

Course Contents

Integrated B.Tech.-M.Tech. (Biotechnology)

Batch 2019-2020 Onward

Semester 1

B.Tech (I & II semester common to all branches)**Engineering Chemistry: CY101.**

(3-1-0)

UNIT- I

(10 L+ 5 T)

Water – Introduction, Specification for water, Impurities in water, Hardness of water, Numerical problems based on Hardness, Analysis of water: alkalinity, Numerical problems based on alkalinity Dissolved Oxygen, Boiler feed water, boiler problems-scale, sludge, priming and foaming, caustic embitterment and corrosion, their causes and prevention, Water softening processes: External treatment(Lime – Soda process, Numerical problems based on Lime-soda Process, Zeolite process ,Ion exchange Process) and Internal treatment (Colloidal conditioning, carbonate conditioning, calgon conditioning and phosphate conditioning), Domestic water treatment: sedimentation, coagulation, Filtration, Disinfection, chlorination, break point chlorination, Ozonization.

UNIT-II

(5 L+ 1T)

Corrosion and its control- Introduction, Types of corrosion- Dry, Wet, Galvanic , Pitting, Water line and Stress corrosion, Mechanism of corrosion- Dry or Chemical, Wet or Electrochemical, Pilling-Bedworth rule, Galvanic series, Factors influencing corrosion, Corrosion control- Modification of environment, corrosion inhibitor and Metallic coatings.

UNIT- III

(10 L+ 4 T)

Fuel – Classification, Characteristics of fuel, Characteristic of good fuel, Calorific Value, Determination of Calorific Value by bomb calorimeter, Analysis of coal –Proximate and Ultimate analysis, Numerical problems based on Proximate and Ultimate analysis, Carbonization-Types of Carbonization of coal, Manufacture of Metallurgical coke by Otto Hoffman process, Conversion of Coal into Liquid Fuels by Fischer-tropsch process and Bergius Process, Liquid Fuels- Petroleum-Refining of crude oil, Cracking of heavy oil residues – thermal and catalytic cracking, Cracking of heavy oil residues – thermal and catalytic cracking, Gaseous Fuels - Natural gas, Water gas, Producer gas, Coal gas.

UNIT- IV

(10 L+ 2 T)

Polymers-Introduction, Classification(based on origin, structure, intermolecular forces, tacticity, type of monomer, response to temperature, conductance and synthesis), Polymerization- Condensation(step growth), Addition (chain growth), Conducting polymer and Biopolymers, Introduction to polymeric composites, Types of composite materials.

Pallam *Pallam* AK Singh *AK Singh* 1
 Andeesh *Andeesh* Vaishnavi *Vaishnavi* Rupika *Rupika* Jaya Maiwala *Jaya Maiwala* D *D*

UNIT-V

Phase Rule – The Phase Rule, Explanation of terms, Advantages and limitations of Phase Rule, Phase rule for one component system (The water system). (3 L+ 1 T)

UNIT-VI

Lubricants - Introduction, Functions, Classification of Lubricants, Mechanism of Lubrication, Properties- Viscosity and viscosity index, Flash and fire point, Aniline point, Neutralization number, Saponification Number and Iodine Number. (4 L+ 1 T)

UNIT-VII

(3L+ 1 T)

Insulators- Introduction, Thermal insulators-Organic and Inorganic insulators, Electrical Insulators.

Books (Text Books & Reference books)

1. J.C. Kuriacose & J. Rajaram, Chemistry in Engineering & Technology ,Vol I & II, By Tata McGraw-Hill Education, 1984.
2. Dr S.S. Dara,S.S. Umare,Engineering Chemistry (Latest ed.), By S.S. Dara S. Chand & Company Ltd., 2013.
3. Jain & Jain , Engineering Chemistry 15th ed., Dhanpat Rai Publications,2006.
4. V.R.Gowarikar, V.Viswanatha,Jayadev Sreedhar, Polymer Science, New Age International, 1986.
5. G. T. Austin, Shreve's Chemical Process Industries 5th ed. Mc-Graw-Hill New York, 1984.

Dollar
Anandib Vanivilash
D
Akash
Rupki
Tanya Neelani

MA 103 (Mathematics-I)

Credit (L-T-P) : 4 (3- 1- 0)

Unit I

Sets and their representations, operations on sets, Cartesian product of sets, relations, functions, algebraic and transcendental function, Principle of Mathematical induction, Solution of quadratic equations. Permutation and Combination, Binomial Theorem.

Unit II

Straight Lines, slope of a line and angle between two lines, various forms of equations of a line: parallel to axes, point-slope form, slope-intercept form, two point forms, intercepts form and normal form, general equation of a line, distance of a point from a line. Introductory idea of Ellipse, Circle, parabola and Hyperbola.

Unit III

Trigonometric functions, positive and negative angles, Measuring angle in radians & in degree and conversion from one measure to another. Definition of trigonometric with the help of unit circle. Trigonometric identities. Complex numbers, algebraic properties of complex numbers, Argand plane and polar representation of complex numbers, Fundamental theorem of algebra.

Unit IV

Vectors and scalars, magnitude and direction of a vector, direction cosines (and ratios) of vectors, Types of vectors, position vector of a point, negative of a vector, components of a vector, addition of vectors, multiplication of a vector by a scalar, position vector of a point dividing a line segment in a given ratio. Scalar product of vectors, projection of a vector on a line, vector product of vectors.

