers.
13. Write a program to check whether an 8-bit number is palindrome or not. If yes, store 01H into a memory location; otherwise store 10H into that location.
14. Write a program to subtract two 2-digit BCD numbers.
15. Write a program to find the 2nd largest number from a given list of numbers.
16. Write a program to count the number of 1's in a 16-bit number. Store this count in a
17. memory location.
18. Write a program to sum all the odd numbers in a given list of numbers and store the result in consecutive locations.
19. Write a program to generate sum of the first 10 natural numbers and store the result in a
20. memory location.
21. Write a program to generate and store the first 10 numbers in the Fibonacci sequence.
22. Write a program to find the number of occurrences of the pattern "10" in a given 8-bit
23. number.

B.Sc. Computer Science Honours -Semester-VI

Internet and Java Programming

Course Code: CSC-601
Course Content

L-6 T-0 P-0 C-6

Unit I

Internet: Internet, Connecting to Internet: Telephone, Cable, Satellite connection, Choosing an ISP, Introduction to Internet services, E-Mail concepts, Sending and Receiving secure E-Mail, Voice and Video Conferencing. **Core Java:** Introduction to Java, Fundamental Programming Structure (Data types, Variables, Operators, Control Flow, Arrays, Big Numbers)

(Lecture 08)

Unit II

Introduction to Object Oriented Programming: Objects & Classes, Constructors, Overloading Methods, Inheritance, Method Overriding, Using final and static keywords, Generic Array List, Object Wrappers and Autoboxing, Abstract Classes, Enumeration, String Handling, Package and Interface, Exception Handling. **Input / Output:** File, Directories, Using Streams, File Management, and Serialization.

(Lecture 08)

Unit III

Graphics Programming: Applet Fundamentals, Java Applet, Introduction to AWT, Event handling, AWT controls, Working with Frames, Graphics, 2D Shapes, Colors, Fonts, Displaying Images, Layout managers, Menus, Multithreading.

(Lecture 08)

Unit IV

Swings: Overview, Swing Components (JApplet, Icons, Labels, Text Fields, Buttons, Check Boxes, Radio Buttons, Combo Boxes, Tabbed Pane, Scroll Pane, Split Panes, Tables, Menus, Progress Bar, Toolbars), Pluggable Look and feel, Dialog Boxes, Inner frames. **Collections:** Collection Interfaces, Concrete Collection, The Collections Framework.

(Lecture 08)

Unit V

JDBC: The Design of JDBC, Basic JDBC Programming Concepts, Query Execution, Scrollable and Updatable Result Sets, java.sql package, connectivity to remote database, navigating through multiple rows retrieved from a database. **Java Servlets:** Servlet basics, Servlet API basic, Life cycle of a Servlet, Running Servlet, Debugging Servlets, Thread-safe Servlets, Introduction to Java Server Pages (JSP).

(Lecture 08)

Text Books:

1. Cay S. Horstmann, Gary Cornell, "Core Java Volume 1, Fundamentals", PHI
2. Cay S. Horstmann, Gary Cornell, "Core Java 2 Volume 2, Advanced Features", PHI
3. Naughton, Schildt, "The Complete Reference JAVA2", TMH
4. Margaret Levine Young, "The Complete Reference Internet", TMH

Reference Books:

1. Balagurusamy E, "Programming in JAVA", TMH
2. Dustin R. Callway, "Inside Servlets", Addison Wesley
3. Mark Wutica, "Java Enterprise Edition", QUE
4. Steven Holzner, "Java2 Black book", Dreamtech

***Latest editions of all the suggested books are recommended.**

B.Sc. Computer Science Honours -Semester VI

Web Technologies and Multimedia

Course Code-CSC-602

L-6, T-0, P-0, C-6

Course Contents

Unit I

History of the web, Development phases of Web, Protocols governing the web, Introduction to Cyber Laws in India, Introduction to International Cyber laws HTML: Formatting Tags, Links, List, Tables, Frames, forms, Comments in HTML,DHTML. **(Lectures 08)**

