

CURRICULUM

For

UNDERGRADUATE DEGREE COURSE IN

BASIC SCIENCES

B.Sc. (PSM)

(First Year)

[Proposed from 2018-19]



IIMT UNIVERSITY
MEERUT

IIMT University, Meerut

FIRST YEAR, SEMESTER-I
STUDY & EVALUATION SCHEME

<i>S. No.</i>	<i>Course Code</i>	<i>Course Name</i>	<i>Periods</i>			<i>Credit</i>	<i>Evaluation Scheme</i>		
			<i>L</i>	<i>T</i>	<i>P</i>		<i>Internal</i>	<i>External</i>	<i>Total</i>
1	BSM-101	Calculus	4	1	-	4	30	70	100
2	BSP-101	Optics	4	1	-	4	30	70	100
3	BSS-101	Probability & Statistical Methods-I	4	1	-	4	30	70	100
4	SEC-101	Fundamentals of computers	3	-	-	3	25	50	75
5	FC-111	Functional & Communicative English-I	3	-	-	3	30	70	100
6	BSP-111P	Basic Physics Lab	-	-	2	2	25	50	75
7	SEC-111P	Computer Lab-I	-	-	2	2	25	50	75
8	ECC-111/112/113/114	Skill Enhancement Course			2	4	-	100	100
		Total	18	3	6	26	195	530	725

FIRST YEAR, SEMESTER-II
STUDY & EVALUATION SCHEME

S. No.	Course Code	Course Name	Periods			Credit	Evaluation Scheme		
			L	T	P		Internal	External	Total
1	BSM-201	Differential Equations and Integral Transform	4	1	-	4	30	70	100
2	BSP-201	Quantum Mechanics and Laser	4	1	-	4	30	70	100
3	BSS-201	Probability & Statistical Methods-II	4	1	-	4	30	70	100
4	SEC-201	Fundamentals of computers-II	3	-	-	3	25	50	75
5	AEC-202	Environmental Science	3	-	-	3	25	50	75
6	FC-211	Functional & Communicative English-II	3	1	-	3	30	70	100
7	BSP-222	Physics Lab-II	-	-	2	2	25	50	75
8	SEC-222	Computer Lab-II	-	-	2	2	25	50	75
9	ECC-211/212/213/214	Skill Enhancement Course			2	4	100		100
		Total	21	4	6	29	320	480	800

SEMESTER-I

[L= Lecture, T = Tutorials, P = Practicals & C = Credits]

BSM-101	CALCULUS	4L:1T:0P	4 Credits
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UNIT I (L-8)

$\epsilon - \delta$ definition of the limit of a function, Continuous functions and classification of discontinuities, Differentiability, Chain rule of differentiability, Rolle's theorem, First and second mean value theorems, Taylor's theorems with Lagrange's and Cauchy's forms of remainder,

UNIT II (L-8)

Successive differentiation and Leibnitz's theorem, Partial differentiation, Euler's theorem, Change of variables. Jacobians, Approximation of errors.

UNIT III (L-8)

Expansion of functions (in Taylor's and Maclaurin's series), indeterminate forms, Maxima and Minima (for functions of two variables), Tangents and Normals (polar form only),

UNIT IV (L-8)

Curvature, Envelopes and evolutes, Asymptotes, Tests for concavity and convexity, Points of inflexion, multiple points, Tracing of curves in Cartesian and polar co-ordinates

UNIT V (L-8)

Reduction formulae, Rectification, Volumes and surfaces of solids of revolution, theorem, Double and triple integrals, Change of order of integration, Beta and Gamma functions, Dirichlet's and Liouville's integral formulae.

Course Outcome:

After completing the course, students should be able to understand:

1. Basics of limit and continuity of a function.
2. Basics of differentiability and its properties.
3. Applications of Differential in different Aspects.
4. Double and triple integrations and related functions.

Books Recommended

1. *H. Anton, I. Bivens and S. Davis, Calculus, John Wiley and Sons, Inc., 2011.*
2. *G.B. Thomas and R.L. Finney, Calculus, Pearson Education, 2007.*

BSP-101	Optics	4L:1T:0P	4 Credits
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UNIT I (L-8)

Geometrical Optics: Cardinal Points of a Coaxial Optical System, general relationship, thick lens, combination of two thin lenses, nodal slide and Newton's formula, Huygen's and Ramsden's eyepieces. Aberration in images: Chromatic aberration, achromatic combination of lenses in contact and separated lenses, Monochromatic aberration and their reduction.