Unit V

Matrices and determinants: definition of a matrix, various types of matrices, addition, subtraction, multiplication of matrices, inverse of matrix, determinant of matrices, expansion of determinant, properties of determinants, solution of linear system of equations, Cramer rule.

Textbook Mathematics Part I and Part II - Textbook for Class XI and XII, NCERT.

Reference Books

- [1] H. S. Hall and S.R. Knight, *Higher Algebra*. Arihant, 2010.
- [2] J. Stewart, *Calculus*, Cengage Learning, Sixth Edition.

Somnath

R. D. Shand

J.

R. D. Shand

Life Sciences [BT 101]

1.The Root System: Organization and anatomy of root in Monocotyledons and Dicotyledons, **The Shoot System:** Organization and anatomy of shoot in Monocotyledons and Dicotyledons; Primary and Secondary growth in Plants, **Leaf:** Anatomy of Leaf in Monocotyledons and Dicotyledons.

2.Reproduction in Angiosperms: Morphology of Flower; Microsporogenesis: Formation of Pollen grains. (Male gametophyte); Megasporogenesis: Development of Embryo Sac (Female Gametophyte); Pollination: Types, Carriers and Development of Pollen Tube, Division of Male Nucleus; double fertilization and triple fusion. **Embryology:** Types of Endosperm and Development of Embryo

3. An introduction to Evolution

Animals:

4. Digestive System and Respiratory System: Comparative morphology of Digestive System: Outline of Morphological and anatomical Structure of Digestive System of mammals. Comparative morphology of Respiratory System: Outline of Morphological Structure of Respiratory System of mammals.

5. Blood Circulatory System: Comparative morphology of Blood Circulatory System: Outline of Morphological and anatomical Structure of Blood Circulatory System of mammals.

6.Urino-Genital System, Reproductive system and Embryogenesis: Comparative morphology of Urinogenital System: Outline of Morphological and anatomical Structure of Urinogenital System of mammals.

Physiology of Reproductive System of mammal; Spermatogenesis and Oogenesis in mammals; Typical mammalian egg structure; Fertilization in Mammals- Sperm egg encounter, Capacitation and Sperm transport; Acrosomal reaction, Cleavage- Salient features and Types of Cleavage; Types of Placenta in mammals.

Text Books/References

A Class Book of Botany by A. C. Dutta

A Textbook of Botany by Gopinath Hait

Animal Physiology by Schmidt-Nielsen

Guyton and Hall Textbook of Medical Physiology by John E. Hall

The Ecology Book by Tom Hennigan

Ecology And Environment by PD Sharma

Course Code: CS101

No. of Lectures (Hrs/Week): 4
Total No. of Lectures: 60

FUNDAMENTALS OF COMPUTER PROGRAMMING

Credits: 3-1-0

End Sem Exam Hours: 3

UNIT I INTRODUCTION TO COMPUTER AND PROGRAMMING CONCEPTS

Definition, characteristic, generation of computers, basic components of a computer system, memory, input, output and storage units, high level language and low level language, Software: system software, application software, hardware, firmware, Operating System, compiler, interpreter and assembler, linker, loader, debugger, IDE. Introduction to algorithm and flow chart; representation of algorithm using flow chart symbol, pseudo code, basic algorithm design, characteristics of good algorithm, development of algorithm.

UNIT II INTRODUCTION TO C PROGRAMMING LANGUAGE

Introduction to C programming language , Declaring variables, preprocessor statements, arithmetic operators, programming style, keyboard input , relational operators, introduction, feature of C language, concepts, uses, basic program structure, simple data types, variables, constants, operators, comments, control flow statement :if, while, for, do-while, switch.

UNIT III DATA TYPES AND STRUCTURES

bitwise operators, Pre defined and User defined data types, arrays, declaration and operations on arrays, searching and sorting on arrays, types of sorting, 2D arrays, Passing 2D arrays to functions, structure, member accessing, structure and union, array of structures, functions, declaration and use of functions, parameter passing, recursion .

UNIT IV FUNDAMENTALS OF POINTERS

Introduction to pointers, pointer notations in C,Declaration and usages of pointers, operations that can be performed on computers, use of pointers in programming exercises, parameter passing in pointers, call by value, call by references, array and characters using pointers, dynamic memory allocation

UNIT V FILE HANDLING IN C AND ENUM

Introduction to file handling, file operations in C , defining and opening in file, reading a file, closing a file, input output operations on file, counting: characters, tabs , spaces, file opening modes, error handling in input/output operations.
sEnumerated data types, use of Enum, declaration of Enum.

28/08/18
Raj
SGK

Fee Deposition on 16th July, 2019 in respective schools.
Students shall deposit required fee i.e. Academic Fee, Hostel Fee and Mess Advances, on or before Date of Registration and submit 'No Dues' at the time of Registration in respective schools. Students without fee deposition receipt will not be registered. Students can deposit fees either by **Demand Draft** in favour of **GAUTAM** **EDUCATION PVT LTD**, **GATE NO 10, SECTOR 10, GREATER NOIDA**

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Text Books:

1. C Programming, Herbert Shield
2. C Programming Language 2nd Edition by Brian, W Kernighan Pearson Education.

Reference Books:

3. Programming in ANSI C by E. Balagurusamy, Tata Mcgraw Hill
4. C Puzzle Book: Puzzles For The C Programming Language by Alan R Feuer Prentice Hall-Gale
5. Expert C Programming: Deep C Secrets (s) by Peter Van Der Linden Dorling Kindersley India.
6. Introduction To UNIX System by Morgan Rachel Tata Mcgraw Hill Education.
7. C: A Reference Manual (5th Edition) by Samuel P. Harbison & Samuel P. Harbison.
8. Programming Using the C Language by Hutchison, R.C, Mcgraw Hill Book Company, New York
9. Fundamentals of computers and programming with C, A.K. SHARMA

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Introduction to Biotechnology [BT 103]

Unit 1 – History and milestones in genetic engineering, Scope of genetic engineering, Genetic engineering guidelines, gene Cloning, Cloning and patenting of life forms.

Unit 2 – Nucleic acid, Nucleic acid purification, Yield analysis, DNA primers and their chemical synthesis, DNA amplification and its applications, Restriction enzymes, DNA modifying enzymes, Linkers, Adaptors, Restriction mapping of DNA fragments and Map construction.

Unit 3 – mRNA enrichment, mRNA amplification, Reverse transcription, cDNA synthesis based cloning, Heterologous gene expression and purification of recombinant protein.

Unit 4 – DNA synthesis and mutation, DNA and Protein sequencing, DNA separation and detection, Molecular markers (DNA, RNA and protein).

Unit 5 – Vectors: Plasmids, Bacteriophages, Phagemids, Cosmids and Artificial chromosomes.

Unit 6 – Alternate strategies of gene cloning: cloning interacting genes – Two and three hybrid systems, Library construction and Screening, cloning differentially expressed genes and DNA microarrays.

Text Books/References:

- Developmental Biology, 6th Edition, Scott F. Gilbert.
- Recombinant DNA, J.D. Watson et al, W.H. Freeman and Company.
- Principles of Gene Manipulation: An Introduction to Genetic Engineering, R.W. Old and S. B Primrose, Blackwell Science Inc.

Core Course

Paper Code:	EN-101
Paper Name:	English Proficiency
Credit:	02
Level:	Undergraduate

Unit 1 Functional Grammar: Form and Functions; Sentences: Simple, Complex, and Compound; Tense, Mood, an Aspect; Sub-Verb Agreement and Concord; Common Errors; Vocabulary Building: Inflection and Derivation; Conversions, Idioms and Phrases, Words in Context

Unit 2 Language Skills (LSRW): Listening Skills: Activity based, Speaking Skills: Activity based, Introduction to IPA, Use of Dictionary, Word stress, Reading Skills: Skimming and Scanning, Reading Comprehension, Writing Skills: Paragraph, Précis and Compositions, Note Making and Note Taking, Logical Ordering of Ideas and Contents, Figures of Speech

Unit 3 Learning through thematic Texts:

- *My Visions for India* Dr. Abdul Kalam
- From *In an Antique Land* Amitav Ghosh
- *The Gift of Magi* O' Henry
- *Master and Man* Leo N. Tolstoy
- *If* Rudyard Kipling
- *The Solitary Reaper* William Wordsworth

Suggested Books:

1. *Word for Word*, Pointon & Clark, Oxford University Press
2. Carter, Ronald; McCarthy, Michael (2006). *Cambridge Grammar of English: A Comprehensive Guide*. Cambridge University Press.
3. *An English Pronouncing Dictionary*, London: Dent, rpt in facsimile in Jones (2002). 17th edn, P. Roach, J. Hartman and J. Setter (eds), Cambridge: CUP, 2006.
4. Redman, Stuart. 2011 English Vocabulary I Use: Pre-intermediate and intermediate. Cambridge: CUP *Cambridge Phrasal Verbs Dictionary* Second edition, Cambridge University Press

Course Name: Human Values & Buddhist Ethics

Code of Course: BS 101

No. of Credits: 2

Unit 1:

Life of Gautam Buddha

Origin of Buddhism

Buddhist Ethics

Buddhist Literature (Pāli Canonical Literature)

Unit 2:

Basic Tenets of Buddhism:

Cattāri-Ariya-Saccāni (The Four Noble Truths)

Ariyo-Āṭhaṅgiko-Maggo (The Eightfold Path or The Middle Path)

Brahma-Vihāra-Bhāvanā (Four Sublime States)

Pañcasīla (The Five Precepts)

Unit 3:

Socially Engaged Buddhism

Ten Wholesome Deeds (Dasa Kusala Kamma)

Ten Unwholesome Deeds (Dasa Akusala Kamma)

Unit 4:

Buddhist View on Environmental Crisis

Buddhist View on Human Rights

Buddhist Economic Theory

Suggested Readings:

- Ambedkar, Bhim Rao, *The Buddha and His Dhamma*, Nagpur: Buddha Bhoomi Prakashan, 1997.
- Bapat, P. V., *2500 Years of Buddhism*, Delhi: Publications Division, Ministry of Information and Broadcasting, Government of India, 1997.
- Bhikkhu Dr. Beligalle Dhammadajoti, *Buddhism & Modern World*, Taiwan: The Corporate Body of the Buddha Educational Foundation, 2011.
- Bhikshu Dharmarakshita, *Pāli Sāhitya Kā Itihās*, Varanasi: Gyanamandala Limited, 1988.
- Bhikshu Dharmarakshita, *Sukhi Grihastha Ke Liye Buddha Upadesh*, New Delhi: Samyaka Prakashana, 2011.
- *Buddhist Dictionary - Manual of Buddhist Terms and Doctrines* (Ed.) Nyanaponika, Taiwan: The Corporate Body of the Buddha Educational Foundation, 2012.
- Chan Khoon San, *Buddhism Course*, Kuala Lumpur: Majujaya Indah Sdn. Bhd., 2012.
- Dharmakirti, *Buddha Ka Nitishashtra*, New Delhi: Samyaka Prakashana, 2012.
- Dharmakirti, *Buddha Ka Samejadarshana*, New Delhi: Samyaka Prakashana, 2012.
- K. Sri Dhammananada, *Gems of Buddhist Wisdom*, Malaysia: Buddhist Missionary Society, 1996.
- K. Sri Dhammananada, *Meditation the Only Way*, Taiwan: The Corporate Body of the Buddha Educational Foundation, 2006.
- K. Sri Dhammananada, *What Buddhists Believe*, Taiwan: The Corporate Body of the Buddha Educational Foundation, 2006.
- Keown, D., *The Nature of Buddhist Ethics*, London: Macmillan, 1992.
- Law, Bimala Churn, *A History of Pāli Literature*, Delhi: Indological Book House, 1983.
- Misra, G.S.P., *Development of Buddhist Ethics*, New Delhi: Munshi Ram Manohar Lal Private Limited, 1984.
- Nārada Thera, *A Manual of Buddhism*, Taiwan: The Corporate Body of the Buddha Educational Foundation, 2005.
- Nārada, *The Buddha and His Teachings*, Taiwan: The Corporate Body of the Buddha Educational Foundation, 2005.
- Narasu, P.Lakshmi, *The Essence of Buddhism*, Madras: Asian Educational Services, 1993.
- Paul Carus, *The Gospel of Buddha*, Nagpur: Kashinath Meshram, Buddha Bhoomi Prakashan, 1997.
- Pyinnyāthīha, *The Triple Gem and The Way to Social Harmony*, Taipei: The Corporate Body of the Buddha Educational Foundation, 2002.
- Rahula, Walpola, *What The Buddha Taught*, Taiwan: The Corporate Body of the Buddha Educational Foundation, 2003.
- Samdhong Rinpoche, *The Social Philosophy of Buddhism*, Varanasi: The Central Institute of Higher Tibetan Studies, 1972.
- Snkrityana, Rahula, *Baudhā Darshana*, Allahabad: Kitab Mahal, 1992.
- Sarao, K.T.S. & Arvind Kumar Singh (Eds.), *A Text Book of the History of Theravada Buddhism*, Delhi: Department of Buddhist Studies, Delhi University, 2006.
- Sarao, K.T.S., *Origin and Nature of Ancient Indian Buddhism*, New Delhi: Munshiram Manoharlal, 2009.
- Sayagi U Ko Lay, *Guide to Tipitaka*, Taiwan: The Corporate Body of the Buddha Educational Foundation, 2002.
- Shakya, Gyanaditya, *Buddha Dharma Darshana Mein Brahma-Vihāra-Bhāvanā*, Ahmedabad: Reliable Publishing House, 2013.
- Shakya, Rajendra Prasad, *Baudhā Darshan*, Madhya Pradesh Hindi Academy, Bhopal, 2001.
- Singh, Anand, *Business Ethics and Indian Value System*, Himalayan Publication, Delhi, 2010.
- *The Dhammapada* (Ed. & Tr.) K. Sri Dhammananda, Taiwan: The Corporate Body of the Buddha Educational Foundation, 2006.
- Thera Piaydassi, *The Buddha's Ancient Path*, Taiwan: The Corporate Body of the Buddha Educational Foundation, 2003.
- Upadhyaya, Bharat Singh, *Pāli Sāhitya Kā Itihās*, Prayag: Hindi Sahitya Sammelan, 2005.
- Upadhyaya, Baladeva, *Baudhā Dharma Darshan Mimamsa*, Varanasi: Chaukhamba Vidya Bhawan, 1999.

BT105 Laboratory I: Basic Biotechnology

1. Safety in Biotechnology Lab
2. Math Skills in Lab
3. Documentation & Lab Notebook
4. Basic Tools in the Biotechnology Laboratory
5. Using a Micropipettor
6. Use of microscope
7. Use of pH meter
8. Calibrating Lab Instruments
9. Molar Solutions and Dilutions
10. Sterilization techniques
11. Preparation of media
12. Isolation, enumeration and Purification of microbes from a Given sample
13. Simple staining & Gram staining
14. Preparation of stock solutions/dilution