Unit II

XML: Introduction, Displaying an XML Document, Document type definitions Common Gateway Interface (CGI), PERL, RMI, COM/DCOM, VBScript. Java Script: Introduction to Documents, forms, Statements, functions, objects in JavaScript, Arrays, FORMS, Buttons, Checkboxes, Text fields and Text areas. **(Lectures 08)**

Unit III

JSP: Introduction, Structure of JSP, Implementation of JSP,EJB: Introduction, Components of EJB, implementing EJB **(Lectures 08)**

Unit IV

Multimedia Basics and it's Tools: Evolution of Multimedia and its objects, Multimedia hardware, Multimedia Software, Text, sound (MIDI), Digital Audio, Audio File Formats, Digital Audio Concepts, MIDI under Windows environment, Image, Audio and Video Capturing **(Lectures 08)**

Unit V

Compression: Discrete Cosine Transform(DCT),Loss Less compression of sound, Lossycompression,JPEG Standards, J P E G compression,Video representation, colors, video compression, MPEG standards. **(Lectures 08)**

Text Books:

1. Burdman, Collaborative Web Development, Addison Wesley.
2. Bayross Ivan, Web Technologies Part II, BPB Publications
3. SujataPandey, Manoj Pandey, Multimedia (System, Technology and Communication), S.K.Kataria& Sons

Reference Books:

1. GundavarmaShishir, CGI Programming on the World Wide Web, O'Reilly & Associate
2. DON Box, Essential COM, Addison Wesley.
3. Tay Vaughan, Multimedia-Making it Work,TMH Publication

***Latest editions of all the suggested books are recommended.**

B.Sc. Computer Science Honours -Semester VI

Mobile Computing

Course Code:CSC-603
Couse Content

L-6,T-0,P-0,C-6

Unit I

Introduction to Mobile computing, wireless communication: communication satellite, electromagnetic spectrum, multiple access schemes, cellular communication-generations 1g,2g,3g,4g, CDMA & GSM overview, Mobile Devices-PDA, palm, window CE **(Lectures 08)**

Unit II

Wireless LAN, Types of Wireless LAN Network, IEEE 802.11 standards, infrared systems, Bluetooth: network, application, protocol stack, frame structure, overview of WiMAX standard, HiperLAN, Ad hoc networks. **(Lectures 08)**

Unit III

Physical Mobility, IPv4, IPv6, Mobile IP, Mobility support in IPv4 & IPv6, Cellular IP, TCP for mobility, CODA file system. **(Lectures 08)**

Unit IV

Mobile Ad hoc networks, Routing protocols, global state routing (GSR), Destination sequenced distance vector routing (DSDV), Dynamic source routing (DSR), Ad Hoc On demand distance vector routing (AODV), Temporary ordered routing algorithm (TORA) **(Lectures 08)**

Unit V

Mobile Internet & wireless Web, WAP, WAP Protocol stack, security issues in mobile computing, IEEE 802.11 security through WEP, Bluetooth security, WAP 2.0 security. **(Lectures 08)**

Text Books:

1. Mobile Computing Theory & Practice “Kumkumgarg – PEARSON”.
2. J.Schiller “Mobile communication “Pearson “

Reference Books:

1. Mobile computing “Ashoke K. Talikdar”
2. Mobile Computing Technology, Applications & Service creation, “Ashoke K. Talikdar, RupaYavagal” McGraw Hill.

***Latest editions of all the suggested books are recommended.**

B.Sc. Computer Science Honours -Semester VI

Artificial intelligence

Course Code:CSC-603(2)

L-6,T-0,P-0,C-6

Course Content

Unit I

Knowledge: Introduction, definition & importance, knowledge based systems, representation of knowledge, Organization of knowledge, knowledge Manipulation, Knowledge acquisition, introduction to prolog.