UNIT II (L-8)

Wave Optics: Theories of Light, Electromagnetic Nature of Light Definition of a Wave Front, Propagation of a Wave Front, Huygens Principle of Secondary Wavelets.

Interference: Division of Amplitude and Division of Wave front, Young's Double Slit Experiment, Lloyd's Mirror and Fresnel's Biprism, Phase Change on Reflection: Stoke's treatment, Interference in Thin Films: Parallel and Wedge-shaped Films, Newton's Rings: Measurement of Wavelength and Refractive Index.

UNIT III (L-8)

Michelson's Interferometer: (1) Idea of form of fringes (No Theory required), (2) Determination of Wavelength, (3) Wavelength Difference, (4) Refractive Index of thin transparent film, (5) Standardization of Meter and (6) Visibility of Fringes, Intensity distribution in multiple beam interference Fabry – Perot.

UNIT IV (L-8)

Fresnel diffraction: Fresnel diffraction, intensity due to cylindrical wavefront by Fresnel half period zones method, Zone plate, straight edge, rectilinear propagation.

Fraunhofer diffraction: Diffraction at a slit, the intensity distribution, Rayleigh criterion, resolving power of telescope and microscopic systems.

UNIT V (L-8)

Diffraction gratings: Diffraction at N parallel slits intensity distribution, plane diffraction grating, reflection grating, blazed gratings, Concave grating and different mountings,

Resolving power of a grating and comparison with resolving powers of prism.

Books Recommended

1. *Fundamentals of Optics* by Francis Arthur Jenkins & Harvey Elliott White (McGraw-Hill, 76).
2. *Optics* by Ajoy Ghatak (Tata McGraw Hill, 2008).
3. *Optics* by Eugene Hecht and A R Ganesan (Pearson Education, 2002).
4. *Light and Optics: Principles and Practices* by Abdul Al-Azzawi (CRC Press, 2007).
5. *Contemporary Optics* by A. K. Ghatak & K. Thyagarajan.(Plenum Press,1978).
6. *Introduction to Optics* by Khanna and Gulati.

BSS-101	Probability and Statistical Methods-I	4L:1T:0P	4 Credits
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Unit-1**(09 Lectures)**

Statistical Methods: Definition and scope of Statistics, concepts of statistical population and sample. Data: quantitative and qualitative, attributes, variables, scales of measurement- nominal, ordinal, interval and ratio. Presentation: tabular and graphical, including histogram and ogives, consistency.

Unit 2**(09 Lectures)**

Measures of Central Tendency: mathematical and positional. Measures of Dispersion: range, quartile deviation, mean deviation, standard deviation, coefficient of variation, Moments, absolute moments, factorial moments, skewness and kurtosis, Sheppard's corrections.

Unit 3**(09 Lectures)**

Bivariate data: Definition, scatter diagram, simple, partial and multiple correlation (3variables only),rank correlation. Simple linear regression, regression coefficient and their properties.

Unit 4**(09 Lectures)**

Probability: Introduction, random experiments, sample space, events and algebra of events. Definitions of Probability–classical, statistical, and axiomatic. Conditional Probability, laws of addition and multiplication, independent events.

Unit 5**(09 Lectures)**

Theorem of total probability, Bayes' theorem and its applications. Principle of least squares and fitting of polynomials and exponential curves. Independence of data with special reference to attributes.

Books Recommended

1. Goon A.M.,Gupta M.K. and Dasgupta B.(2002):Fundamentals of Statistics,Vol.I &II,8th Edn.The World Press, Kolkata.
2. Miller, Irwin and Miller, Marylees (2006): John E. Freund's Mathematical Statistics with Applications, (7thEdn.), Pearson Education, Asia.
3. Mood, A.M. Graybill, F.A. and Boes, D.C. (2007): Introduction to the Theory of Statistics, 3rdEdn.,(Reprint),Tata McGraw-Hill Pub. Co. Ltd.