List of Experiments

1. To determine the total hardness of the water sample
2. To determine the alkalinity of the water sample
3. To determine the total residual chlorine in the given water sample.
4. To determine the of dissolved Oxygen in given sample of water
5. To determine the total iron (Fe^{+2} and Fe^{+3} ion) in the given mixture solution by KMnO_4 .
6. To determine the Ferrous (Fe^{+2}) and Ferric ions(Fe^{+3}) in the given mixture solution by $\text{K}_2\text{Cr}_2\text{O}_7$ using external indicator method.
7. To determine the Ferrous (Fe^{+2}) and Ferric ions(Fe^{+3}) in the given mixture solution by $\text{K}_2\text{Cr}_2\text{O}_7$ using internal indicator method.
8. To determine the Saponification value of an oil
9. To determine the Iodine value of a given lubricating oil
10. To determine the Acid value of an oil
11. Determine the amount of Cu by iodometric titration
12. To find the normality of an acid solution by conductometrically
13. To determine the molarity of HCl by pH-metrically
14. Preparation of PMMA
15. Preparation of urea-formaldehyde resin

Out of fifteen experiments, ten experiments are to be performed

REFERENCE BOOKS:

1. O.P. Vermani and A.K. Narula Applied Chemistry: Theory and Practice New Age International Pvt Ltd Publishers , 2008.
2. G.H. Jeffery, J. Bassett, J. Mendham and R.C. Denney, Vogel's Textbook of Quantitative Chemical Analysis, 5th ed. John Wiley & Sons Inc; 1989.
3. Laboratory Manual on Engg. Chemistry by S.K. Bhasin and Sudha Rani.

Dollar
Ramesh
Vani Vats
Tanya Hatt
Shashikala

I-YEAR (I-SEMESTER)
(Effective from session: 2016-17)

COMPUTER PROGRAMMING LAB - I		Course Code: CS181	Credits: 1
No. of Lab (Hrs./Week): 2	No. of Lab Sessions (Sem.): 15	Mid Sem. Exam (Hrs.): 0	End Sem. Exam (Hrs.): 2

NOTE: Suggested list of experiments but not limited to these only.

List of Experiments:

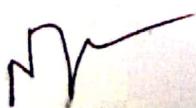
1. Write a C program to reverse a given number, find the sum of digits of the number.
2. Write a C program to concatenate two strings.
3. Write a C program to take marks of a student as input and print the his/her grade bases on following criteria using if – else statements

Marks < 40	FAIL
40 <= Marks < 59	GOOD
59 <= Marks < 80	Excellent
80 <=	Marks Outstanding
4. Perform experiment 3 using switch case statement.
5. Write a C program to compute the length of a string using while loop.
6. Write a C program to convert all the lowercase letter to uppercase letter and all uppercase letters to lower case letter given a string as input.
7. Write a C program to compute the roots of a quadratic equation.
8. Write a C program to check whether a given number is prime or not, also check whether it is divisible by a number k or not.
9. Write a C program to check whether a given year is leap year or not.
10. Write a C program to take two matrixes as input and print the sum of two matrixes.
11. Write a C program to display the address of a variable using pointer.
12. Write a C program to compute the length of a string using pointer.
13. Create a structure called STUDENT having name, registration number, class, session as its field. Compute the size of structure STUDENT.
14. Write a C program to check weather a given string is palindrome or not.
15. Write a C program to generate following patterns.

1			
2	2		
3	3	3	
4	4	4	4

A			
B	C	B	
C	D	C	D
D	D	D	D

**DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
SCHOOL OF ICT, GAUTAM BUDDHA UNIVERSITY, GREATER NOIDA, INDIA**




Course Contents

Integrated B.Tech.-M.Tech. (Biotechnology)

Batch 2019-2020 Onward

Semester 2

Engineering Physics (PH102) course will be common for all branches of SoE (CE, EE, ME), and SoICT (CS, EC), and will remain same as approved previously. Bio-Technology/Food Technology students will have common Physics course, namely Applied Physics (PH-101). Engineering Physics Laboratory (PH104) course will be common for all branches of SoE, SoICT, SoBT and SoVSAS. The changes will be effective from Session 2014-2015.

PH101-APPLIED PHYSICS (Food/Bio Technology)

4-Credits (3-1-0)

Module I-Optics: Sinusoidal wave propagation: One dimensional wave equation, Light as Electromagnetic wave, Superposition of waves: Interference of light, Coherent sources, Division of wavefront: Young's fringes, Fresnel's bi-prism; Division of amplitude: Uniform thin films, Newton's rings; Diffraction of light: Types, Fraunhofer diffraction of Single and double slits; Diffraction grating and resolving power; Polarization of light, Malus' and Brewster's laws, Concept of double refraction, Nicol prism, Quarter and half wave plates, Production of circularly and elliptically polarized light, Rotatory polarization, Optical Activity, Polarimeters.

Module II: Application of Optics: Optical imaging devices, Holographic principles: Recording and reconstruction of holograms; Lasers: spontaneous and stimulated emissions, main components of laser, three level laser system; Optical fibers: Total internal reflection, numerical aperture, Attenuation, optical fiber sensors and their applications.

Module III-Quantum Theory Fundamentals: Particle nature of waves: Photo-electric and Compton effect, Wave nature of particles: De-Broglie waves; Davisson-Germer Experiment; Wave-packet, Heisenberg's Uncertainty principle; wave-function and its physical interpretation; Schrodinger wave equation; particle in a box (One dimensional), Concept of tunneling effect.

Module IV-Solid state physics: Bonding in solids, Lattice and crystal structures, Band theory of solids: classification, Solid State Devices.

V-Nanotechnology: Properties of nanoparticles; carbon nanotubes (CNT); Applications of nanotechnology in Bio and Food Science, Measurement Techniques: X-Ray Diffraction (XRD), Spectroscopy, Scanning electron microscope (SEM), Atomic force microscope (AFM).

Texts/References

1. Ajoy Ghatak, Optics, Tata McGraw Hill Education Pvt. Ltd., (2009)
2. Arthur Beiser, Concepts of Modern Physics, Tata McGraw-Hill Education Pvt Ltd, (2006)
3. K. K. Chattopadhyay & A. N. Banerjee, Introduction to Nanoscience and Nanotechnology, PHI Learning Pvt Ltd. (2009)

PH104-ENGINEERING PHYSICS LABORATORY 1.5 Credit (0-0-3) 1 Credit (0-0-2) bphsb

List of Experiments *

1. Measurement of basic constants: Length, Weight & Time.
2. Study of current balance/ force acting on a current carrying conductor.
3. To study the magnetic field variation of paired coils in a Helmholtz arrangement
4. To study Interference due to division of wavefront with double and multiple slits
5. To study Fraunhofer diffraction of light using a single slit and circular hole.
6. To study the interference of light by Fresnel's Biprism and find the fringe width.
7. To determine the Cauchy' constant using Prism and spectrometer
8. To find wavelengths of Mercury light source using Plane Transmission Diffraction Grating
9. To study the Polarization of light and verify Malus's Law
10. Study of Photoelectric effect and calculate the Planck's Constant
11. To determine the wavelength of light by Newton's Rings.

12. To determine the energy band gap of a given semiconductor material using Four-Probe method.
13. To find the e/m of electron by Thomson's method.
14. To study the characteristics of Solar Cell.
15. To calculate the wavelength of sodium light using Fresnel's biprism.
16. To determine specific rotation of sugar using half shade polarimeter.
17. To study the Coupled Pendulum
18. Study of Electron Diffraction (Dual Nature of Electron)
19. To study Faraday's law of Induction
20. To study the B-H curve of magnetic materials
21. To study the concept of quantization of energy levels by using Franck-Hertz experiment

Note: The courses not mentioned here will remain same as approved previously.

* Students will perform 8-10 experiments from the list of experiments. bphsb

Kiran

FMS bphsb

Qasim
26/7

Bphsb
26/9/18

Rahul
26/9/18

MA 104 (Mathematics-II)

Credit (L-T-P) : 4 (3- 1- 0)

Unit I

Limit, continuity and differentiability of functions, Derivatives of elementary functions, rules of differentiation, Derivatives of polynomial and trigonometric functions, derivative of composite functions, chain rule, derivatives of inverse trigonometric functions, derivative of implicit function, logarithmic differentiation. Derivative of functions expressed in parametric forms, successive differentiation

Unit II

Successive differentiation, Leibnitz Theorem, Partial differentiation, Euler Theorem, Taylors series (Single Variable), Maxima and Minima (Single Variables),

Unit III

Integration as inverse process of differentiation, Integration of elementary functions, integration by substitution, by partial fractions and by parts, Fundamental theorem of calculus, Basic properties of definite integrals and evaluation of definite integrals, definite integral as limit of sum, Application to areas and curves

Unit IV

Definition of ordinary differential equations, order and degree, general and particular solutions of a differential equation, Formation of differential equation, solution of differential equations of first order and first degree: solution by method of separation of variables, homogeneous differential equations, linear differential equations, exact differential equations, Solution of second order differential equations with constant coefficients.

Unit V

Introduction to mathematical modeling, modeling of Simple elementary biological system, population growth model, exponential models, logarithmic models

Textbook *Mathematics Part I and Part II - Textbook for Class XI and XII, NCERT.*

Reference Books

- [1] G. B. Thomas and R. L. Finney, *Calculus and Analytical Geometry*, Pearson Education.
- [2] J. N. Kapoor, *Mathematical Modeling*, New Age International.
- [3] J. Stewart, *Calculus*, Cengage Learning, Sixth Edition.



BT205: Biomolecules

Unit 1

Chemistry and biology: Introduction to Biochemistry, water as a biological solvent, weak acid and bases, pK values for acid and bases, pH, preparation of buffers, Henderson-Hasselbalch equation and calculation of acid base for buffers, physiological buffers, fitness of the aqueous environment for living organism, biochemical reactions, buffering capacity, buffers used in biochemistry. Preparation of solutions, Molarity, Normality and percent solutions, calculation of ionic strength of solutions. properties and structure of water, hydrogen bond, ionic interactions, van der waals force and hydrophobic effect.

Unit 2

Carbohydrates: Introduction & Occurrence, Classification of Mono-, Di- and Polysaccharides, Reducing & Non-reducing Sugars, Constitution of Glucose & Fructose, Osazone formation, Pyranose & Furanose forms, Determination of ring size, Inter-conversion of monosaccharides.

Unit 3.

Lipids: General introduction, Classification & Structure of Simple & Compound lipids, Properties of Lipid aggregates (elementary idea), Biological membrane, Lipoproteins. Vitamins (water and fat soluble) and minerals.

Unit 4 Proteins: General introduction, Classification & General characteristics, Structure of Primary, Secondary, Tertiary & Quaternary proteins (elementary idea), Classification of Amino acids. Membrane proteins. Haemoglobin and myoglobin.

Unit 5

Nucleic acids: Components of DNA and RNA, Nucleosides & Nucleotides (introduction, structure & bonding), Double helical structure of DNA (Watson-Crick model), various forms of DNA.

Unit 6

Enzymes: History, general characteristics, nomenclature, IUB enzyme classification, Definition with examples of holoenzyme, apoenzyme, coenzymes, cofactors activators, inhibitors, active site (identification of groups excluded), metalloenzymes, units of enzyme activity, specificenzymes, isoenzymes, monomeric enzymes, oligomeric enzymes and multienzyme complexes, enzyme specificity. Nature of non enzymatic and enzymatic catalysis, measurement and expression of enzyme activity- enzyme assays, Definition of IU, Katal, enzyme turn over number and specific activity, role of non protein organic molecules and inorganic ions, coenzyme, prosthetic groups, role of vitamins as coenzymes.

Core Course

Paper Code:	EN-102
Paper Name:	Professional Communication
Credit:	02
Level:	Undergraduate

Unit 1 Introduction to Communication: Communication: Definition, Nature and Scope, Types: Verbal and Non Verbal Communication, Barriers to Effective Communication, Attributes to Effective Communication, Communication in Professional Domain, Oral Presentations, Group Discussions, Job Interviews, Conducting Meetings/Seminars, Agenda and Minutes

Unit 2 Correspondence and Written Communication

Report Writing, Research Articles, Business Proposals, Writing Résumé, Job Applications, Letters: Order Letter, Complaint Letter, Apology, Persuasive, Other tools of Correspondences: Notice, Circular, Memos, Office Order, Tender Notices, e-mails Etiquettes, etc.

Unit 3 Learning through Thematic Texts

- | | |
|--|------------------|
| ▪ <i>Literature and Science</i> | Aldous Huxley |
| ▪ <i>The Man Who Knew Too Much</i> | Alexander Baron |
| ▪ <i>An Astrologer's Day</i> | R. K. Narayan |
| ▪ <i>The Sniper</i> | Liam O' Flaherty |
| ▪ <i>Road Not Taken</i> | Robert Frost |
| ▪ <i>A refusal to mourn the Death by Fire of a Child in London</i> | Dylan Thomas |

Suggested Books:

1. Business Correspondence and Report Writing, Sharma and Mohan, TMH
2. Business Communication, Meenakshi Raman, Prakash Singh, Oxford Higher Education
3. An English Pronouncing Dictionary, London: Dent, rpt in facsimile in Jones (2002). 17th edn, P. Roach, J. Hartman and J. Setter (eds), Cambridge: CUP, 2006.
4. McC Arthy Michael and Felicity O'Dell, English Vocabulary in Use CUP.2002

Ability Enhancement Compulsory Courses (AECC – Environmental Studies)

Unit 1: Introduction to environmental studies

- Multidisciplinary nature of environmental studies; components of environment – atmosphere, hydrosphere, lithosphere and biosphere.
- Scope and importance; Concept of sustainability and sustainable development. (2 Lectures)

Unit 2: Ecosystems

- What is an ecosystem? Structure and function of ecosystem; Energy flow in an ecosystem: food chain, food web and ecological succession. Case studies of the following ecosystems:
 - a) Forest ecosystem
 - b) Grassland ecosystem
 - c) Desert ecosystem
 - d) Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)
- (6 Lectures)

Unit 3: Natural Resources: Renewable and Non-renewable Resources

- Land Resources and land use change; Land degradation, soil erosion and desertification.
- Deforestation: Causes and impacts due to mining, dam building on environment, forests, biodiversity and tribal populations.
- Water: Use and over-exploitation of surface and ground water, floods, droughts, conflicts over water (international & inter-state).
- Heating of earth and circulation of air; air mass formation and precipitation.
- Energy resources: Renewable and non-renewable energy sources, use of alternate energy sources, growing energy needs, case studies.

(8 Lectures)

Unit 4: Biodiversity and Conservation

- Levels of biological diversity :genetic, species and ecosystem diversity; Biogeography zones of India; Biodiversity patterns and global biodiversity hot spots
- India as a mega-biodiversity nation; Endangered and endemic species of India
- Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts, biological invasions; Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.
- Ecosystem and biodiversity services: Ecological, economic, social, ethical, aesthetic and Informational value.

(8 Lectures)

Unit 5: Environmental Pollution

- Environmental pollution : types, causes, effects and controls; Air, water, soil, chemical and noise pollution
- Nuclear hazards and human health risks
- Solid waste management: Control measures of urban and industrial waste..
- Pollution case studies.

(8 Lectures)

Unit 6: Environmental Policies & Practices

- Climate change, global warming, ozone layer depletion, acid rain and impacts on human communities and agriculture.
- Environment Laws : Environment Protection Act; Air (Prevention & Control of Pollution) Act; Water (Prevention and control of Pollution) Act; Wildlife Protection Act; Forest Conservation Act; International agreements; Montreal and Kyoto protocols and conservation on Biological Diversity (CBD). The Chemical Weapons Convention (CWC).
- Nature reserves, tribal population and rights, and human, wildlife conflicts in Indian context

(7 Lectures)

Unit 7: Human Communities and the Environment

- Human population and growth: Impacts on environment, human health and welfares.
- Carbon foot-print.
- Resettlement and rehabilitation of project affected persons; case studies.
- Disaster management: floods, earthquakes, cyclones and landslides.
- Environmental movements: Chipko, Silent valley, Bishnios of Rajasthan.
- Environmental ethics: Role of Indian and other religions and cultures in environmental conservation.
- Environmental communication and public awareness, case studies (e.g., CNG vehicles in Delhi).

(6 Lectures)

Unit 8: Field work

- Visit to an area to document environmental assets; river/forest/flora/fauna, etc.
- Visit to a local polluted site – Urban/Rural/Industrial/Agricultural.
- Study of common plants, insects, birds and basic principles of identification.
- Study of simple ecosystems-pond, river, Delhi Ridge, etc.

(Equal to 5 Lectures)

Suggested Readings:

1. Carson, R. 2002. *Silent Spring*. Houghton Mifflin Harcourt.
2. Gadgil, M., & Guha, R. 1993. *This Fissured Land: An Ecological History of India*. Univ. of California Press.
3. Gleeson, B. and Low, N. (eds.) 1999. *Global Ethics and Environment*, London, Routledge.
4. Gleick, P.H. 1993. Water in *Crisis*. Pacific Institute for Studies in Dev., Environment & Security. Stockholm Env. Institute, Oxford Univ. Press.
5. Groom, Martha J. Gary K. Meffe, and Carl Ronald carroll. *Principles of Conservation Biology*. Sunderland: Sinauer Associates, 2006.
6. Grumbine, R. Edward, and Pandit, M.K. 2013. Threats from India's Himalaya dams. *Science*, 339: 36-37.
7. McCully, P. 1996. *Rivers no more: the environmental effects of dams*(pp. 29-64). Zed Books.
8. McNeil, John R. 2000. Something New Under the Sun: An Environmental History of the Twentieth Century.

9. Odum, E.P., Odum, h.T. & Andrews, J.1971. *Fundamentals of Ecology*. Philadelphia: Saunders.
10. Pepper, I.L., Gerba, C.P. & Brusseau, M.L. 2011. Environmental and Pollution Science. Academic Press.
11. Rao, M.N. & Datta, A.K. 1987. *Waste Water Treatment*. Oxford and IBH Publishing Co. Pvt. Ltd.
12. Raven, P.H., Hassenzahl, D.M. & Berg, L.R. 2012. *Environment*. 8th edition. John Wiley & Sons.
13. Rosencranz, A., Divan, S., & Noble, M.L. 2001. *Environmental law and policy in India*. Tripathi 1992.
14. Sengupta, R. 2003. *Ecology and economics: An approach to sustainable development*. OUP.
15. Singh, J.S., Singh, S.P. and Gupta, S.R. 2014. *Ecology, Environmental Science and Conservation*. S. Chand Publishing, New Delhi.
16. Sodhi, N.S., Gibson, L. & Raven, P.H. (eds). 2013. *Conservation Biology: Voices from the Tropics*. John Wiley & Sons.
17. Thapar, V. 1998. *Land of the Tiger: A Natural History of the Indian Subcontinent*.
18. Warren, C.E. 1971. *Biology and Water Pollution Control*. WB Saunders.
19. Wilson, E.O. 2006. *The Creation: An appeal to save life on earth*. New York: Norton.
20. World Commission on environment and Development. 1987. *Our Common Future*. Oxford University Press.
21. www.nacwc.nic.in
22. www.opcw.org

Open Elective Course

Course Name:	Introduction to Language Culture and Society
Course Code:	EN - 111
Credits:	02
Level:	Undergraduate

Unit 1 Language as a System; Design Features; Language and Culture; Language, Gender and Identity; Language Myths

Unit 2 Social Functions of Language; Language: Standard and Vernacular; Language, Dialects, Sociolect, and Registers; Language Acquisition Theories; Bilingualism and Multilingualism; Code Switching and Code Mixing;

Unit 3 Language Families of India; Language policy and planning in India; Language and Constitutional Provisions; English in India

Suggested Readings:

1. **Crystal, David.** 2010. *The Cambridge Encyclopedia of Language*. Third Edition. Cambridge University Press.
2. **Fasold, Ralph. W.** (1990) *The Sociolinguistics of Language*, Oxford: Blackwell.
3. **Fromkin, Victoria, Robert Rodman, & Nina Hyams.** 10th Edition. *An Introduction to Language*. Cengage Learning.
4. **Hudson, R. A.** (2011). *Sociolinguistics*. Cambridge. Cambridge University Press 2nd Edition.
5. **Lyons, John** (the 15th Edition reprinted 2014) *Language and Linguistics: An Introduction*, Cambridge University Press.

BT104 Biomolecules Lab

1. Preparation of Buffers- Citrate /Phosphate/acetate
2. Qualitative estimation of carbohydrates
3. Qualitative estimation of proteins/amino acids
4. Qualitative estimation of lipids & fats
5. Iodine test for polysaccharides
6. DNA estimation
8. RNA estimation
9. [Acid-Base Titration](#)