(Lectures 08)

Unit-II

Formalized Symbolic Logic, syntax & semantics of FOPL, Inference rule, the resolution principal, normal deductive inference models, Heuristic reasoning methods.

(Lectures 08)

Unit-III

Search and control Strategies: Introduction, concepts, uniformed search, searching and – or- graphs, matching techniques, structures used in retrieval techniques, Integrating knowledge in memory, memory organization system.

(Lectures 08)

Unit-IV

Fuzzy Logic: Basic concepts, fuzzy sets, membership functions, types of membership function, basic operations in fuzzy sets, Intersection & Union- complementary, subethood, properties of fuzzy sets.

(Lectures 08)

Unit-V

Expert system architecture: rule based architectures, non production system architecture dealing with uncertainty, knowledge organization & validation

(Lectures 08)

Text Books:

1. Dan W Patterson “ Introduction to Artificial Intelligence and Expert System PHI”
2. Stuart Russell and Pete nerving “Artificial Intelligence :A modern Apporach PHI”

Reference Books:

1. Artificial Intelligence by Elaine Rich & Kevin Knight (Second Edition)
2. Principles of Artificial Intelligence by Morgn Kaufmann.
3. N.J. Jilsson, Problem Solving Methods in Artificial Intelligence, McGraw-Hill
4. E.B.Hunt, Artificial Intelligence, Academic Press

***Latest editions of all the suggested books are recommended.**

DIGITAL IMAGE PROCESSING

Course Code: CSC 603(3)

L-6, T-0, P-0,C-6

Course Content

Unit I

Digital image fundamentals - Digital Image through scanner, digital camera. Concept of graylevels.Gray level to binary image conversion.Sampling and quantization.Relation ship between pixels.Imaging Geometry. **(Lectures 08)**

Unit II

Image Transforms 2-D FFT , Properties. Walsh transform, Hadamard Transform, Discrete cosine Transform, Haar transform, Slant transform, Hotelling transform. Image enhancement Point processing.Histogramprocessing.Spatial filtering. **(Lectures 08)**

Unit III

Enhancement in frequency domain, Image smoothing, Image sharpening. Colour image processing :Psedo colour image processing, full colour image processing. **(Lectures 08)**

Unit IV

Image Restoration Degradation model, Algebraic approach to restoration, Inverse filtering, Least mean square filters, Constrained Least Squares Restoration, Interactive Restoration. **(Lectures 08)**

Unit V

Image segmentation Detection of discontinuities. Edge linking and boundary detection, Thresholding, Region oriented segmentation. Image compression Redundancies and their removal methods, Fidelity criteria, Image compression models, Source encoder and decoder, Error free compression, Lossy compression. **(Lectures 08)**

Text Books :

1. Digital Image processing – R.C. Gonzalez & R.E. Woods, Addison Wesley/ Pearson education, 2nd Edition, 2002.

Reference Books :

1. Fundamentals of Digital Image processing – A.K.Jain , PHI.
2. Digital Image processing using MATLAB – Rafael C. Gonzalez, Richard E Woods and Steven L. Edition, PEA, 2004.
3. Digital Image Processing – William K. Pratt, John Wiley, 3rd Edition, 2004.
4. Fundamentals of Electronic Image Processing – Weeks Jr., SPIC/IEEE Series, PHI

***Latest editions of all the suggested books are recommended.**

B.Sc. Computer Science Honours -Semester VI
Data Mining

Course Code: CSC 603(4)

L-6,T-0,P-0,C-6

Course Content

Unit I

Data mining: Introduction, Data mining – on what kind of data, data mining functionalities – what kind of patterns to be mined, Classification of data mining systems, data mining task primitives, integration of a data mining systems with a database or data warehouse systems, major issues in data mining. **(Lectures 08)**