SEC-101	Fundamental of Computers-I	3L:0T:0P	3 Credits
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UNIT I (L-8)

Knowing computer: What is Computer, Basic Applications of Computer; Components of Computer System, Central Processing Unit (CPU), VDU, Keyboard and Mouse, Other input/output Devices, Computer Memory, Concepts of Hardware and Software; Concept of Computing, Data and Information; Applications of IECT; Connecting keyboard, mouse, monitor and printer to CPU and checking power supply. Operating Computer using GUI Based

UNIT II (L-8)

Operating System: What is an Operating System; Basics of Popular Operating Systems; The User Interface, Using Mouse; Using right Button of the Mouse and Moving Icons on the screen, Use of Common Icons, Status Bar, Using Menu and Menu-selection, Running an Application, Viewing of File, Folders and Directories, Creating and Renaming of files and folders, Opening and closing of different Windows; Using help; Creating Short cuts, Basics of O.S Setup; Common utilities.

UNIT III (L-13)

Understanding Word Processing: Word Processing Basics; Opening and Closing of documents; Text creation and Manipulation; Formatting of text; Table handling; Spell check, language setting and thesaurus; Printing of word document. Using Spread Sheet: Basics of Spreadsheet; Manipulation of cells; Formulas and Functions; Editing of Spread Sheet, printing of Spread Sheet. Introduction to Internet, WWW and Web Browsers: Basic of Computer networks; LAN, WAN; Concept of Internet; Applications of Internet; connecting to internet; What is ISP; Knowing the Internet; Basics of internet connectivity related troubleshooting, World Wide Web; Web Browsing software's, Search Engines; Understanding URL; Domain name; IP Address; Using e-governance website

UNIT IV (L-6)

Communications and collaboration: Basics of electronic mail; Getting an email account; Sending and receiving emails; Accessing sent emails; Using Emails; Document collaboration; Instant Messaging; Netiquettes.

UNIT V (L-13)

Making Small Presentation: Basics of presentation software; Creating Presentation; Preparation and Presentation of Slides; Slide Show; Taking printouts of presentation / handouts.

Books Recommended

1. *Introduction to computer Science, IITL Education solution Limited, R&D Wing, PEARSON Education, and Edition 2004*
2. *Rajaraman V. – Fundamental of Computers, Prentice Hall of India Pvt. Ltd., New Delhi – 2nd edition, 1996.*

FC-111	Functional & Communicative English-I	4L:1T:0P	4 credits
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Unit-I- Functional Grammar**(L-8)**

- **Parts of speech**
- Nouns –Kinds, Number, Gender, Noun and Case
- Adjectives—Kind, Comparative degrees, Formation of adjectives
- Pronouns---Types
- Verbs: Irregular verbs, Three forms of verbs, Auxiliary verbs, Modal auxiliaries
- Adverbs-Types
- Prepositions
- Conjunctions
- Interjections
- Articles
- Time, Tense and Aspect

*Resources--- *Explanation and Grammar Worksheets***UNIT–II Vocabulary****(L-8)**

- One word substitute Compound Words
- Use of Suffix/Prefix
- Synonymous

*Resources---*Paraphrase, *Editing *Understanding of context, *Worksheets***UNIT-III Spoken English****(L-8)**

- **Extempore:** What is an extempore speech? How to prepare for an extempore speech. Nuances to Extempore speech.
- **Debates:** Types of Debate, Importance of Debate, Debate rules, Debate format, Nuances of Debate with rebuttal strategy.

Resources--- a Conversational situation to be provided to develop, *Topics to be given to speak on recent issues based on contemporary situation.***UNIT-IV Soft skills****(L-8)**

- **Kinesics :** Introduction, What is Body Language ,
- Major components of Body Language,
- Features of Body Languages,
- Importance of Body Language,
- Proxemics: Distances (Intimate Distance, Personal Distance, Social Distance, Public Distance),

UNIT-V Written English

(L-8)

- Do's/dont's of writing
- Application: Application to dean, application for leave, application to bank Manager to sanction loan for education.

Books prescribed :

1. Oxford Guide to writing and speaking , John Seely, O.U.P
2. Effective Technical Communication, M. Asraf Rizvi, Tata McGraw Hill
3. English Grammar & composition,Wren & Martin

BSP 111	Basic Physics Lab	0L:0T:2P	2 Credits
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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 biquartz Polarimeter.
4. To determine Refractive index and dispersive power of a prism material by spectrometer.
5. To determine the resolving power of grating.
6. To determine the Resolving power of a telescope.
7. To study the angular divergence of He-Ne laser beam.
8. To determine the Coefficient of Thermal Conductivity of Copper by Searle's Method.
9. To determine the Coefficient of Thermal Conductivity of Copper by Angstrom's Method.
10. To determine the Coefficient of Thermal Conductivity of a bad conductor by Lee and Charlton's disc method.
11. To verify Stefan's law.

BSC-111	CHEMISTRY LAB - I	0L:0T:2P	2 Credits
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Note: Do all experiments from the following list

- Laboratory techniques.
- To analyse given inorganic mixture for two acid and basic radicals from following radicals
 - Basic Radicals:
 NH_4^+ , Pb^{2+} , Cu^{2+} , Bi^{3+} , Cd^{2+} , As^{3+} , Sb^{3+} , Sn^{2+} , Al^{3+} , Fe^{3+} , Cr^{3+} , Mn^{2+} , Zn^{2+} , Co^{2+} , Ni^{2+} , Ba^{2+} , Sr^{2+} , Ca^{2+} , Mg^{2+}
 - Acidic Radicals:
 CO_3^{2-} , S^{2-} , SO_3^{2-} , CH_3COO^- , NO_2^- , NO_3^- , Cl^- , Br^- , I^- , SO_4^{2-}
- Calibration of fractional weights, pipette and burette.
- Preparation of standard solutions, dilutions, 0.1M to 0.001M solution.
- Titrimetric Analysis:
 - To determine the percentage of available chlorine in the supplied sample of bleaching powder.
 - To determine the total hardness of water sample in terms of CaCO_3 by EDTA titration method using EBT indicator.
 - To determine the strength of given HCl solution by titration against NaOH solution using phenolphthalein as indicator.
 - To determine the chloride content in supplied water sample by using Mohr's method.
 - Determination of temporary hardness of water sample by O-Hehner's method.

SEC-111	Computer Lab-I	0L:0T:2P	2 Credits
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Windows

1. Create a new folder and do the following:
 1. Make a word document in it.
 2. Make an Excel document in it.
 3. Make a new folder in it
 4. Rename the initial folder
 5. Move, Copy & Delete the initial folder
2. Implement the various well known features of Windows operating system such as Notepad, WordPad, Paint, System tools, Entertainment etc. enclosed in Start→Programs→Accessories.
3. Implement various display properties by right clicking on the Windows Desktop.
4. Explore the taskbar of Windows.
5. Set the wall paper and screen saver.
6. Set the data/time.

MS-Word

1. Create a document and
 - a. Put Bullets and Numbers
 - b. Apply various Font parameters.
 - c. Apply Left, Right, and Centre alignments.
 - d. Apply hyperlinks
 - e. Insert pictures
 - f. Insert ClipArt
 - g. Show the use of WordArt
2. Create any document and show the use of File→versions.
3. Create any document and show the difference between paste and paste special.
4. Create a document to show the use of Washout/Watermark.
5. Implement the concept of mail merge.
6. Implement the concept of macros.
7. Implement the concept of importing a file/document.
8. Implement the concept of merging the documents.
9. Create a student table and do the following:
 - a. Insert new row and fill data
 - b. Delete any existing row
 - c. Resize rows and columns
 - d. Apply border and shading
 - e. Apply merging/splitting of cells
 - f. Apply sort
 - g. Apply various arithmetic and logical formulas.
10. Create your resume using General Templates.

Skill Enhancement Course

Once upon a time, people thought it was possible to qualify for a job and then just do that job forever without having to learn more. This was probably never really true...but it is DEFINITELY NOT true now! The technical skills and knowledge needed for work are changing all the time now and everyone need to be learning throughout their careers to stay relevant and competitive.

Learning is skills enhancement – and skills enhancement will help you to get employed and stay employed. Skills Enhancement is all about getting the skills you need to succeed in the work you want to do. Some jobs require specific technical skills and specific education, accreditation or licensing – you will need to know what is required for kind of work you want.

At IIMTU the student will go through the following Skill Enhancement course structure,

S. No.	Course Name	Course Code	Max. marks
1.	Industrial Visits/ Seminars or Presentation on The Reports of The Visits.	ECC-111	25
2.	University Social Responsibility(USR)	ECC-112	25
3.	Spoken Tutorial Certification	ECC-113	25
4.	MOOCS(Swayam)	ECC-114	25

1. Industrial Visits/ Seminars or Presentation on the reports of the visits;

In this section the presentation skills on the basis of observation and learning will be developed and evaluated. Student will be expected to give presentation in the department interpreting the report of his/her industrial visit organized by his department during semester. Participation in the seminars organized in the department will also be considered and evaluated in this section.

2. University Social Responsibility(USR);

Social responsibility describes the way we are making a difference to the social and economic well-being of our communities through our teaching, research, and public events and activities.

We strive to make a positive difference to the life and future of our region by taking socially responsible decisions that have real, beneficial, measurable impacts on the people and the world around us.

The aim of USR should be;

- Increasing the university's impact within society and contributing to tackling societal challenges increasing public understanding of the university's research
- Increasing cooperation with industry or public bodies
- Increasing the impact of university research on the social and cultural life of the local
- Community promoting university participation in policy-making
- Potential helping to align the university with trends in policy and funding

To meet the mentioned challenges a variety of activities can be carried out. Some of the points are listed below.

- Collaboration with companies, public services or NGOs in social projects to help the disadvantaged
- Sensitizing, educational campaigns on social responsibility in areas of influence which are close to the university
- Collaboration with public services and NGOs in sustainable initiatives
- Sensitizing educational campaigns on environmental protection in areas of influence which are close to the university
- Organization and sponsoring of performances committed to both local and regional socioeconomic development
- Organization of volunteering programs for students, professors and staff
- Scientific research on social problems and the knowledge generation
- Application of scientific knowledge to the development of new environment-friendly products, technologies and processes
- Integrating values such as respecting individual and social
- Education in environmental values
- University awareness of environmental problems and Vocational training to solve environmental problems

In this section the performance of the student will be evaluated on the basis of his/her participation and work carried out towards USR.

3. Spoken Tutorial Certification;

Salient features of the Spoken Tutorial project are

- Spoken Tutorial is a 10 minute audio-video tutorial on IT topics.
- The objective of the Spoken Tutorial project is to improve the employment potential of our students by teaching them IT skills

- The Spoken Tutorial project is funded by the National Mission on Education through ICT, MHRD.
- There are about 630 original spoken tutorials, created in English
- Spoken Tutorials cover many useful IT topics, such as Basic IT Literacy, Tux Typing, KTurtle, C, C++, Java, PHP, Linux, Scilab, Python, OpenFOAM, PERL, Ruby, LibreOffice, Blender, GeoGebra, Jmol, GChemPaint and Inkscape.
- These videos are dubbed into all 22 Indian languages. In each of the following languages, we have more than 100 tutorials: Assamese, Bengali, Gujarati, Hindi, Kannada, Malayalam, Marathi, Nepali, Punjabi, Sanskrit, Tamil, Telugu and urdu. Including the dubbed tutorials, there is a total of 4200 videos.
- Spoken Tutorials are created for self learning - achieved through novice check of the script.
- The usage of language dubbed Spoken Tutorials is increasing, with the large scale acceptance of this method by ITIs, who entered our fold about six months ago. We have already trained more than 4,00,000 ITI students through this methodology. The local language use is expected to increase further when the Government Schools start using this methodology.

4. MOOCS (Massive Open Online courses);

A massive open online course (MOOC) is an online course aimed at unlimited participation and open access via the web. In addition to traditional course materials such as filmed lectures, readings, and problem sets, many MOOCs provide interactive courses with user forums to support community interactions among students, professors, and teaching assistants (TAs) as well as immediate feedback to quick quizzes and assignments.

The certification courses recommended are tabulated below;

PHP, My SQL / Perl	Engg. (Degree & Diploma) (CS & IT), BCA, MCA, B.Sc. (CS)
C/C++, Java, Netbeans & Python	CS / IT - Engg., BCA, MCA, B.Sc. (CS)
Linux	Diploma - CS / IT, BCA, B.Sc (CS)
Science Lab. & OSCAD (Free EDA)	B.Tech. & Poly. (EC, EE, CE, ME)
Latex & Firefox	B.Ed & BTC B.Sc. Nursing B.Sc. Home Science B.Sc. (All Streams) B.Com.
GIMP, Q - CAD	B.Arch. / BFT (Proposed (2018-2019))
Cell Designer	B.Sc. Biotech. B.Sc. Microbiology

G. Chem. Paint & J Mol app	B.Sc. Chem. B. Pharma M. Pharma M.Sc. Chem.
Inks cape & Blender	BJMC
Java Business app.	Librarians
Math	B.Sc. (Maths)

SEMESTER-II

[L= Lecture, T = Tutorials, P = Practicals & C = Credits]

BSM-201	Differential Equations and Integral Transforms	4L:1T:0P	4 Credits
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Unit 1**(09 Lectures)**

Formation of a differential equation (D.E.), Degree, order and solution of a D.E., Equations of first order and first degree : Separation of variables method, Solution of homogeneous equations, linear equations and exact equations, Differential equations of the first order but not of the first degree, Clairaut's equations and singular solutions, Orthogonal trajectories.

Unit 2**(09 Lectures)**

Linear differential equations of nth order with constant coefficients, Homogeneous linear differential equations, Simultaneous linear differential equations with constant coefficients, Linear differential equations of the second order (including the method of variation of parameters),

Unit 3**(09 Lectures)**

Series solutions of second order differential equations, Legendre and Bessel functions (P_n and J_n only) and their properties Order, degree and formation of partial differential equations,

Unit 4**(09 Lectures)**

Partial differential equations of the first order, Lagrange's equations, Charpit's general method, Linear partial differential equations with constant coefficients, Partial differential equations of the second order, Monge's method.

Unit 5**(09 Lectures)**

The concept of transform, Integral transforms and kernel, Linearity property of transforms, Laplace transform, Inverse Laplace transform, Convolution theorem, Applications of Laplace transform to solve ordinary differential equations.

Books Recommended

1. Shepley L. Ross, Differential Equations, 3rd Ed., John Wiley and Sons, 1984.
2. I. Sneddon, Elements of Partial Differential Equations, McGraw-Hill, International Edition, 1967.

BSP-201	Quantum Mechanics and Laser	4L:1T:0P	4 Credits
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UNIT – I (09 Lectures)

Basic concept of Classical Mechanics: Mechanics of particle, Mechanics of System of Particles, constraints, Holonomic and Non Holonomic constraints, Virtual work, Alembert's Principle, Lagrange's equations, Simple Application of Lagrange's formulation- Linear Harmonic Oscillator, simple Pendulum.

UNIT – II (09 Lectures)

Quantum Theory: Origin of Quantum theory, Black body Radiations, Distribution of energy in the Spectrum of black body Radiation, Photoelectric effect, Laws of photoelectric emission, Ritz combination principle, Planck's radiation.

UNIT – III (09 Lectures)

De Broglie's Wave and Uncertainty Principle: Inadequacy of classical mechanics, Two slit experiment, Superposition Principle, Wave particle dualism for light and matter, De Broglie's Wave, De Broglie's model of the atom, Davisson-Germer experiment, Wave Velocity and group velocity, Heisenberg uncertainty Principle, Application of uncertainty Principle.

UNIT – IV (09 Lectures)

Schrodinger Equation and its Application: Concept of Wave function " Ψ ", Schrodinger Equations- Time dependent form, Expectation Value, Operators, Time Independent Schrodinger equation (Steady State form), Particle in one dimensional box, energy Quantization, Wave function.

UNIT – V (09 Lectures)

Lasers: Spontaneous and Stimulated emissions, Metastable states, Einstein's A and B coefficients, Optical Pumping and Population Inversion, Three-Level and Four-Level Lasers, Ruby Laser and He- Ne Laser.

Text and Reference Books

1. Classical Mechanics – Herbert Goldstein.
2. Classical Mechanics – J.C. Upadhayaya.
3. Classical Mechanics – Gupta – Kumar (Pragati publication).
4. Perspective of Modern Physics – Bezier.
5. Quantum Mechanics – Robert Eisberg.
6. Modern Physics – J. B. Rajam.
7. Quantum Mechanics – B. S. Rajput.
8. Elements of Quantum Mechanics – Kamal Singh-S.P. Singh.

BSS-201	Probability and Statistical Methods- II	4L:1T:0P	4 Credits
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Unit 1**(09 Lectures)**

Random experiment, trial, sample point and sample space, events, operations of events. Concepts of equally likely, mutually exclusive and exhaustive events. Definition of probability: Classical, relative frequency and axiomatic approaches. Discrete probability space, properties of probability under set theoretic approach. Independence of events, Conditional probability, total and compound probability theorems, Bayes theorem and its applications.

Unit 2**(09 Lectures)**

Random variables - discrete and continuous. probability mass function (pmf) and probability density function (pdf), Cumulative distribution function (cdf). Joint distribution of two random variables, marginal and conditional distributions.

Unit 3**(09 Lectures)**

Independence of random variables. Expectation of a random variable (rv) and its properties, expectation of sum of random variables and product of independent random variables, conditional expectation and related problems.

Unit 4**(09 Lectures)**

Moments, moment generating function (m.g.f.) & their properties, continuity theorem for m.g.f. (without proof). Cumulants and c.g.f., characteristics function (definition only).

Unit 5**(09 Lectures)**

Chebyshev's inequality. Weak law of large numbers and Central Limit Theorem for a sequence of independently and identically distributed random variables and their applications (statement only).

Books Recommended

1. Goon A.M., Gupta M.K. and Dasgupta B. (2002): Fundamentals of Statistics, Vol. I & II, 8th Edn. The World Press, Kolkata.
2. Miller, Irwin and Miller, Marylees (2006): John E. Freund's Mathematical Statistics with Applications, (7th Edn.), Pearson Education, Asia.
3. Mood, A.M. Graybill, F.A. and Boes, D.C. (2007): Introduction to the Theory of Statistics, 3rd Edn., (Reprint), Tata McGraw-Hill Pub. Co. Ltd.
4. Gupta, S.C. and Kapoor, V.K. : Fundamentals of Mathematical Statistics, Sultan Chand and Sons, New Delhi.

SEC-201	Fundamentals of computers-II	4L:1T:0P	4 Credits
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UNIT 1.

Types of computer languages:- Machine Language, Assembly Language and High Level Language, Concept of Assembler, Compiler, Loader and Linker. Number system : Binary, octal and hexadecimal number systems, their mutual conversions, Binary arithmetic, , Operators and expression using numeric and relational operators, operator precedence and associativity

UNIT 2.

Approaches to Problem Solving, Concept of algorithm and flow charts. Fundamental data types, Storage classes- automatic, register, static and external. History and Importance of C ,Basic Structure and execution of C programmes, Constants, Variables, and Data Types and various type of declarations

UNIT 3.

Conditional Statements: if statement and nesting if and if-else statement, Switch statement. Program loops and iterations: use of while, do while and for loops, multiple loop variables, use of break and **continue statements.**

UNIT 4.

Arrays: Array notation and representation, manipulating array elements, using multi dimensional arrays. Defining Structure, Declaring Structure Variable and Accessing Structure Members, Initialization of Structure, union, enumerated data types, Definition of Functions, Function calls and arguments and corresponding return values, recursive functions

UNIT 5

Use of Computer in E-Commerce Data Processing, Files and Records, File Organization (Sequential,Direct/Random, Index) Computer Applications in Business – Need and Scope Computer Applications in various fields of Commerce, Cryptography, Firewall, Internet Security, Privacy Ethical Issues & Cyber Law.

Text Book: 1. Introduction to computer Science, ITL Education solution Limited, R&D Wing, PEARSON Education, Edition 2004.

2. Let Us C Of Yashwant Kanetkar 11th Edition, 2016.

Reference Book: 1. Rajaraman V. – Fundamental of Computers, Prentice Hall of India Pvt. Ltd., New Delhi – 2nd edition, 1996.

2. Programing in Ansi c by E Balagurusamy.

3. Behrouz A. Frouzan: Cryptography and Network Security, Tata McGraw Hill

4. Bernard Menezes, " Network Security and Cryptography", Cengage Learning.

AEC-202	Environmental Science	4L:1T:0P	4 Credits
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UNIT I [08 Hrs]

Environment and Natural Resources : Definition, scope, importance and need for public awareness, Natural Resources - Forest, water, mineral, energy, food, land resources and their conservation, Material cycle - Nitrogen, carbon, sulphur cycle, human activities and environment, Sustainable development.

UNIT II [08 Hrs]

Ecology and Ecosystem: Concept of ecology, classification and application, Concept of ecosystem, structure, functioning and energy flow, important ecosystem such as forest, desert, pond grassland and marine etc., Food web, food chain, ecological pyramids, ecological succession.

UNIT III [08 Hrs]

Bio-diversity: Concept, classification, value of biodiversity, biodiversity at global and national level. Hot spot of biodiversity, Threat to biodiversity, India as a mega biodiversity centre, Endangered and endemic species of India, Conservation of biodiversity (ex-situ and in-situ).

UNIT IV [10 Hrs]

Environment Pollution: Environment pollution - Water, air, soil, noise, thermal, marine, solid waste, nuclear pollution etc. Global environmental problem - Green house effect, global warming, Ozone hole, Deforestation, acid rain, water an air borne diseases etc. Natural disaster - Earthquake, Tsunami, Floods, Cyclone, Landslides, Volcanic eruptions etc, Case study - Bhopal Gas Tragedy, Chernobyl nuclear disaster, London and photochemical smog etc.

UNIT V [10 Hrs]

Environment Protection: Role of government in environmental protection, Ministry of environment and forestry, water act 1974, Air act 1981, wildlife act 1972, forest act 1988, Environment protection act 1986 etc. EIA, Role of environmental education in environmental protection, Role of NGO in environmental protection. Man and Biosphere Program (MAB), Environmental organizations and agencies in India such as CPCB, CSE, CEE, NEERI etc., Global efforts for environmental protection - International conventions and protocols, Stockholm conference 1972; Montreal protocol 1987, Earth Summit 1992, Kyoto protocol 1997 etc., Case study - Chipko movement, Silent valley project, Narmada Bachao Andolan, Bishnoi community etc.

Text Books:

1. Ecology and environment by Dr. P.D. Sharma
2. Essential of environment and ecology by Dr.S.V.S Rana
3. Environmental chemistry by Dr.A.K. de
4. Environmental geography by Dr.Savindra Singh .

Reference Books:

- Principles of Environmental Science and Engineering - P. Venugopala Rao, Prentice Hall of India.
Environmental Science and Engineering - Meenakshi, Prentice Hall India.

FC-211	Functional & Communicative English-II	4L:1T:0P	4 Credits
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Unit-1--Functional Grammar

- Structures-Sentence, Types,
- Structural Classification of sentences ,
- Phrases, Types,
- Active/Passive Speech
- Direct/Indirect narration,
- Subject -verb Agreement{ Error Correction }

Resources--- *Explanation and Grammar Worksheets

Unit-2 Vocabulary

- Word formation/transformation
- Homonyms
- Frequent use of Phrases/idioms
- Foreign words and Phrases
- Correction of spelling

*Resources---**Paraphrase, *Editing *Understanding of context ,*Worksheets

Unit 3-Communication skills

- Meaning of communication,
- Process of communication,
- language of tool of communication,
- Difference between General and Professional communication,
- Types of Communication: Formal and informal communication, Oral and written communication, Verbal and Non-Verbal communication,
- Significance of Communication,
- Barrier to communication

Unit 4- Spoken English

- **Elaborate quotations** :Quote interpretation , Answering a telephone call, Making enquiries, General tips- Pronunciation, Tone, Pitch, Pace, Volume, relevance, brief, simple Reading Newspaper, sentence starter for explainingquotes,quote analysis worksheet.
- **Speak on proverbs:** Usage andSpeech on famous proverbs,

Resources--- * a Conversational situation to be provided to develop, *Topics to be given to speak on recent issues based on contemporary situation.

Unit 5-Written English

- Formal/informal styles of writing
- Letters: Formal and Informal letter
- Resume Writing

BSP-222	Physics Lab-II	0L:0T:2P	2 Credits
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Note: Select any ten experiments from the following list:

1. To determine Ionisation potential of a gas (Soft valve).
2. Determine the viscosity coefficient of water.
3. To determine the Ionization Potential of mercury.
4. V-I characteristic of the diode and zener diode 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.

SEC-222	Computer Lab-II	0L:0T:2P	2 Credits
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Note: Do all Programs from the following list:

1. WAP that calculates the Simple Interest and Compound Interest. The Principal , Amount, Rate of Interest and Time are entered through the keyboard
2. WAP that accepts the temperature in Centigrade and converts into Fahrenheit using the formula $C/5=(F-32)/9$.
3. WAP to find the greatest of three numbers.
4. WAP that swaps values of two variables using a third variable
5. WAP that finds whether a given number is even or odd.
6. WAP that tells whether a given year is a leap year or not.
7. WAP to find the factorial of a given number.
8. WAP to print sum of even and odd numbers from 1 to N numbers.
9. WAP to print the Fibonacci series.
10. WAP to check whether the entered number is prime or not.
11. WAP to find the sum of digits of the entered number.
12. WAP to find the reverse of a number.
13. WAP to add and multiply two matrices of order nxn.
14. WAP that finds the sum of diagonal elements of a mxn matrix.
15. WAP to implement strlen (), strcat (),strcpy () using the concept of Functions.