VII-Semester

Mathematical Physics			
Course Code	**21BSP71**	CIE Marks	50
Teaching Hours/Week (L:T:P: S)	2:2:0:1	SEE Marks	50
Total Hours of Pedagogy	40	Total Marks	100
Credits	03	Exam Hours	03 Hours

Course Objectives:

1. To understand the necessary differential calculus essential to explain physical concepts.
2. To apprehend the required integral calculus essential to describe the physical concepts.
3. To understand the special functions and their applications.

Teaching-Learning Process (General Instructions)

These are sample Strategies; which teacher can use to accelerate the attainment of the various course outcomes.

1. Apart from conventional lecture methods various types of innovative teaching techniques through videos, animation films may be adopted so that the delivered lesson can progress the students in theoretical, applied and practical skills in physics.
2. Seminars and Quizzes may be arranged for students in respective subjects to develop skills.
3. Encourage the students for group learning to improve their creativity and analytical skills.
4. While teaching show how every concept can be applied to the real world. This helps the students to expand understanding level.
5. Support and guide the students for self-study.
6. Ask some higher order thinking questions in the class, which promotes critical thinking.
7. Inspire the students towards the studies by giving new ideas and examples.

Module-1

Partial Differential Equations: **08 hours**

Solutions to partial differential equations, using separation of variables: Laplace's Equation in problems of rectangular, cylindrical and spherical symmetry. Wave equation and its solution for vibration modes of a stretched string, rectangular and circular membranes. Diffusion Equation, Heat Equation, Poisson's Equation, Schrodinger's Wave Equation.

Pedagogy	Chalk and talk, Power point presentation, Videos **Self-study Component:** Introduction to partial differential equations and their solutions.

Module-2

Vector Calculus: **08 hours**

Differentiation of vectors, Integration of Vectors, Vector functions of Several Arguments, Scalar and Vector Fields, Vector Operators: Gradient of a scalar field, Divergence of a vector field ,Curl of a vector field and their applications, Vector Operator Formulae : Vector operators acting as sum and products, Combination of Grad, Div and Curl, Cylindrical and Spherical polar coordinates, General curvilinear coordinates.

Pedagogy	Chalk and talk, Power point presentation, Videos **Self-study Component:** Introduction to vectors, differentiation and integration of vectors.

Module-3

Fourier Series and Fourier Transforms: **08 hours**

Fourier Series: Dirichlet's Conditions, Fourier Co-efficient, Even-Odd Functions, Cosine and Sine Series, Half range series, Complex Fourier Series, Parseval's Theorem.

Fourier Transforms: The uncertainty Principle, Fraunhofer diffraction, Properties of Fourier Transforms, Applications of Fourier Transforms for boundary value problems.

Pedagogy	Chalk and talk, Power point presentation, Videos **Self-study Component: Fourier series and Fourier transforms**

Module-4

Line, surface and volume integrals: **08 hours**

Line integrals, Evaluating line integrals; physical examples; line integrals with respect to a scalar. Connectivity of regions, Green's theorem in a plane, Conservative fields and potentials, Surface integrals: Evaluating surface integrals; vector areas of surfaces; physical examples, Volume integrals: Volumes of three-dimensional regions, Integral forms for grad, div and curl, Divergence theorem, Green's theorems, Stokes Theorem and their physical applications.

Pedagogy	Chalk and talk, Power point presentation, Videos **Self-study Component: Introduction to Line integrals, surface integrals, and volume integrals.**

Module-5

Special functions: **08 hours**

Legendre functions, General solution for integer l, properties of Legendre polynomials, Spherical harmonics, Chebyshev functions, Bessel functions, General solution for non-integer ν; general solution for integer ν; properties of Bessel functions, Spherical Bessel functions, Laguerre functions, Hermite functions.

Pedagogy	Chalk and talk, Power point presentation, Videos **Self-study Component:** Legendre and Bessel functions.

Course outcome (Course Skill Set)

At the end of course the student will be able to:

1. Apply the partial differential equations to describe physical phenomena.
2. Implement vector calculus in physics.
3. Apply Fourier series and transforms in Physics.
4. Implement the types of integrals to explain the concepts in physics.
5. Summarize the various special functions required in physics.

Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 40% of the maximum marks (20 marks). A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures not less than 35% (18 Marks out of 50)in the semester-end examination(SEE).

Continuous Internal Evaluation:

Three Unit Tests each of **20 Marks (duration 01 hour**)

1. First test at the end of 5th week of the semester
2. Second test at the end of the 10th week of the semester
3. Third test at the end of the 15th week of the semester

Two assignments each of **10 Marks**

4. First assignment at the end of 4th week of the semester
5. Second assignment at the end of 9th week of the semester

Group discussion/Seminar/quiz any one of three suitably planned to attain the COs and POs for **20 Marks** (**duration 01 hour**)

6. At the end of the 13th week of the semester

The sum of three tests, two assignments, and quiz/seminar/group discussion will be out of 100 marks and will be **scaled down to 50 marks**

(to have less stressed CIE, the portion of the syllabus should not be common /repeated for any of the methods of the CIE. Each method of CIE should have a different syllabus portion of the course).

CIE methods /question paper is designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course.

Semester End Examination:

Theory SEE will be conducted by University as per the scheduled timetable, with common question papers for the subject (**duration 03 hours)**

1. The question paper will have ten questions. Each question is set for 20 marks.
2. There will be 2 questions from each module. Each of the two questions under a module (with a maximum of 3 sub-questions), **should have a mix of topics** under that module.

The students have to answer 5 full questions, selecting one full question from each module.

Suggested Learning Resources:

Text books:

1. Mathematical Methods for Physics and Engineering, Riley, Hobson, Bense, 2nd Edition, Cambridge Low Price Edition, Cambridge university press,
2. Mathematical Physics V. Balakrishnan, Ane Books Pvt. Ltd.
3. Mathematical Physics, B D Gupta , Fourth Edition, Vikas Publishing house private limited.
4. Ancillary Mathematics, Volume II, P Balasubrahmanyam, KG Subramanian, Tata Mcgraw-Hill publishing company limited.
5. Differential Equations with Applications and Historical Notes, George F Simmons, Second Edition, Indian Edition, McGraw-Hill Education (India) Private Limited.
6. Mathematical Methods for Physicists – A Comprehensive Guide, Arfken, Weber, Harris, 7th Edition, Academic Press (Imprint of Elsevier)
7. Partial Differential Equations-An Introduction, Walter A. Strauss, John Wiley and Sons, Ltd.

Web links and Video Lectures (e-Resources):

1.https://youtu.be/vzAZ76dIR2E 2.https://youtu.be/ew3vYpIaM7Y 3.https://youtu.be/lmA4jWLmFvM 4.https://youtu.be/TgnaYFlnnCk 5.https://youtu.be/LYNOGk3ZjFM
Activity Based Learning (Suggested Activities in Class)/ Practical Based learning SciLAB, Octave https://nptel.ac.in https://swayam.gov.in

VII Semester

Classical Mechanics and Statistical Physics			
Course Code	21BSP72	CIE Marks	50
Teaching Hours/Week (L:T:P: S)	2:10:0	SEE Marks	50
Total Hours of Pedagogy	40	Total Marks	100
Credits	03	Exam Hours	03 Hours

Course Learning Objectives:

Understand the applications of classical mechanics including Newtonian, Lagrangian and Hamiltonian equations of motion to real physical systems.

Teaching-Learning Process (General Instructions)

These are sample Strategies, which teacher can use to accelerate the attainment of the various course outcomes.

1. Apart from conventional lecture methods various types of innovative teaching techniques through videos, animation films may be adopted so that the delivered lesson can progress the students in theoretical, applied and practical skills in physics
2. Seminars and Quizzes may be arranged for students in respective subjects to develop skills.
3. Encourage the students for group learning to improve their creativity and analytical skills.
4. While teaching show how every concept can be applied to the real world. This helps the students to expand understanding level.
5. Support and guide the students for self-study.
6. Ask some higher order thinking questions in the class, which promotes critical thinking.
7. Inspire the students towards the studies by giving new ideas and examples.

Module-1

Newtonian Mechanics: **08 hours**

Mechanics of system of particles: qualitative discussion of centre of mass, total angular momentum and total kinetic energy of system of particles, conservation laws of linear momentum, angular momentum and total energy. Motion in central field: equivalent one-body problem, reduced mass of the system, equation of motion. The Kepler Laws: inverse square law of force, scattering cross section, Rutherford's formula for scattering cross section, Kepler laws, equation for Kepler second law. Laboratory coordinate systems and transformations.

Pedagogy	Chalk and talk, Power point presentation, Videos **Self-study Component:** Qualitative discussion of center of mass

Module-2

Lagrangian formulation: **08 hours**

Constraints and their classification, degrees of freedom, generalised coordinates, principle of virtual work, D'Alemberts principle, Lagrange's equations of motion, simple applications.

Symmetries of space and time and their connection with conservation laws, cyclic coordinates, Hamilton's variational principle.

Hamiltonian formulation*:* Hamiltonian equations of motion from variational principle, Hamiltonian and its physical significance, applications of Hamiltonian formulation to harmonic oscillator and simple pendulum, (without support).

Canonical transformations**:** generating functions, poisons brackets and their properties, canonical equations in terms of poisons bracket notation, angular momentum poison bracket and invariance under canonical transformations.

Pedagogy	Chalk and talk, Power point presentation, Videos **Self-study Component:** Generalized coordinates and degrees of freedom

Module-3

Rigid body dynamics: **08 hours**

Angular momentum and kinetic energy of a rigid body, moment of inertia tensor, classification of rigid bodies as spherical, symmetric and asymmetric, Euler's equation of motion, motion of symmetric top.

Relativistic mechanics: Four dimensional formulations: four vectors, four velocities, four momentum and four accelerations, Lorentz covariant form of equation of motion.

Pedagogy	Chalk and talk, Power point presentation, Videos **Self-study Component: Angular momentum and kinetic energy of rigid body.**

Module-4

Basics of Thermo-dynamical and statistical concepts: **08 hours**

Phase space, ensembles, Ergodic hypothesis and Liouvlille's theorem, probability, probability distribution, most probable distribution. The probable distribution and partition function. Micro canonical, canonical and grand canonical ensembles, thermo dynamical potential and partition function, Partition function of system of particles.

Classical statistics: The translation Partition function, Gibbs paradox and Boltzmann equipartition theorem. Rotational

and vibrational partition function. Einstein relation and electronic partition function. Maxwell's-Boltzmann distribution function and its physical applications.

Pedagogy	Chalk and talk, Power point presentation, Videos **Self-study Component;** Phase space, ensembles

Module-5

Quantum statistics: **08 hours**

The symmetry and antisymmetric wave functions. Bosons and Fermions, Bose-Einstein and Fermi-Dirac distribution functions. Ideal Bose and Fermi gasses, their properties at high and low temperatures and densities.

Qualitative discussion of Bose-Einstein condensation, black body radiation and photons. The phonons and specific heat of solids.

Fluctuations: Fluctuations in canonical, grand canonical and Micro canonical ensembles. The Brownian motion and Langevin equation. Onsager reciprocity relations.

Pedagogy	Chalk and talk, Power point presentation, Videos **Self-study Component:** The symmetric and antisymmetric wave functions.

Course Outcomes:

At the end of the course the student will be able to:

1. Understand Newton's formulation the concept of single and many body problem conservation laws, motion in central field, application of Kepler's laws of motion to Solar system.
2. Apply Lagrangian and Hamiltonian equations of motion for real physical systems and understand the concept of canonical transformations.
3. Interpret the concept of rigid body dynamics and its equations of motion to apply for real physical systems and demonstrate the four dimensional Minkowski world.
4. Interpret, apply and analyze the concepts of thermos dynamical and statistical, averages for real Physical systems and classical, statistical mechanics.
5. Interpret, apply and analyze the concepts of quantum statistical mechanics for real physical systems.

Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 40% of the maximum marks (20 marks). A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures not less than 35% (18 Marks out of 50)in the semester-end examination(SEE).

Continuous Internal Evaluation:

Three Unit Tests each of **20 Marks (duration 01 hour**)

1. First test at the end of 5th week of the semester
2. Second test at the end of the 10th week of the semester
3. Third test at the end of the 15th week of the semester

Two assignments each of **10 Marks**

4. First assignment at the end of 4th week of the semester
5. Second assignment at the end of 9th week of the semester

Group discussion/Seminar/quiz any one of three suitably planned to attain the COs and POs for **20 Marks** (**duration 01 hours**)

6. At the end of the 13th week of the semester

The sum of three tests, two assignments, and quiz/seminar/group discussion will be out of 100 marks and will be **scaled down to 50 marks**

(to have less stressed CIE, the portion of the syllabus should not be common /repeated for any of the methods of the CIE. Each method of CIE should have a different syllabus portion of the course).

CIE methods /question paper is designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course.

Semester End Examination:

Theory SEE will be conducted by University as per the scheduled timetable, with common question papers for the subject (**duration 03 hours)**

1. The question paper will have ten questions. Each question is set for 20 marks.
2. There will be 2 questions from each module. Each of the two questions under a module (with a maximum of 3 sub-questions), **should have a mix of topics** under that module.

The students have to answer 5 full questions, selecting one full question from each module.

Suggested Learning Resources:

Text books:

1. Introduction to classical Mechanics-R G Takwale and P S Puranik (Tata Mcgraw Hill 1983 or new edition).
2. Classical Mechanics- H Goldstein (Addition Wesley, 1980)
3. Classical Mechanics- N C Rana and P S Joag (Tata Mcgraw Hill 1990).
4. Classical Mechanics particles and rigid bodies- (Kiran C Gupta *New age international publishers*).
5. Classical Mechanics – J C Upadhyaya (Himalaya Publishers).
6. Mechanics- A Sommerfield (Academic press 1952).
7. Statistical Mechanics and Properties of Matter- E S R Gopal (Macmillan)
8. Statistical Mechanics – K Hung (Wiley Eastern)
9. Elementary statistical Physics – C Kittel. (John Wiley)
10. Fundamental of statistical and Thermal Physics- F Reif (Mc Graw Hall)
11. An introduction to statistical Physics- W G V Roser (John Wiley)
12. Thermodynamics of irreversible processes-S R de Groot.
13. Statistical Physics – L D Landau and E M Lifshitz (Pergamon)

Web links and Video Lectures (e-Resources):

1.https://youtu.be/rk0rp2Jpidc
2.https://youtu.be/ohbmg53jDN0
3.https://youtu.be/s2RmqPIfETc
4.https://youtu.be/Q6Gw08pwhws

Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

https://youtu.be/rk0rp2Jpidc
https://nptel.ac.in
https://swayam.gov.in

VII- Semester

Applied Electronics Lab			
Course Code	21BSPL73	CIE Marks	50
Teaching Hours/Week (L:T:P)	1:0:2	/SEE Marks	50
Credits	2	Exam Hours	3 Hours

Course objectives:

1. To acquire knowledge on the design and construction of electronic circuits
2. To study the wave forms generated by the electronic circuits
3. To design Flip-Flip Circuits using IC.

List of Experiments:

Sl.NO	Experiments
1	Design of Regulated Power supply.
2	Astable, Monostable and Bistable Multivibrator circuit construction and wave form visualization.
3	Bias Feed back (Voltage Series/Shunt, Current Series/ Shunt)
4	Verification of Thevnin and Norton Theorems.
5	Conversion network of resistors from Star to delta.
6	Spectral Response of Solar Cell.
7	Construction of Clipping and Clamping circuits and visualization of wave forms.
8	Study the working of SR Flip-Flop using IC 7400 and with the help of truth table.

Course outcomes (Course Skill Set):

At the end of the course the student will be able to:

1. Demonstrate the Design of power supply, vibrator and wave form modifying circuits and the visualization of wave forms.
2. Demonstrate the verification of network theorems and network conversion.
3. Demonstrate the circuit design and working of SR Flip-Flop using IC 7400.

Assessment Details (both CIE and SEE)

Continuous Internal Evaluation (CIE): The CIE marks awarded in case of Practical shall be based on the weekly evaluation of laboratory journals/ reports after the conduction of every experiment and one practical test.

Semester End Evaluation (SEE students): The practical examinations to be conducted as per the time table of University in a batch wise with strength of students not more than 10-15 per batch.

1. All laboratory experiments are to be included for practical examination.
2. Breakup of marks and the instructions printed on the cover page of answer script to be strictly adhered by the examiners.
3. Students can pick one experiment from the questions lot prepared by the examiners.
4. Change of experiment is allowed only once and 15% Marks allotted to the procedure part to be made zero.

Books

1. Analog Electronics with Op-amps: A Source Book of Practical Circuits (Electronics Texts for Engineers and Scientists), Anthony Peyton , Vincent Walsh, Cambridge University Press.
2. Experiments in Electronics, S V Subramanya, Laxmi Publications; Second edition (1 January 2011)
3. Handbook of Experiments in Electronics and Communication Engineering, 1/e, B Sasikala & S Poornachandra Rao, Vikas Publishing

Suggested Learning Resources:

1. **https://www.circuitlab.com/editor/#?id=7pq5wm&from=homepage**
2. **https://www.tinkercad.com/circuits**
3. **https://www.youtube.com/watch?v=FpbntkguMIM**(S R Flip-Flop)

VII - Semester

Advanced Condensed Matter Physics			
Course Code	21BSP741	CIE Marks	50
Teaching Hours/Week (L:T:P: S)	2:2:0:0	SEE Marks	50
Total Hours of Pedagogy	40	Total Marks	100
Credits	03	Exam Hours	03 Hours

Course Learning Objectives: This course will develop a student;

1. To Study the transport properties of solids.
2. To Study the Interactions of Magnetic Domains, EPR and NMR.
3. To Understand the Types of Bonding and Vibrations in Lattice.
4. To Study Diffraction of x-rays by crystals, Crystal Defects and Imperfections.
5. To Understand superfluidity and superfluid properties of Helium.

Teaching-Learning Process (General Instructions)

These are sample Strategies; which teacher can use to accelerate the attainment of the various course outcomes.

1. Apart from conventional lecture methods various types of innovative teaching techniques through videos, animation films may be adopted so that the delivered lesson can progress the students in theoretical, applied and practical skills in physics
2. Seminars and Quizzes may be arranged for students in respective subjects to develop skills.
3. Encourage the students for group learning to improve their creativity and analytical skills.
4. While teaching show how every concept can be applied to the real world. This helps the students to expand understanding level.
5. Support and guide the students for self-study.
6. Ask some higher order thinking questions in the class, which promotes critical thinking.
7. Inspire the students towards the studies by giving new ideas and examples.

Module-1

Transport properties of solids **8 Hours**

Boltzmann transport equation and its linearization. The relaxation time approximation. Variational method for the solution of the linearized Boltzmann equation. Electron-phonon interaction. Ideal resistance in metals. Mattheissen's rule.
Transport coefficients of metals and semiconductors in presence of magnetic field. Limitations of the Boltzmann transport equation. Kubo formula for electrical conductivity.

Pedagogy	Chalk and talk, Power point presentation, Videos **Self-study Component:** Boltzmann equation

Module-2

Interactions of Magnetic Domains, EPR and NMR **8 Hours**

Magnetic domains and interactions - Origin of domains, anisotropy energy density, Bloch wall, Indirect exchange, RKKY interaction, Spin glass.
Electron Paramagnetic Resonance (EPR) - Phenomenon of magnetic resonance, Bloch equation, Adiabatic fast passage and slow passage solution, Rate of absorption, Saturation, line width, Spin lattice relaxation, Spin-Spin relaxation, Exchange interaction, EPR set up.
Nuclear Magnetic Resonance (NMR) - Nuclear moments-Overview, Nuclear induction and absorption experiment, Rate of absorption, Line width, Motional narrowing in liquids, Chemical shift, High resolution spectroscopy, Knight shift

Pedagogy	Chalk and talk, Power point presentation, Videos **Self-study Component:** Origin of domains

Module-3

Types of Bonding and Vibrations in Lattice **8 Hours**

The van der waals bond. Cohesive energy of inert gas solids. Ionic bond. Cohesive energy and bulk modulus of ionic crystals. Medelung constant. The covalent bond. Metallic bond.
Vibrations of one-dimensional monatomic and diatomic lattices. Infrared absorption in ionic crystals (one-dimensional model). Normal modes and phonons. Frequency distribution function. Review of Debye's theory of lattice specific heat. An harmonic effects.

Pedagogy	Chalk and talk, Power point presentation, Videos **Self-study Component:** The van der walls blond.

Module-4

Diffraction of x-rays by crystals, Crystal Defects and Imperfections **8 Hours**

Scattering of x-rays by an atom and by a three dimensional crystal. Laue interference function, Bragg equation. Ewald construction. Width of diffraction maxima. Crystal structure factor. Space group extinctions. Patterson function. Effect of temperature on the intensity of Bragg reflections. Debye-Waller factor

Lattice imperfections, Vacancies and interstitial defects, Dislocations, Crystal growth, Colour centers.

Pedagogy	Chalk and talk, Power point presentation, Videos **Self-study Component:** Diffraction

Module-5

Super fluidity **8 Hours**

Introduction, Thermodynamic Properties of Liquid Helium, The Elementary Superfluid Properties of Helium II, Bose Condensation and Super fluidity (A Quantum Mechanical Treatment) – Helium as a Quantum Liquid, Two Fluid Model, Phonons and Rotons and Microscopic Quantum effects.

Pedagogy	Chalk and talk, Power point presentation, Video **Self-study Component:** Introduction to Superfluidity

Course outcome (Course Skill Set)

Course Outcomes

After the completion of the course student should be able to :

1. Explain the transport properties of solids.
2. Discuss the Interactions of Magnetic Domains, EPR and NMR.
3. Elucidate Types of Bonding and Vibrations in Lattice.
4. Describe Diffraction of x-rays by crystals, Crystal Defects and Imperfections.
5. Explain superfluidity and superfluid properties of Helium.

Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 40% of the maximum marks (20 marks). A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures not less than 35% (18 Marks out of 50)in the semester-end examination(SEE).

Continuous Internal Evaluation:

Three Unit Tests each of **20 Marks (duration 01 hour**)

1. First test at the end of 5th week of the semester
2. Second test at the end of the 10th week of the semester
3. Third test at the end of the 15th week of the semester

Two assignments each of **10 Marks**

4. First assignment at the end of 4th week of the semester
5. Second assignment at the end of 9th week of the semester

Group discussion/Seminar/quiz any one of three suitably planned to attain the COs and POs for **20 Marks** (**duration 01 hours**)

6. At the end of the 13th week of the semester

The sum of three tests, two assignments, and quiz/seminar/group discussion will be out of 100 marks and will be **scaled down to 50 marks**

(to have less stressed CIE, the portion of the syllabus should not be common /repeated for any of the methods of the CIE. Each method of CIE should have a different syllabus portion of the course).

CIE methods /question paper is designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course.

Semester End Examination:

Theory SEE will be conducted by University as per the scheduled timetable, with common question papers for the subject (**duration 03 hours)**

1. The question paper will have ten questions. Each question is set for 20 marks.
2. There will be 2 questions from each module. Each of the two questions under a module (with a maximum of 3 sub-questions), **should have a mix of topics** under that module.

The students have to answer 5 full questions, selecting one full question from each module.

Suggested Learning Resources:

Text Books

1. Solid State Physics: Mattis
2. Electron Paramagnetic Resonance: Pake Electron Paramagnetic Resonance: Pake
3. Molecular spectroscopy: Banwell.
4. Solid State Physics: C. Kittle
5. Magnetism in Condensed Matter: Stephen Bludell
6. O. Madelung – Introduction of Solid State Theory (Springer).
7. J.M. Ziman: Principles of the theory of solids

Web links and Video Lectures (e-Resources):

https://www.youtube.com/watch?v=R6g0AkT3SRE
https://www.youtube.com/watch?v=UNgEL7Q52sI
https://www.youtube.com/watch?v=UNpKCYZFfDU

Activity Based Learning (Suggesthttps://nptel.ac.in
https://swayam.gov.in

VII-Semester

Instrumentation Techniques and Material Characterization			
Course Code	21BSP742	CIE Marks	50
Teaching Hours/Week (L:T:P: S)	2:2:0:1	SEE Marks	50
Total Hours of Pedagogy	40	Total Marks	100
Credits	03	Exam Hours	03 Hours

Course Objectives:

1. To understand errors and uncertainties in measurements and functional elements of measuring systems.
2. To Study the various types of sensors and their Classification.
3. To Understand the statistical analysis of data and curve fitting
4. To study the various Material Characterization techniques

Teaching-Learning Process (General Instructions)

These are sample Strategies, which teacher can use to accelerate the attainment of the various course outcomes.

1. Apart from conventional lecture methods various types of innovative teaching techniques through videos, animation films may be adopted so that the delivered lesson can progress the students in theoretical, applied and practical skills in physics
2. Seminars and Quizzes may be arranged for students in respective subjects to develop skills.
3. Encourage the students for group learning to improve their creativity and analytical skills.
4. While teaching show how every concept can be applied to the real world. This helps the students to expand understanding level.
5. Support and guide the students for self-study.
6. Ask some higher order thinking questions in the class, which promotes critical thinking.
7. Inspire the students towards the studies by giving new ideas and examples.

Module-1

Errors and Uncertainties in Measurements: **8 Hours**

Introduction to errors and uncertainties in the measurement of performance parameters of instruments. Static performance parameters: Accuracy, Precision, Resolution, Threshold, Sensitivity, Linearity, Hysteresis, Dead band, Backlash, Drift, and Span. Impedance loading and matching.

Typical applications of Instrument systems, Functional elements of Instrumentation and Measuring systems i.e. Input elements (Transducers and Electrodes), intermediate elements (signal conditioning), and output elements (Data display and storage).

Pedagogy	Chalk and talk, Power point presentation, Videos **Self-study Component:** Introduction to errors

Module-2

Iintroduction to transducer sensors **8 Hours**

Definition of a transducer/sensor Role of a transducer in a generalized measurement system. Classification of transducers. Characteristics of transducers. Significant parameters of a transducer. Temperature sensors: Temperature scales. Mechanical temperature sensors, Resistance type temperature sensors, Platinum resistance thermometer. Thermistors. Thermocouples. Solid state sensors. Quartz thermometer. Radiation type sensors - Optical pyrometers. Calibration of thermometers

Pedagogy	Chalk and talk, Power point presentation, Videos **Self-study Component:** Basics of transducer sensors

Module-3

Statistical Analysis **8 Hours**

Statistical Analysis: The Mean as the Best Value, Curve Fitting, Straight Line Fitting, Fitting to Linear Functions, Nonlinear Fitting, $\chi 2$ as the Goodness of Fit, Covariance and Correlations, Distributions, The Binomial Distribution, The Poisson Distribution, The Gaussian Distribution, Data Analysis with SciLAB or Octave, labplot.

Pedagogy	Chalk and talk, Power point presentation, Videos **Self-study Component:** Poisson Distribution

Module-4

Material Characterization - 1 **8 Hours**

Spectroscopic Techniques: Principle, instrumentation and working of X-Ray (Absorption) Photo-electron Spectroscopy(XPS). Electron spin resonance (ESR)

Magnetic characteristics: Principle instrumentation and working of nuclear Magnetic Resonance (NMR), vibrating sample magnetometer (VSM).

Pedagogy	Chalk and talk, Power point presentation, Videos **Self study Component:** Basics of X ray

Module-5

Material Characterization - 2 **8 Hours**

Principle, construction and working of X-ray Diffractometer, Crystallite size determination by Scherrer equation, Atomic Force Microscopy (AFM): Principle, construction, working and applications, X-ray photoelectron spectroscopy(XPS), Scanning electron microscopy (SEM), Transmission electron microscopy (TEM), Thermal Techniques: Principle, instrumentation and working of Thermo-Gravimetric Analysis (TGA). Differential Thermal Analysis (DTA), Differential scanning calorimetry (DSC) .

Pedagogy	Chalk and talk, Power point presentation, Videos **Self-study Component:** Differential scanning calorimetry (DSC)

Course outcome (Course Skill Set)

At the end of the course the student will be able to

1. Explain the types of errors and uncertainties in measurements and functional elements of measuring systems.
2. Describe the various types of sensors and their Classification.
3. Apply Understand the statistical analysis of data and curve fitting
4. Discuss the various Material Characterization techniques

Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 40% of the maximum marks (20 marks). A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures not less than 35% (18 Marks out of 50)in the semester-end examination(SEE).

Continuous Internal Evaluation:

Three Unit Tests each of **20 Marks (duration 01 hour**)

1. First test at the end of 5th week of the semester
2. Second test at the end of the 10th week of the semester
3. Third test at the end of the 15th week of the semester

Two assignments each of **10 Marks**

4. First assignment at the end of 4th week of the semester
5. Second assignment at the end of 9th week of the semester

Group discussion/Seminar/quiz any one of three suitably planned to attain the COs and POs for **20 Marks** (**duration 01 hours**)

6. At the end of the 13th week of the semester

The sum of three tests, two assignments, and quiz/seminar/group discussion will be out of 100 marks and will be **scaled down to 50 marks**

(to have less stressed CIE, the portion of the syllabus should not be common /repeated for any of the methods of the CIE. Each method of CIE should have a different syllabus portion of the course).

CIE methods /question paper is designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course.

Semester End Examination:

Theory SEE will be conducted by University as per the scheduled timetable, with common question papers for the subject (**duration 03 hours)**

1. The question paper will have ten questions. Each question is set for 20 marks.
2. There will be 2 questions from each module. Each of the two questions under a module (with a maximum of 3 sub-questions), **should have a mix of topics** under that module.

The students have to answer 5 full questions, selecting one full question from each module.

Suggested Learning Resources:

Text books:

1. Instrumentation Measurement and Analsysis, Nakra Chaudhary, 4th Edition, Mc GrawHill education, 2016
2. Instrumentation : Devices and Systems , C Rangan, G Sharma, and V S V Mani, Mc GrawHill education, 2017
3. Characterization of Materials John B Watchman and Zwi H Kalman , Butterworth-Heinemann ; Manning, Boston, Greenwich, ©1993
4. Materials Characterization Techniques, Sam Zhang, Lin Li, Ashok Kumar, CRC Press · 2008
5. Fundamentals of Statistics, S C Gupta, Himalaya publishing House, 2018
6. Statistical Methods, Dr. S. P Guplta, Sultan Chand and Sons.

Web links and Video Lectures (e-Resources):

https://youtu.be/LUSEBR3HPQg https://youtu.be/dkStfMscuOQ https://youtu.be/pNv25yMBYTA https://youtu.be/zO8ga-b6Eso https://youtu.be/5xMnNdtJo60 https://youtu.be/gxexATzHkXI
Activity Based Learning (Suggested Activities in Class)/ Practical Based learning XRD Data Analysis https://nptel.ac.in https://swayam.gov.in

VII-Semester

Astrophysics and Atmospheric Physics			
Course Code	21BSP751	CIE Marks	50
Teaching Hours/Week (L:T:P: S)	2:2:0:1	SEE Marks	50
Total Hours of Pedagogy	40	Total Marks	100
Credits	03	Exam Hours	03 Hours

Course Objectives:

1. Understand the evolution of the universe and solar system.
2. Understand and apply the laws of solar structure
3. Understand the fundamentals of atmospheric physics

Teaching-Learning Process (General Instructions)

These are sample Strategies, which teacher can use to accelerate the attainment of the various course outcomes.

1. Apart from conventional lecture methods various types of innovative teaching techniques through videos, animation films may be adopted so that the delivered lesson can progress the students in theoretical, applied and practical skills in physics
2. Seminars and Quizzes may be arranged for students in respective subjects to develop skills.
3. Encourage the students for group learning to improve their creativity and analytical skills.
4. While teaching show how every concept can be applied to the real world. This helps the students to expand understanding level.
5. Support and guide the students for self-study.
6. Ask some higher order thinking questions in the class, which promotes critical thinking.
7. Inspire the students towards the studies by giving new ideas and examples.

Module-1

Introduction to Astrophysics: **8 Hours**

History of astrophysics: Overview of the major constituents of the universe. Solar system: Planets, laws of motion of the planets, inner planets and outer planets, Black body Radiation-Specific intensity, Luminosity-Basics of radiative transfer-emission coefficient, absorption coefficient and source function.

The Sun:

The sun, solar atmosphere, photosphere, chromosphere, corona, sun spots, solar flares, thermal equilibrium, energy production mechanism in stars.

Pedagogy	Chalk and talk, Power point presentation, Videos **Self-study Component:** General Information about Universe

Module-2

Stellar evolution **8 Hours**

Formation of protostar and Jean's length, hydrostatic equilibrium and stellar stability, thermal energy and mean temperature of sun, convective equilibrium, radiative equilibrium in stars, Protostar stage, pre main sequence stage, main sequence stage, red giant stage, white dwarf, neutron stars.

Chandrasekhar mass limit and supernovae and hyper novae explosion, black hole formation, qualitative discussion of Schwarzschild's solution (no derivation) and how to detect them. Thermodynamics of Black Holes and Hawking Radiation (no derivation), "inside" a black hole, Supermassive black holes in galactic nuclei.

Pedagogy	Chalk and talk, Power point presentation, Videos **Self-study Component :** Stellar Matter

Module-3

Stellar Astrophysics: **8 Hours**

Trigonometric parallax, stellar brightness- luminosity, apparent magnitude, absolute magnitude system, distance modulus, colour index, extinction (death), colour temperature and effective temperature.

Measurement of stellar mass and radii: Stellar spectra, colours of stars, motion of stars, radial velocity, spectral classification of stars, luminosity and classification of stars, HR (Hertzsprung-Russell) diagram.

Pedagogy	Chalk and talk, Power point presentation, Videos **Self-study Component:** Light Year, Arc Second

Module-4

Atmospheric Physics **8 Hours**

Introduction to the atmosphere: Descriptions of the atmospheric behavior, mechanisms influencing the atmospheric behavior, Composition and Structure: Description of air, stratification of mass, thermal and dynamical structure, trace constituents**,** atmospheric models, weather and clouds.

Atmospheric thermodynamics: The ideal gas law, Atmospheric composition, Hydrostatic balance, Entropy and potential temperature Parcel concepts, The available potential energy , Moisture in the atmosphere, The saturated adiabatic lapse

rate, The Tephigram, Cloud formation.

Pedagogy	Chalk and talk, Power point presentation, Videos **Self-study Component:** Layers in Atmosphere

Module-5

Atmospheric radiation: **08 Hours**

Basic physical concepts, Radiative-transfer equation, Basic spectroscopy of molecules, Transmittance, Absorption by atmospheric gases, heating rates, greenhouse effect.

Aero-gel and clouds:

Morphology of Atmospheric Aerosol: Continental Aerosol, Marine Aerosol, Stratospheric Aerosol, Microphysics of Clouds: Droplet Growth by Condensation, Droplet Growth by Collision, Growth of Ice Particles, Macroscopic Characteristics of Clouds: Formation and Classification of Clouds, Micro-physical Properties of Clouds, Cloud Dissipation.

Pedagogy	Chalk and talk, Power point presentation, Videos **Self-study Component: Radiation**

Course outcome (Course Skill Set)

At the end of the course the student will be able to

1. Explain the history of astrophysics and the sun environment.
2. Describe the Life Cycle of a Star
3. Describe the Stellar Quantities and HR Diagram
4. Elucidate the behavior of atmosphere and atmospheric thermodynamics.
5. Discuss the Atmospheric radiation and formation of clouds.

Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 40% of the maximum marks (20 marks). A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures not less than 35% (18 Marks out of 50)in the semester-end examination(SEE).

Continuous Internal Evaluation:

Three Unit Tests each of **20 Marks (duration 01 hour**)

1. First test at the end of 5th week of the semester
2. Second test at the end of the 10th week of the semester
3. Third test at the end of the 15th week of the semester

Two assignments each of **10 Marks**

4. First assignment at the end of 4th week of the semester
5. Second assignment at the end of 9th week of the semester

Group discussion/Seminar/quiz any one of three suitably planned to attain the COs and POs for **20 Marks** (**duration 01 hours**)

6. At the end of the 13th week of the semester

The sum of three tests, two assignments, and quiz/seminar/group discussion will be out of 100 marks and will be **scaled down to 50 marks**

(to have less stressed CIE, the portion of the syllabus should not be common /repeated for any of the methods of the CIE. Each method of CIE should have a different syllabus portion of the course).

CIE methods /question paper is designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course.

Semester End Examination:

Theory SEE will be conducted by University as per the scheduled timetable, with common question papers for the subject (**duration 03 hours)**

1. The question paper will have ten questions. Each question is set for 20 marks.
2. There will be 2 questions from each module. Each of the two questions under a module (with a maximum of 3 sub-questions), **should have a mix of topics** under that module.

The students have to answer 5 full questions, selecting one full question from each module.

Suggested Learning Resources:

Text books:

1. The Physical universe, Universe of California, 1982, Shu F.
2. Astrophysics-Stars and Galaxies; K D Abhyankar (Tata Mc Graw Hill, 1990).
3. An Introduction to Modern Astrophysics; Bradley W Carrol &Dale A Ostlie.
4. Structure and evaluation of stars; M Schwarachild (Dover, 1958)
5. Astrophysical concepts; Harwit M
6. Astrophysics Volume I & II; R Bowers and T Deeming (Jones & Bartlett, 1984)
7. Radiative processes in Astrophysics; G B Rybicki & Lightman A. P.
8. Kip S. Thorne, Black Holes and Time Warps: Einstein's Outrageous Legacy (W.W. Norton, paperback, 1994).
9. Mitchell Begelman and Martin Rees, Gravity's Fatal Attraction: Black Holes in the Universe (W. H. Freeman, Scientific American Library Paperback, 2nd Edition).
10. An introduction to atmospheric physics, David G Andrews, 2nd edition, Cambridge university press. (2010)
11. Fundamentals of Atmospheric Physics, Murry L. Salby, Academic press. (1996)

Web links and Video Lectures (e-Resources):

1. https://archive.nptel.ac.in
2. Astrophysics: https://nptel.ac.in/courses/115105046
3. Introduction to atmospheric physics: https://www.youtube.com/watch?v=bKoFqXoLV0Y
4. Thermodynamics and Physics of atmosphere lecture 1: https://www.youtube.com/watch?v=-2Jodueaz6s
5. Stellar Evolution: https://www.youtube.com/watch?v=qwzh2Y5yxkU
6. Stellar Astrophysics: https://www.youtube.com/watch?v=e-NUDjgUFZU

Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

1. Celestia Space Visualization software.
2. Stellarium Space Visualization Software

VII-Semester

Communication Electronics			
Course Code	21BSP752	CIE Marks	50
Teaching Hours/Week (L:T:P: S)	2:2:0:1	SEE Marks	50
Total Hours of Pedagogy	40	Total Marks	100
Credits	03	Exam Hours	03 Hours

Course Objectives:

1. To study the fundamental of communication.
2. To study the basic components of communication.
3. To study the electronic devices used in communication.
4. To study various types of communication methods.

Teaching-Learning Process (General Instructions)

These are sample Strategies, which teacher can use to accelerate the attainment of the various course outcomes.

1. Apart from conventional lecture methods various types of innovative teaching techniques through videos, animation films may be adopted so that the delivered lesson can progress the students in theoretical, applied and practical skills in physics
2. Seminars and Quizzes may be arranged for students in respective subjects to develop skills.
3. Encourage the students for group learning to improve their creativity and analytical skills.
4. While teaching show how every concept can be applied to the real world. This helps the students to expand understanding level.
5. Support and guide the students for self-study.
6. Ask some higher order thinking questions in the class, which promotes critical thinking.
7. Inspire the students towards the studies by giving new ideas and examples.

Module-1

Fundamental of Electronics for Communication **8 Hours**

Communication System: Importance, elements, and Types, Electromagnetic Spectrum, Bandwidth.
Electronic Fundamentals: Gain, Attenuation, Decibels, Tuned circuits and Resonance, Filters and types, Fourier Theory, Modulation and multiplexing.

Pedagogy	Chalk and talk, Power point presentation, Videos **Self-study Component:** Electromagnetic spectrum

Module-2

Modulation Circuits **8 Hours**

Basic amplitude modulation Concepts, Modulation index and % Modulation, Amplitude Modulator and Demodulator Circuits.
Basic Principles of Frequency Modulation, Principles of Phase Modulation, Modulation Index and Sidebands, Differences between AM and FM, Frequency Modulator, Phase Modulator, Frequency Demodulator Circuits.
Numerical Problems

Pedagogy	Chalk and talk, Power point presentation, Videos **Self study Component:** Modulation concept

Module-3

Transmitters and Receivers **8 Hours**

Radio Transmitters: Fundamentals, Carrier Generators, Power Amplifiers, Impedance-Matching Networks, Typical Transmitter Circuits
Communication Receivers: Basic Principles of Signal Reproduction Super heterodyne, Receivers, Frequency Conversion, Intermediate Frequency and Images. Typical Receiver Circuits, Receivers and Transceivers.

Pedagogy	Chalk and talk, Power point presentation, Videos **Self-study Component:** Basics of Transmitters and receivers

Module-4

Antennas, Transmission Lines, internet and Radio Wave Propagation **8 Hours**

Transmission Lines: Basics, Standing Waves, Transmission Lines as Circuit Elements, The Smith Chart.
Internet: Internet Applications, Internet Transmission Systems, Storage-Area Networks, Internet Security
Antenna Fundamentals, Common Antenna Types, Radio Wave Propagation

Pedagogy	Chalk and talk, Power point presentation, Videos **Self-study Component;** Basics of transmission lines

Module-5

Digital Data Communication and Cell Phone Technologies **8 Hours**

Digital Data Transmission: Digital Codes, Principles of Digital, Transmission, Transmission Efficiency, Modem Concepts and Methods, Wideband Modulation, Broadband Modem Techniques,

Cell Phone Technologies: Cellular Telephone Systems, 2G and 3G Digital Cell, Phone Systems, Long Term Evolution and 4G Cellular Systems, Base Stations and Small Cells.

Pedagogy	Chalk and talk, Power point presentation, Videos **Self-study Component:** Basic of digital communication

Course outcome (Course Skill Set)

At the end of the student will be able to course

1. To describe the electronic fundamentals of communication.
2. To explain the modulations and circuits.
3. To Summarize the various types of transmitters and receivers.
4. To illustrate various electronic components wired and non-wired communication.
5. To discuss the Digital Data communication and Cell Phone Technologies

Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 40% of the maximum marks (20 marks). A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures not less than 35% (18 Marks out of 50)in the semester-end examination(SEE).

Continuous Internal Evaluation:

Three Unit Tests each of **20 Marks (duration 01 hour**)

1. First test at the end of 5th week of the semester
2. Second test at the end of the 10th week of the semester
3. Third test at the end of the 15th week of the semester

Two assignments each of **10 Marks**

4. First assignment at the end of 4th week of the semester
5. Second assignment at the end of 9th week of the semester

Group discussion/Seminar/quiz any one of three suitably planned to attain the COs and POs for **20 Marks** (**duration 01 hours**)

6. At the end of the 13th week of the semester

The sum of three tests, two assignments, and quiz/seminar/group discussion will be out of 100 marks and will be **scaled down to 50 marks**

(to have less stressed CIE, the portion of the syllabus should not be common /repeated for any of the methods of the CIE. Each method of CIE should have a different syllabus portion of the course).

CIE methods /question paper is designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course.

Semester End Examination:

Theory SEE will be conducted by University as per the scheduled timetable, with common question papers for the subject (**duration 03 hours)**

1. The question paper will have ten questions. Each question is set for 20 marks.
2. There will be 2 questions from each module. Each of the two questions under a module (with a maximum of 3 sub-questions), **should have a mix of topics** under that module.

The students have to answer 5 full questions, selecting one full question from each module.

Suggested Learning Resources:

Text books:

- Principles of Electronic Communication Systems, Louis E. Frenzel Jr., Tata McGraw Hill, 4th Edition
- Communication Electronics : Principles and Applications, Louis E Frenzel, 3rd Edition, Glenco McGraw Hill
- Electronic Communication systems, George Kennedy, Bergard Davis, 4th Edition, Tata McGraw Hill.

Web links and Video Lectures (e-Resources):

1. https://www.youtube.com/watch?v=yCkybSDBMOY
2. https://www.youtube.com/watch?v=aamSV16ibVw
3. https://archive.nptel.ac.in/courses/117/102/117102062/

Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

1. Designing AM transmitter and receiver and demonstrating the communication.

VII Semester

GEOGRAPHY			
Course Code	21BSO761	CIE Marks	50
Teaching Hours/Week (L:T:P: S)	2:0:0	SEE Marks	50
Total Hours of Pedagogy	25	Total Marks	100
Credits	02	Exam Hours	03

CLO 1	To introduce students to basic concepts of geography and several up-to-date issues which are widely discussed in the field of geography.
CLO 2	To provide an overview of the major branches of physical geography and their interconnections
CLO 3	Ability to interpret the distribution and processes of physical and human phenomena.
CLO 4	Provide an understanding of the definitions and concepts related to natural hazards and disaster risk reduction.
CLO 5	To identify economic patterns across space and time in order to provide insight into how and why economic systems and practices develop.

Pedagogy (General Instructions)

These are sample Strategies, which teacher can use to accelerate the attainment of the various course outcomes.

1. Lecturer method (L) does not mean only traditional lecture method, but different type of teaching methods may beadopted to develop the outcomes.
2. Show Video/animation films to convince abstract concepts.
3. Encourage collaborative (Group Learning) Learning in the class
4. Ask at least three HOTS (Higher order Thinking) questions in the class, which promotes critical thinking
5. Adopt Problem Based Learning (PBL), which fosters students' Analytical skills, develop thinking skills such as theability to evaluate, generalize, and analyze information rather than simply recall it.
6. Topics will be introduced in a multiple representation.
7. Show the different ways to solve the same problem and encourage the students to come up with their own creativeways to solve them.
8. Discuss how every concept can be applied to the real world - and when that's possible, it helps improve the students' understanding.

Module-1: Introduction to Geography

Introduction, Defining Geography, Nature and Scope of Geography, Branches of Geography, Spatial Distribution of Phenomenon, Importance of Physical Geography and Human Geography.

Pedagogy	**Chalk and talk/power point presentation:Videos/Learning material:**

Module-2: Physical Geography

Weathering, factors affecting weathering; Concept of cycle of erosion; works of running water, wind and glaciers; Karst and coastal regions; Drainage patterns, lakes and islands. Elements of weather and climate; Composition and structure of the atmosphere; Insolation, heat budget, vertical, horizontal and seasonal distribution of temperature.

Pedagogy	**Chalk and talk/power point presentation:Videos/Learning material:**

Module-3: Environmental Geography

Principle of ecology; Human ecological adaptations; Influence of man on ecology and environment; Global and regional ecological changes and imbalances; Ecosystem their management and conservation; Environmental degradation, management, and conservation; Biodiversity and sustainable development; Environmental policy; Environmental hazards and remedial measures; Environmental education and legislation.

Pedagogy	**Chalk and talk/power point presentation:Videos/Learning material:**

Module-4: Perspectives in Human Geography

Areal differentiation; regional synthesis; Dichotomy and dualism; Environmentalism; Quantitative revolution and locational analysis; Radical, behavioral, human, and welfare approaches; Languages, religions, and secularization; Cultural regions of the world; Human development index.

Pedagogy	**Chalk and talk/power point presentation:Videos/Learning material:**

Module-5: Economic Geography

World economic development: measurement and problems; World resources and their distribution; Energy crisis; the limits to growth; World agriculture: a typology of agricultural regions; Agricultural inputs and productivity; Food and nutrition problems; Food security; famine: causes, effects, and remedies; World industries: location patterns and problems; Patterns of world trade.

Pedagogy	**Chalk and talk/power point presentation:Videos/Learning material:**

Course outcome (Course Skill Set)

At the end of the course the student will be able to:

CO 1: Explain the meaning, definitions, nature, and scope of physical geography and identify and describe the branches of physical geography.

CO 2: Examine the origin, shape, and size of the earth, and the effects of the movement of the earth, coordinates -latitude, longitude, and time.

CO 3: Discuss the major environmental issues facing the earth system, including global warming, greenhouse effect, ozone depletion, floods, droughts, weather variations, changing ecosystems, snow/glaciers melting, and impact of pollution.

CO 4: Define and explain key concepts related to natural hazards and disaster risk Reduction.

CO 5: Understand the process of recovery and reconstruction following a disaster.

Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 40% of the maximum marks (20 marks). A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures not less than 35% (18 Marks out of 50) in the semester-end examination(SEE).

Continuous Internal Evaluation:

Three Unit Tests each of **20 Marks (duration 01 hour**)

1. First test at the end of 5th week of the semester
2. Second test at the end of the 10th week of the semester
3. Third test at the end of the 15th week of the semester

Two assignments each of **10 Marks**

4. First assignment at the end of 4th week of the semester
5. Second assignment at the end of 9th week of the semester

Group discussion/Seminar/quiz any one of three suitably planned to attain the COs and POs for **20 Marks** (**duration 01hours**)

6. At the end of the 13th week of the semester

The sum of three tests, two assignments, and quiz/seminar/group discussion will be out of 100 marks and will be **scaleddown to 50 marks**
(to have less stressed CIE, the portion of the syllabus should not be common /repeated for any of the methods of the CIE.Each method of CIE should have a different syllabus portion of the course).
CIE methods /question paper is designed to attain the different levels of Bloom's taxonomy as per the outcomedefined for the course.
Semester End Examination:
Theory SEE will be conducted by University as per the scheduled timetable, with common question papers for the subject(**duration 03 hours)**
1. The question paper will have ten questions. Each question is set for 20 marks.
2. There will be 2 questions from each module. Each of the two questions under a module (with a maximum of 3 sub-questions), **should have a mix of topics** under that module.
The students have to answer 5 full questions, selecting one full question from each module.

Suggested Learning Resources:

- A.M. Patwardhan ., (2012),' The Dynamic Earth System', Prentice Hall India Learning Private Limited; Third edition
- B.S. Negi., (1993), 'Physical Geography', S.J. Publication, Meerut.
- D.S. Lal., (1998), 'Climatology' Chaitnya publishing house, Allahabad.
- K. Siddhartha., (2001), 'Atmosphere, Weather and Climate', Kisalaya publication, New Delhi.
- R.N. Tikka., (2002), 'Physical Geography' Kedarnath Ramnath & Co, Meerut.
- Robinson, H. et al (1995): Elements of Cartography, 6th Edition, John Wiley & Sons, New York.
- Strahler, A.N., (2005), 'Physical Geography', Wiley Publications., 3rd Ed.
- W. Kenneth Hamblin & Eric H. Christiansen., (2003), 'Earth's Dynamic Systems' Pearson; 10th edition.
- Monkhouse, F.J.R. & Wilkinson H.R.(2000):Maps and Diagrams, Methuen &Co. London.
- Mishra, R.P. (1973): Fundamentals of Cartography, Prasaranga, University of Mysore
- Rampal, K.K.(1993): Mapping and Compilation, Concept Publishing Co.New Delhi.

Web links and Video Lectures (e-Resources):

1. https://www.youtube.com/watch?v=qLnQlLcwoxM
2. https://www.youtube.com/watch?v=625W7bwB5GY

Activity Based Learning (Suggested Activities in Class)/ Practical Based learning
https://wiki.millersville.edu/display/ittac/Geography+Virtual+Lab+Instructions

VII Semester

Mass Communication and Journalism			
Course Code	**21BSO762**	CIE Marks	50
Teaching Hours/Week (L:T:P: S)	2:0:0	SEE Marks	50
Total Hours of Pedagogy	25	Total Marks	100
Credits	02	Exam Hours	03

CLO 1	To introduce students to basic concepts of mass communication and journalism and several up-to-date issues which are widely discussed in the field of mass communication and journalism.
CLO 2	Explain the concepts and process of communication.
CLO 3	Understand the theories and models of communication.
CLO 4	Elucidate News report and Feature writing
CLO 5	Understand the writing for the web.

Pedagogy (General Instructions)

These are sample Strategies, which teacher can use to accelerate the attainment of the various course outcomes.

1. Lecturer method (L) does not mean only traditional lecture method, but different type of teaching methods may beadopted to develop the outcomes.
2. Show Video/animation films to convince abstract concepts.
4. Encourage collaborative (Group Learning) Learning in the class
5. Ask at least three HOTS (Higher order Thinking) questions in the class, which promotes critical thinking
6. Adopt Problem Based Learning (PBL), which fosters students' Analytical skills, develop thinking skills such as theability to evaluate, generalize, and analyze information rather than simply recall it.
7. Topics will be introduced in a multiple representation.
8. Show the different ways to solve the same problem and encourage the students to come up with their own creativeways to solve them.
9. Discuss how every concept can be applied to the real world - and when that's possible, it helps improve the students' understanding.

Module-1: Communication: Concepts and Process

Nature and process of human communication, functions of communication, verbal and non- verbal communication, intra-personal, inter-personal, small group, public and mass communication. Nature and process of mass communication, media of mass communication, characteristics and typology of audiences. Social Functions of Mass Communication, Scope of Mass Communication.

Pedagogy	**Chalk and talk/power point presentation:Videos/Learning material:**

Module-2: Communication Theories

Authoritarian; Libertarian; Socialistic; social-responsibility; Normative theories; Development media theory; Democratic participation media theory.

Pedagogy	**Chalk and talk/power point presentation:Videos/Learning material:**

Module-3: Communication Models

Overview of the importance of communication models, Understanding the role of following models in the study of communication: Lasswell, Shannon and Weaver, Osgood, Dance, Schramm, Gerbner, Newcomb, Wesley and Maclean model.

Pedagogy	**Chalk and talk/power point presentation:Videos/Learning material:**

Module-4: Writing for Print

Basics of writing a news report: Structuring a news report- 5 W's and H, Intro/ Lead, Inverted Pyramidand other news structures, Dateline. Feature writing, book reviews. Opinion and editorial writing.

Pedagogy	**Chalk and talk/power point presentation:Videos/Learning material:**

Module-5 Writing for the Web

Basics of writing for online media- structure and contentWriting stories for internet, editing and rewriting

Pedagogy	**Chalk and talk/power point presentation:Videos/Learning material:**

Course outcome (Course Skill Set)

At the end of the course the student will be able to:

CO 1	Discuss the basics concepts of mass communication and journalism.
CO 2	Understand the communication theories and models.
CO 3	Understand the basics of writing a news report and Feature writing.
CO 4	To be able to write for online media.
CO 5	To be able to write stories for internet and carry out editing and rewriting.

Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 40% of the maximum marks (20 marks). A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures not less than 35% (18 Marks out of 50) in the semester-end examination(SEE).

Continuous Internal Evaluation:

Three Unit Tests each of **20 Marks (duration 01 hour**)

1. First test at the end of 5th week of the semester
2. Second test at the end of the 10th week of the semester
3. Third test at the end of the 15th week of the semester

Two assignments each of **10 Marks**

4. First assignment at the end of 4th week of the semester
5. Second assignment at the end of 9th week of the semester

Group discussion/Seminar/quiz any one of three suitably planned to attain the COs and POs for **20 Marks** (**duration 01hours**)

6. At the end of the 13th week of the semester

The sum of three tests, two assignments, and quiz/seminar/group discussion will be out of 100 marks and will be **scaleddown to 50 marks**

(to have less stressed CIE, the portion of the syllabus should not be common /repeated for any of the methods of the CIE.Each method of CIE should have a different syllabus portion of the course).

CIE methods /question paper is designed to attain the different levels of Bloom's taxonomy as per the outcomedefined for the course.

Semester End Examination:

Theory SEE will be conducted by University as per the scheduled timetable, with common question papers for the subject(**duration 03 hours)**

1. The question paper will have ten questions. Each question is set for 20 marks.
2. There will be 2 questions from each module. Each of the two questions under a module

(with a maximum of 3 sub-questions), **should have a mix of topics** under that module.
The students have to answer 5 full questions, selecting one full question from each module.

Suggested Learning Resources:

Books

1. McQuail, D., McQuail's Mass Communication Theory, Vistar Publications New Delhi, 2009
2. Baran, J.S. and Dennis K. Davis, Mass Communication Theory: Foundations, Ferment, and Future,Thomson Wadsworth, Noida, 2007
3. Becker, S. L., Discovering Mass Communications, Scott, Foresman, Glenview, 1987
4. Berger, A. A., Essentials of Mass Communication, Sage, New Delhi, 1995
5. McLuhan, M., Understanding Media, Mentor, London, 1980
6. Wright, C. R., Mass Communication and Sociological perspectives, Random House, New York,1986
7. Kumar, K. J., Mass communication in India, 1995
8. D.R. Williamson, Feature Writing for Newspaper Fiske, J., An introduction to Communication,Routledge, 1990
9. Fiske, J., An introduction to Communication, Routledge, 1990
10. Introduction to Online Journalism: Publishing News and Information by Ronald De Walk.
11. J. J. Astor, Art of Modern Journalism
12. Journalism in the 21st Century: Online Information, Electronic Databases and the News by TomKoth (Adamantine Press Ltd.)
13. K. M. Srivastava, News Reporting & Editing
14. M. V. Charnley, Reporting
15. M.V. Kamath, Professional Journalism

Web links and Video Lectures (e-Resources):

1. https://www.youtube.com/watch?v=QcnI7o2n2MI
2. https://www.youtube.com/watch?v=QdL6RTaB5qk
3. https://www.youtube.com/watch?v=aSVxsXMdTlw

Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

- https://communication.depaul.edu/about/initiatives/center-for-communication-engagement/Pages/varc-lab.aspx