Unit II

Data preprocessing: Descriptive data summarization, data cleaning, data integration and transformation, data reduction, data discretization and concept hierarchy generation. Data warehouse and OLAP technology: What is data warehouse, A multidimensional data model, data warehouse architecture, data warehouse implementation, data warehouse usage, OLAP, OLAM **(Lectures 08)**

Unit III

Mining frequent patterns, association and correlation, efficient and scalable frequent itemset mining methods, From association mining to correlation analysis. Classification : Introduction, issues, classification by decision tree induction, rule based classification, classification by back propagation, lazy learners, other classification methods, **(Lectures 08)**

Unit IV

Prediction: Accuracy and error measures, evaluating the accuracy of a classifier or predictor. Cluster Analysis: Types of data in cluster analysis, a categorization of major clustering methods, partitioning methods. **(Lectures 08)**

Unit V

Mining complex types of data: Multidimensional analysis and descriptive mining of complex data objects, mining spatial database, multimedia database, mining world wide web. Applications and trends in data mining: Data mining applications, data mining system products and research prototypes, social impact of data mining, trends in data mining. **(Lectures 08)**

Text Books:

1. Kamber and Han, “Data Mining Concepts and Techniques”, Hartcourt India P. Ltd., 2001.
2. Paul Raj Poonia, “Fundamentals of Data Warehousing”, John Wiley & Sons, 2003

Reference Books:

1. Margaret Dunham, “Data Mining: Introductory and Advanced Topics, 1/e”, Pearson
2. G. K. Gupta, “Introduction to Data Mining with Case Studies”, PHI, 2006.
3. W. H. Inmon, “Building the Operational Data Store”, 2nd Ed., John Wiley, 1999
4. B. M. Shawkat Ali, Saleh A. Wasimi, “Data Mining Methods and Techniques”, Cengage Learning, 2009

***Latest editions of all the suggested books are recommended.**

B.Sc. Computer Science Honours -Semester VI

EMBEDDED SYSTEM

Course Code: CSC-603(5)

L-6,T-0,P-0,C-6

Course Content

Unit I

Fundamentals To Embedded Systems: Embedded systems and its applications, Embedded Operating system, Design parameters of an embedded system and its significance, design life cycle, tools introduction, hardware and software partitioning and co-design. Definition and Classification – Overview of Processors and Hardware Units in an Embedded System. **(Lectures 08)**

Unit II

Hardware Fundamentals For The Embedded Developers: Digital circuit Parameters- Open collector outputs Tristate outputs I/O sinking and Sourcing, PLD's, Watchdog Timers, Hardware design and development. Synchronous–ISO–synchronous and Asynchronous Communications from Serial Devices – Examples of Internal Serial–Communication Devices – UART and HDLC – Parallel Port Devices- Sophisticated interfacing features in Devices/Ports Timer and Counting Devices. **(Lectures 08)**

Unit III

Embedded Programming: Programming in Assembly Language (ALP) vs. High Level Language – C Program Elements – Macros and Functions – Use of Pointers – Use of Function Calls – Multiple Function Calls. Embedded versus external memory devices, CISC and RISC processors, Harvard and Von Neumann Architectures. Optimization of Memory Codes. Tasks, Data, Semaphores and shared data, Operating system services, Message queues, Mailboxes. **(Lectures 08)**

Unit IV

Real Time Operating Systems: OS Services – Interrupt Routines Handling – Task Scheduling Models – Handling of Task Scheduling and Latency and Deadlines as Performance Metrics – Inter Process Communication and Synchronization – Shared Data Problem – Use of Semaphore(s) – Priority Inversion Problem and Deadlock Situations – Inter Process Communications using Signals – Semaphore Flag or Mutex as Resource key – Message Queues – Mailboxes – Pipes – Virtual (Logical) Sockets – RPCs. **(Lectures 08)**

Unit V

Real Time Operating Systems : LCD, Stepping Motor, ADC, DAC, LED, Push Buttons, Key board, Latch Interconnection, PPI. Serial protocols, Parallel protocols and wireless protocols. Basic Features – Task Management Library at the System – Library Header File, Inter Process (Task) Communication Functions. **(Lectures 08)**

Text Books:

1. Rajkamal, “Embedded Systems Architecture, Programming and Design”, Tata McGraw Hill, First reprint, 2003.
2. Embedded System Design-Frank Vahid/Tony Givargis, John Willey.
3. Microcontroller (Theory and Applications) Ajay V Deshmukh, Tata McGraw-Hill.

Reference Books:

1. David E. Simon, “An Embedded Software Primer”, Pearson Education Asia, First Indian Reprint, 2000.
2. Microcontrollers (Architecture, Implementation & Programming) Kenneth Hintz, Daniel Tabak, Tata McGraw-Hill.

***Latest editions of all the suggested books are recommended.**

B.Sc. Computer Science Honours -Semester VI

Software Lab : Java & Web Technologies –Lab

Course Code CSC-651

L-0, T-0, P-6, C-3

Course Content

1. Java
2. Installation of JDK 1.7
3. Installation of NetBeans 6.9
4. Using Netbeans
5. Basic Programs to demonstrate the working of basic data types.
6. Programs to implement the use of Objects.
7. Programs to parse data with the help of Wrapper classes.
8. Using function overloading
9. Constructor overloading & passing object as parameter.
10. Using finalize() method
11. Programs to implement multithreading
12. Programs to implements String handling
13. Programs to implement file handling
14. Programs to implement JDBC
15. Programs to implement JFC-SWING-All controls
16. Programs to implement event handling on Swing controls
17. Implementing Java-2D In Applets
18. Programs to implement Servlets & JSP's on Apache Tomcat Server 6.0
19. Web Technology Lab
20. Using various HTML Tags
21. Rendering tags in different browsers.
22. Combining JavaScript with HTML – Form Validation, User Input, Form Submission,etc
23. Creating CSS to combine with javascripts
24. Creating rounded table corners using div tags &css.
25. Using AJAX
26. Using XMLHttpRequest objects within a Javascript code
27. AJAX based form validation
28. Loading a html page within a div tag using AJAX
29. Dynamic Data Loading using AJAX on a form
30. Creating Auto-suggest Text field using AJAX
31. Using XML, creating DTD's, combining XML with CSS, validating XML
32. Creating a simple ASP Page to submit data to the server.
33. Using JQuery plugins on a HTML page

B.Sc. Computer Science Honours -Semester VI

Software Lab : MATLAB

Course Code CSC-652

L-0, T-0, P-6, C-3

Course Content

1. Introduction to Matlab Environment
2. Defining Matrices
3. Matrix Manipulation
4. Data Structures
5. 2D Graphics
6. 3D Graphics
7. Flow Control
8. Editor/Debugger window
9. Creating Matlab functions
10. Improving code performance
11. Error Correcting
12. Advanced Matlab subjects (only a glance)

B.Sc. Computer Science Honours -Semester VI

Project Lab-Under the Super vision of Project Guide(In house Development)

Course Code CSC-653

L-0, T-0, P-6, C-3

Course Content

Project work to be carried out on either of the following categories:

1. Client Server Based (VB.Net/Java)
2. MIS Based (VB.Net/Java/C-C++)

Evaluation:

Project Guide/Supervisor of the project will be nominated by Head of Department and the internal evaluation shall be done by three faculty members committee nominated by the Director of the college.

The external evaluation will be done by the external examiner arranged by examination branch of the university.

Assessment criteria:

Internal: 50 marks

Internal review by the committee - 50marks

External: 50 marks

By External examiner appointed by the University – 50 marks

Note:

The evaluation format for internal assessment as in Annexure I

The evaluation format for external assessment as in Annexure II

EVALUATION SHEET

B.Sc. Computer Science Honours -Semester VI

(To be filled by the Internal Examiners only)

Subject Code: CSC-653

Subject: Project Lab

Name of Candidate:

Roll No:

Please evaluate out of marks as indicated.

S.No	Details	Maximum Marks	Examiner I	Examiner II	Examiner III	Average
			Marks	Marks	Marks	Marks
1	Problem Clarity	5				
2	Technical aspects of the system (scope, objective ,tools used)	10				
3	Software Engineering Concepts & models	10				
4	Methodology (Database design/ Business Process design / GUI Design)	10				
5	Confidence / Body Language	5				
6	Presentation Skills	5				
7	Assessment Of Accuracy using Testing Tools	5				
	TOTAL	50				
	Signature of Internal Examiners with date	-----				
		Average marks out Of 50				
	Signature of the Director with date					

EVALUATION SHEET**B.Sc. Computer Science Honours -Semester VI***(To be filled by the External Examiners only)***Subject Code: CSC-653****Subject: Project Lab****Name of Candidate:****Roll No:****Please evaluate out of marks as indicated.**

S.No	Details	Maximum Marks	Examiner I
			Marks Awarded
1	<i>Problem Clarity</i>	5	
2	<i>Technical aspects of the system (scope, objective ,tools used)</i>	10	
3	<i>Software Engineering Concepts & models</i>	10	
4	<i>Methodology (Database design/ Business Process design / GUI Design)</i>	10	
5	<i>Confidence / Body Language</i>	5	
6	<i>Presentation Skills</i>	5	
7	<i>Assessment Of Accuracy using Testing tools</i>	5	
	<i>TOTAL</i>	50	
	<i>Signature of External Examiner with date</i>		

B.Sc. Computer Science Honours -Semester VI

Comprehensive Viva-Voce

Course Code CSC-654
Course Content

L-0, T-0, P-6, C-3

Objective:

The objective of this paper is to judge the understanding as well as application of the knowledge gained by the students by the end of the third year of the course.

Guidelines:

1. The comprehensive viva voce is scheduled to be held at the end of VI Semester in third year.
2. This is also to see the articulation of what is being learnt by them and see their relevance in the practical field.
3. The Total marks of viva are 100 (Internal Marks 50 + External Marks 50). The internal marks will be awarded by conducting the presentation of the students in the front of a panel of at least three faculty members who will be appointed by Director/Principal of the college.
4. The external marks will be awarded by the external examiner who will be appointed by the examination division.

EVALUATION SHEET

(To be filled by the GUIDE & Internal Examiners only)

Name of Candidate:

Roll No:

Class and Section:

Please evaluate out of marks as indicated.

S.N o.	Details	Marks (20)	Marks (15)	Marks (15)	Marks
		Guide	Int. Exam. 1	Int. Exam. 2	Average
	Maximum marks in each column	(4 marks x5)	(3 marks x5)	(3 marks x5)	
1	OBJECTIVE IDENTIFIED & UNDERSTOOD				
2	LITERATURE REVIEW / BACKGROUND WORK (Coverage, Organization, Critical review)				
3	DISCUSSION/CONCLUSIONS (Clarity, Exhaustive)				
4	SLIDES/PRESENTATION SUBMITTED (Readable, Adequate)				
5	FREQUENCY OF INTERACTION (Timely submission, Interest shown, Depth, Attitude)				
	Total				
	Signature				
	Average out of 50				
	Signature of Director				

EVALUATION SHEET

(To be filled by the External Examiner only)

Name of Candidate:

Roll No :

Please evaluate out of fifty marks.

S.No.	Details	Marks (50)
	Maximum marks in each column	(10 marks x5)
1	OBJECTIVE IDENTIFIED & UNDERSTOOD	
2	LITERATURE REVIEW / BACKGROUND WORK	
3	DISCUSSION/CONCLUSIONS	
4	POWER POINT PRESENTATION	
5	RESPONSE TO QUESTIONS DURING DISCUSSIONS	
	Total (Out of 50)	

Signature:

Date: