



Department of Physics

SHRI KRISHAN CHANDER GOVERNMENT DEGREE COLLEGE POONCH

(AUTONOMOUS)

Accredited Grade 'A' by NAAC

Syllabi and academic programmes for FYUGP Semester – I & II for the examination to be held in Dec. 2026, 2027 & 2028 (Semester – I) and May 2027, 2028 & 2029 (Semester – II).

Phone: 01965220231, Email: degreecollegepoonch@gmail.com

Web: www.skcgdcpoonch.ac.in



Department of Physics
SHRI KRISHAN CHANDER GOVERNMENT DEGREE COLLEGE
POONCH
(AUTONOMOUS)

Accredited Grade 'A' by NAAC

(Affiliated to University of Jammu)

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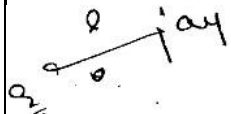
Shri Krishan Chander Government Degree College Poonch has been accredited with 'A' Grade by NAAC and has recently been awarded Autonomous status by UGC vide order No. F.2-10/2023 (Ac - Policy) dated 20th February 2026. Consequently, the University of Jammu vide order No. CDC/2026/9724 – 26 dated 09/02/2026 has authorized the college to function as an Autonomous college with effect from the Academic Session 2026-27.

Keeping in view the guidelines of UGC, the Department of Physics has constituted its Board of Studies for developing, reviewing and updating course content, syllabi and academic programmes for FYUGP Semester – I & II for the examination to be held in Dec. 2026, 2027 & 2028 (Semester – I) and May 2027, 2028 & 2029 (Semester – II).

MINUTES OF THE BOARD OF STUDIES MEETING

The Department of Physics, SKC GDC Poonch convened the meeting of its newly constituted Board of Studies under Autonomous scheme on 18-06-2026 at 11: 00 AM in Online mode. The Chairman welcomed the members and briefed the agenda of the meeting and forum was opened for individual subject deliberations.

MEMBERS PRESENT

S.No.	Name	Designation	Signatures
1.	Dr. Waseem Ul Haq	Chairperson	
2.	Prof. Mujahid Ul Islam	University Nominee	
3.	Dr. Sandeep Arya	Subject expert from the university.	Not Joined
4.	Dr. Tanuj Kumar	Subject expert from the university.	
5.	Dr. Ajay Singh Dadwal	Subject expert from Industry.	

6.	Prof. Rizwan Ahmed Khan	Alumni Member	
7.	Prof. Mohd Faisal	Member	
8.	Dr. Joginder Singh	Member	
9.	Dr. Balwinder Kour	Member	

The following agenda items were discussed in the meeting and resolved unanimously:

Item No. 1. To discuss, adopt and approve the syllabus, credits and courses for FYUGP Semester- I & II

Resolution:

The Department of Physics presented draft syllabi before the members of the Board of Studies in Physics. They thoroughly discussed and suggested minor changes. All the members of BoS approved the 80% adoption of the syllabus from the parent University (The University of Jammu), and the remaining 20% syllabus in all the courses framed by the Department of Physics has been approved by the members of the BoS after threadbare discussion.

The syllabi and courses of study for semester I & II classes of Four Year Undergraduate Programme (FYUGP) under NEP-2020 to be taught are:

SEMESTER-I

S. No.	Subject Code	Subject Type	Course Title	Credits	Int. Marks	Ext. Marks	Total Marks
1.	UMJPYTH-101	Major-Theory	Mechanics	4	20	80	100
2.	UMJPYPR-111	Major-Practical	Mechanics	2	25	25	50
3.	UMIPYTH-121	Minor-Theory	Kinematics	4	20	80	100
4.	UMIPYPR-131	Minor-Practical	Kinematics	2	25	25	50
5.	UMDPYTH-141	Multi-disciplinary	Physics in Daily Life	3	15	60	75

6.	USEPYTH-151	Skill Enhancement	Fundamentals of Electricity, Safety, and Tools	3	35	40	75
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SEMESTER-II

S. No.	Subject Code	Subject Type	Course Title	Credits	Int. Marks	Ext. Marks	Total Marks
1.	UMJPYTH-201	Major-Theory	Electrostatics and Magnetism	4	20	80	100
2.	UMJPYPR-211	Major-Practical	Electrostatics and Magnetism	2	25	25	50
3.	UMIPYTH-221	Minor-Theory	Electromagnetism	4	20	80	100
4.	UMIPYPR-231	Minor-Practical	Electromagnetism	2	25	25	50
5.	UMDPYTH-241	Multi-disciplinary	Renewable energy and Energy Harvesting	3	15	60	75
6.	USEPYTH-251	Skill Enhancement	Small Domestic Appliances (Heating & Motorized)	3	35	40	75

The note for paper setting and evaluation strategy for above courses are as per the guidelines notified by the college authorities.

It was also resolved that the syllabi of the above courses be notified after the approval of the competent authority.

Item No. 2. To review the course objectives and outcomes for FYUGP Semester I & II

Resolution:

The members of Board of Studies in Physics approved the course objectives and outcomes prepared by the department.

Item No. 3. To approve the procedure relevant to both internal and external examination to be held in Dec. 2026, 2027 & 2028 (Semester – I) and May 2027, 2028 & 2029 (Semester – II)

Resolution:

The members of Board of Studies in Physics approved the procedure and scheme of internal and external examination patterns as prepared by the department for the examinations to be held in Dec. 2026, 2027 & 2028 (Semester – I) and May 2027, 2028 & 2029 (Semester – II).

Item No. 4. To discuss the pattern and model of question papers for FYUGP Semester I & II

Resolution:

The board unanimously agreed and approved the paper pattern and model question papers for all courses designed for FYUGP Semester I & II.

Item No. 5. To prepare a panel of paper setters and evaluators to be sent to the Controller of Examinations for FYUGP Semester I & II

Resolution:

Resolved to prepare a panel of paper setters and evaluators from amongst teachers in Physics working in colleges affiliated to the University of Jammu, teachers working in the field of Physics.



(Dr. Waseem Ul Haq)
Chairman

Signatures:

1.



2.

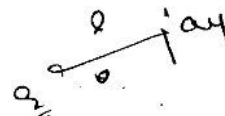


3.

4.



5.



6.



7.



8.



9.



Approved by



(Dr. Jasbir Singh)

Principal

SKC Govt. Degree College Poonch

Dept. of Physics, SKC GDC Poonch
Syllabus of Physics at FYUP under CBCS as per NEP-2020
for the examination to be held in session 2026, 2027, 2028

SYLLABUS OF PHYSICS FOR FOUR YEAR UNDERGRADUATE PROGRAMME (FYUGP)
UNDER CBCS AS PER NEP-2020 W.E.F. ACADEMIC SESSION 2026

List of Major, Minor, Multi-disciplinary and Skill Enhancement Courses in Physics
for 1st and 2nd Semesters of FYUGP (Four Year Undergraduate Program) as per
NEP-2020

SEMESTER-I

S. No.	Subject Code	Subject Type	Course Title	Credits	Int. Marks	Ext. Marks	Total Marks
1.	UMJPYTH-101	Major-Theory	Mechanics	4	20	80	100
2.	UMJPYPR-111	Major-Practical	Mechanics	2	25	25	50
3.	UMIPYTH-121	Minor-Theory	Kinematics	4	20	80	100
4.	UMIPYPR-131	Minor-Practical	Kinematics	2	25	25	50
5.	UMDPYTH-141	Multi-disciplinary	Physics in Daily Life	3	15	60	75
6.	USEPYTH-151	Skill Enhancement	Fundamentals of Electricity, Safety, and Tools	3	35	40	75

SEMESTER-II

S. No.	Subject Code	Subject Type	Course Title	Credits	Int. Marks	Ext. Marks	Total Marks
1.	UMJPYTH-201	Major-Theory	Electrostatics and Magnetism	4	20	80	100
2.	UMJPYPR-211	Major-Practical	Electrostatics and Magnetism	2	25	25	50
3.	UMIPYTH-221	Minor-Theory	Electromagnetism	4	20	80	100
4.	UMIPYPR-231	Minor-Practical	Electromagnetism	2	25	25	50
5.	UMDPYTH-241	Multi-disciplinary	Renewable energy and Energy Harvesting	3	15	60	75
6.	USEPYTH-251	Skill Enhancement	Small Domestic Appliances (Heating & Motorized)	3	35	40	75

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Semester :	I	Type:	Major
Course Name:	Mechanics	Course Code:	UMJPYTH-101
Credits:	4	L T P:	4-0-0 (Theory)
Contact Hrs.	60		
Duration of Exam	3 Hours		
<u>For Theory :</u> End Semester Exam : 80 Marks, Mid Semester Exam: 20Marks			

Syllabus for Theory (4 Credits)

Note : The Mid Semester Examination shall be conducted after completing 50% of syllabus.

Course learning outcomes:

- Understand Coordinate systems, laws of motion and their application to various dynamical situations, notion of inertial frames and concept of Galilean invariance.
- Understand the phenomena of collisions and idea about centre of mass and laboratory frames and their correlation.
- Understand the principles of elasticity through the study of Young's Modulus and modulus of rigidity.
- In the laboratory course, the student shall perform experiments related to mechanics.

Unit- I

Coordinate Systems: Unit vectors, displacement, velocity, acceleration, area and volume elements in cartesian and spherical Polar coordinates.

Frames of Reference: Inertial and non-inertial frames of reference, uniformly rotating frame, Coriolis force and centrifugal force, effect of centrifugal force due to rotation of the earth, Coriolis force on a freely falling body.

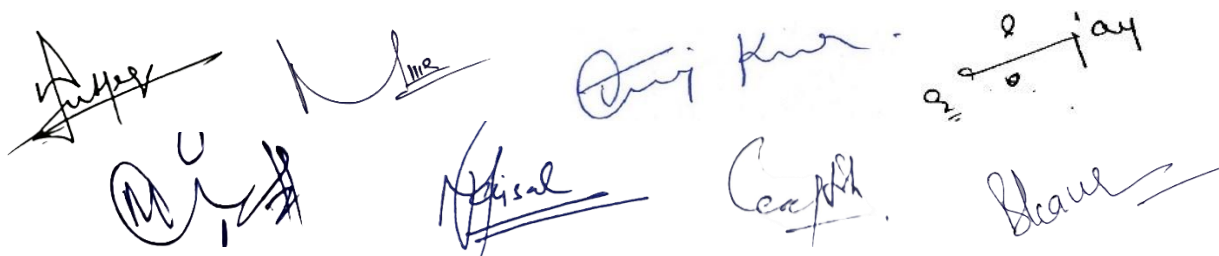
Unit- II

Collision of Particles: Concept of center of mass, Relationship between displacement, velocities, kinetic energies and angles in lab and centre of mass system.

Inverse square law of force: Concept of central and non-central forces. Centre of mass and its motion, equivalent one body problem. Angular momentum, differential equation of orbit in a central force field and Kepler's Laws.

Unit- III

Oscillations: Simple harmonic motion, differential equation of SHM and its solution, velocity and acceleration in simple harmonic motion, kinetic energy and potential energy of a simple harmonic oscillator, Examples of SHM: compound pendulum, torsional pendulum, bifilar oscillations, LC circuit, oscillations of two masses connected by a spring and Helmholtz resonator.



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Semester :	I	Type:	Major
Course Name:	Mechanics	Course Code:	UMJPYTH-101
Credits:	4	L T P:	4-0-0 (Theory)
Contact Hrs.	60		
Duration of Exam	3 Hours		
<u>For Theory :</u> End Semester Exam : 80 Marks, Mid Semester Exam: 20Marks			

Unit- IV

Damped oscillations: Nature of damping force, differential equation of damped harmonic oscillator and its solution, energy and power dissipation, logarithmic decrement, quality factor and relaxation time. Example of damping in physical systems and resistance damping.

Forced oscillations: Transient and Steady state behaviour, Resonance.

Note for paper setters for End Semester Examination:

Note for paper setters for Mid Semester Examination:

Text and Reference Books:

1. An introduction to mechanics, D. Kleppner, R.J. Kolenkow, 1973, McGraw-Hill.
2. Mechanics, Berkeley Physics, vol.1, C.Kittel, W.Knight, et.al. 2007, Tata McGraw-Hill.
3. Physics, Resnick, Halliday and Walker 8/e. 2008, Wiley.
4. Analytical Mechanics, G.R. Fowles and G.L. Cassiday. 2005, Cengage Learning.
5. Feynman Lectures, Vol. I, R.P.Feynman, R.B.Leighton, M.Sands, 2008, Pearson Education
6. University Physics, Ronald Lane Reese, 2003, Thomson Brooks/Cole.
7. Mechanics, D.S. Mathur, S. Chand and Company Limited, 2000 University Physics



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Semester :	I	Type:	Major
Course Name:	Major practical	Course Code:	UMJPYTPR-111
Credits:	2	L T P:	2-0-0
Contact Hrs.	30		
Duration of Exam	11/2 Hours		
<u>For Theory :</u> End Semester Exam : 25 Marks, Mid Semester Exam: 25 Marks			

List of Experiments:

1. To determine the height of a building using a Sextant.
2. To study the Motion of Spring and calculate (a) Spring constant, (b) g and (c) Modulus of rigidity.
3. To determine the Moment of Inertia of a Flywheel.
4. To determine value of g and velocity for a freely falling body using Digital Timing Technique
5. To determine the Modulus of Rigidity of a Wire by Maxwell's needle.
6. To determine the value of g using Bar Pendulum.
7. To determine moment of inertia of a rectangular bar or slab / Bifilar Oscillator.
8. To determine the Young's modulus of a metal/alloy bar using Bending of beam method.

Note : Perform any five of the following experiments as per the availability of equipments/ apparatus

Pattern of Exam: Continuous Assessment: 10 marks
Final Examination: 15 marks

Text and Reference Books Recommended:

1. Advanced Practical Physics for students, B. L. Flint and H.T. Worsnop, 1971, Asia Publishing House.
2. Advanced level Physics Practicals, Michael Nelson and Jon M. Ogborn, 4th Edition, reprinted 1985, Heinemann Educational Publishers
3. A Text Book of Practical Physics, I. Prakash & Ramakrishna, 11th Edn, 2011, Kitab Mahal.
4. B.Sc. Practical Physics by Harnam Singh
5. Advanced Practical Physics for Students by Worsnop and Flint

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**Syllabus of Physics at FYUP under CBCS as per NEP-2020
for the examination to be held in December 2022, 2023, 2024**

Semester :	I	Type:	Minor
Course Name:	Kinematics	Course Code:	UMIPYTH-121
Credits:	4 (Theory)	L T P:	4-0-0 (Theory)
Contact Hrs.	60		
Duration of Exam	3 Hours (Theory)		
For Theory : End Semester Exam : 80 Marks Mid Semester Exam: 20 Marks			

Syllabus for Theory (4 Credits)

Note : The Mid Semester Examination shall be conducted after completing 50% of syllabus.

After going through the course, the student should be able to

- Understand Coordinate systems, laws of motion and their application to various dynamical situations, notion of inertial frames and concept of Galilean invariance.
- Understand the phenomena of Oscillations and damped oscillations through SHM and damped harmonic oscillator.
- Understand the principles of elasticity through the study of Young's Modulus and modulus of rigidity.
- In the laboratory course, the student shall perform experiments related to kinematics.

Unit- I

Coordinate Systems: Unit vectors, displacement, velocity, acceleration, area and volume elements in Cartesian and spherical Polar coordinate systems.

Frames of Reference: Inertial and non-inertial frames of reference, uniformly rotating frame, Coriolis force and centrifugal forces, Coriolis force on a freely falling body.

Unit- II

Motion Under a Central Force: Concept of central and non-central forces, Equivalent one body problem, Angular momentum conservation in a central force field, Motion in a plane, Energy of reduced mass and its conservation, Differential equation of the orbit, Turning points of motion, Relation between eccentricity and energy, Kepler's laws.

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UNIVERSITY OF JAMMU

Syllabus of Physics at FYUP under CBCS as per NEP-2020 for the examination to be held in December 2022, 2023, 2024

Semester :	I	Type:	Minor
Course Name:	Kinematics	Course Code:	UMIPYTH-121
Credits:	4 (Theory)	L T P:	4-0-0 (Theory)
Contact Hrs.	60		
Duration of Exam	3 Hours (Theory)		
For Theory : End Semester Exam : 80 Marks Mid Semester Exam: 20 Marks			

Unit- III

Elasticity: Hooke's law - Stress-strain diagram - Elastic moduli, Relation between elastic constants, Poisson's Ratio, Expression for Poisson's ratio in terms of elastic constants, Work done in stretching and work done in twisting a wire.

Unit- IV

Oscillations: Simple harmonic motion, Differential equation of SHM and its solution, Kinetic energy and potential energy of a simple harmonic oscillator, Examples of SHM: compound pendulum, LC circuit and oscillations of two masses connected by a spring,

Damped oscillations: Differential equation of damped harmonic oscillator and its solution, Logarithmic decrement, Energy of damped oscillator, Power dissipation, Quality factor, Relaxation time.

Text and Reference Books:

1. An introduction to mechanics, D. Kleppner, R.J. Kolenkow, 1973, McGraw-Hill.
2. Mechanics, Berkeley Physics, vol.1, C.Kittel, W.Knight, et.al. 2007, Tata McGraw-Hill.
3. Physics, Resnick, Halliday and Walker 8/e. 2008, Wiley.
4. Analytical Mechanics, G.R. Fowles and G.L. Cassiday. 2005, Cengage Learning.
5. Feynman Lectures, Vol. I, R.P.Feynman, R.B.Leighton, M.Sands, 2008, Pearson Education
6. University Physics, Ronald Lane Reese, 2003, Thomson Brooks/Cole.
7. Mechanics, D.S. Mathur, S. Chand and Company Limited, 2000 University Physics.

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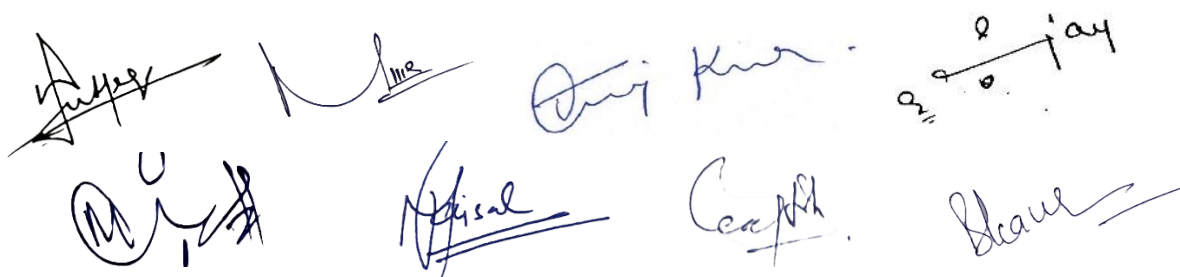
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Semester :	I	Type:	Minor
Course Name:	Kinematics	Course Code:	UMIPYTH-121
Credits:	4 (Theory)	L T P:	4-0-0 (Theory)
Contact Hrs.	60		
Duration of Exam	3 Hours (Theory)		
<u>For Theory :</u> End Semester Exam : 80 Marks Mid Semester Exam: 20 Marks			

Testing and Evaluation:

Examination Pattern shall be as under:

1. **20 marks shall be earmarked for Internal Assessment** (05 Marks for Attendance and 15 Marks for Assessment Test).
2. **Scheme for award of marks for attendance:**
 - a. Attendance of 75-80 % = 01 Marks
 - b. Attendance of 81-85 % = 02 Marks
 - c. Attendance of 86-90 % = 03 Marks
 - d. Attendance of 91-95 % = 04 Marks
 - e. Attendance of 96-100 % = 05 Marks
3. **Pattern of Internal Assessment Test of 15 marks:**
 - a. The test shall comprise of two sections:
 - i. **SECTION-A (Short Answer Type questions)**
 1. Attempt any five Questions of 02 Marks each out of eight Questions. **(5x2=10 Marks)**
 - ii. **SECTION-B (Long Answer Type questions)**
 1. Attempt any one Question of 05 Marks out of two Questions. **(1x5=5 Marks)**
4. **Pattern of External End-Semester Examination of 80 marks:**
 - a. The Paper shall comprise of three Sections:
 - i. **SECTION-A(Very short Answer Type Questions)**
 1. 06 questions of 01 mark each. **6x1=6 marks**
 2. 05 questions of 02 mark each. **5x2=10 marks**
 - ii. **SECTION-B(Short Answer Type Questions)**
 1. Total 08 questions (02 Questions from each unit) of 04 marks each.
 2. Attempt any one Question from each Unit. **4x4=16 marks**
 - iii. **SECTION-C (Long Answer Type Questions)**
 1. Total 08 questions (02 Questions from each unit) of 12 marks each.
 2. Attempt any one Question from each Unit. **4x12=48 marks**



Dept. of Physics, SKC GDC Poonch
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for the examination to be held in session 2026, 2027, 2028

Semester :	I	Type:	Minor
Course Name:	Kinematics	Course Code:	UMIPYTPR-131
Credits:	2 (Practical)	L T P:	2-0-0 (Theory)
Contact Hrs.	60		
Duration of Exam	3 Hours (Theory)		
<u>For Theory :</u> End Semester Exam : 25 Marks Mid Semester Exam: 25 Marks			

Perform any five of the following experiments subject to the availability of equipments/ apparatus

List of Experiments:

1. To determine the Moment of Inertia of a Flywheel.
2. To determine the Young's Modulus of a Wire by bending beam Method.
3. To determine the Modulus of Rigidity of a Wire by Maxwell's needle.
4. To determine the elastic Constants of a wire by Searle's method.
5. To determine the value of g using Bar Pendulum.
6. To determine the value of g using Kater's Pendulum.
7. To find the surface tension of water by Jaeger's Method.
8. To determine the frequency of A.C. mains using electric vibrator.

Note: The concerned department may add some more practical on the availability of some new practical as per Lab title.

Pattern of Exam:

Text and Reference Books:

1. B.Sc. Practical Physics by C. L. Arora.
2. Practical Physics by G L Squires Cambridge University Press
3. Advanced Practical Physics for Students by Worsnop and Flint
4. Practical Physics by R K Shukla
5. B.Sc. Practical Physics by Harnam Singh

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Semester :	I	Type:	Multi-disciplinary
Course Name:	Physics in Daily Life	Course Code:	UMDPYT-141
Credits:	3	L T P:	3-0-0
Contact Hrs.	45		
Duration of Exam	3 Hours	End Semester Exam	60 Marks
		Mid Semester Exam	15 Marks
<i>Mid Semester Exam shall be conducted after completing 50% of syllabus.</i>			

Course Outcomes:

The aim of this course is to enable the students to be familiar with various basic physical phenomena.

Unit-I

Quantities, Energy and Power: Physical quantities, Standards and Units, International system of Units, Standards of time, length and mass, Precision and significant figures, errors.

Energy and Power: Explosions and energy; Kinetic energy and conservation of momentum in explosions; Heat energy and its units; Energy table and discussions; Discussion of cost of energy; Measuring energy; Power; Different power sources.

Unit-II

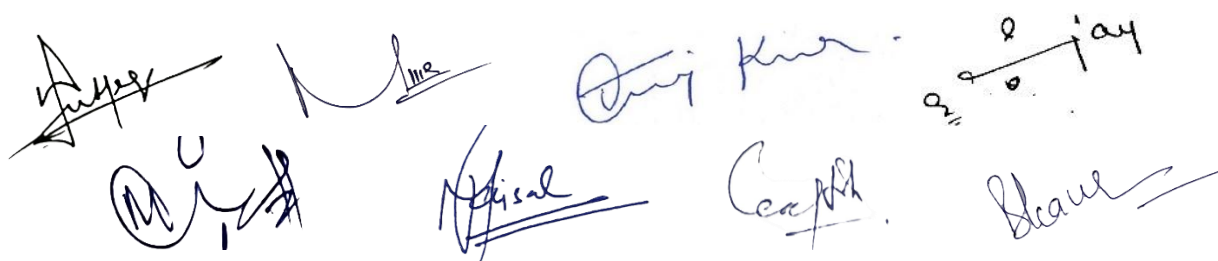
Gravity, Force and Space: The force of Gravity; Newton's third law; Weightlessness; Low earth orbit; Geosynchronous satellites; Spy satellites; Medium Earth Orbit satellite; Circular Acceleration; momentum; Rockets; Airplanes, helicopters and fans; Hot air and helium balloons; angular momentum and torque.

Unit-III

Nuclei and radioactivity: Radioactivity; Elements and isotopes; Radiation and rays; Seeing radiation; The REM – The radiation poisoning; Radiation and cancer; The linear hypothesis; Different types of radiation; The half-life rule; Smoke detectors; measuring age from radioactivity; Environmental radioactivity; Glow of radioactivity, Basic concepts of Fission and Fusion.

Unit IV

The Solar system and the Universe: The Planets, The Moon, Comets, Meteors, The Sun, Solar Energy, Solar Atmosphere, Sunspots, The Stars, Apparent magnitude, Absolute magnitude and stellar distances, Stellar Evolution, The Universe, Milky Way Galaxy, Cosmic Rays, Other galaxies, The expanding universe.



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Semester :	I	Type:	Multi-disciplinary
Course Name:	Physics in Daily Life	Course Code:	UMDPYT-141
Credits:	3	L T P:	3-0-0
Contact Hrs.	45		
Duration of Exam	3 Hours	End Semester Exam	60 Marks
		Mid Semester Exam	15 Marks
<i>Mid Semester Exam shall be conducted after completing 50% of syllabus.</i>			

Text and Reference Books:

1. Physics for future presidents by Richard A. Muller (w.w. Norton and Co.)
2. Abhyankar K. D., Astrophysics: Stars and Galaxies (Universities Press, 2009).
3. Nuclei and Radioactivity by G.R. Choppin (W.A. Bejamin, N.Y. York)
4. Space, Time and Gravitation by A.S. Eddington (Cambridge University Press).
5. Work, Energy and Power by Sarah Allen.
6. The Casual Sky Observer's Guide by Rony De Laet Springer 2012.

Testing and Evaluation:

Examination Pattern shall be as under:

1. **20 marks shall be earmarked for Internal Assessment** (05 Marks for Attendance and 15 Marks for Assessment Test).
2. Scheme for award of marks for attendance:
 - a. Attendance of 75-80 % = 01 Marks
 - b. Attendance of 81-85 % = 02 Marks
 - c. Attendance of 86-90 % = 03 Marks
 - d. Attendance of 91-95 % = 04 Marks
 - e. Attendance of 96-100 % = 05 Marks
3. Pattern of Internal Assessment Test of 15 marks:
 - b. The test shall comprise of two sections:
 - i. SECTION-A (Short Answer Type questions)
 1. Attempt any five Questions of 02 Marks each out of eight Questions. **(5x2=10 Marks)**
 - ii. SECTION-B (Long Answer Type questions)
 1. Attempt any one Question of 05 Marks out of two Questions. **(1x5=5 Marks)**
4. Pattern of External End-Semester Examination of 80 marks:
 - c. The Paper shall comprise of three Sections:
 - i. SECTION-A(Very short Answer Type Questions)
 1. 06 questions of 01 mark each. **6x1=6 marks**
 2. 05 questions of 02 mark each. **5x2=10 marks**
 - ii. SECTION-B(Short Answer Type Questions)
 1. Total 08 questions (02 Questions from each unit) of 0
 2. Attempt any one Question from each Unit. **4x4=16 marks**
 - iii. SECTION-C (Long Answer Type Questions)
 1. Total 08 questions (02 Questions from each unit) of 12 marks each.

Attempt any one Question from each Unit. **4x12=48 marks**

Dept. of Physics, SKC GDC Poonch

**Syllabus of Physics at FYUP under CBCS as per NEP-2020
for the examination to be held in session 2026,2027,2028**

Semester :	I	Type:	Skill Enhancement Course
Course Name:	<i>Fundamentals of Electricity, Safety, and Tools</i>	Course Code:	USEPYT-151
Credits:	3	L T P:	1-0-2
Contact Hrs.	30		
Duration of Exam	2½ Hours	End Semester Exam	40 Marks
		Mid-Semester Exam	35 Marks
<i>Mid Semester Exam shall be conducted after completing 50% of syllabus.</i>			

Course Outcomes:

The aim of this course is to enable the students to be familiar with various mechanical and electrical tools through hands-on mode

Semester 1: Fundamentals of Electricity, Safety, and Tools

- **Unit 1: Basic Electrical Theory**

Understanding Voltage, Current, Resistance, and Power. Applying Ohm's Law and the Power Formula in real-world scenarios. Differences between Alternating Current (AC) and Direct Current (DC). Understanding single-phase vs. three-phase power supplies. **Electrical Safety and First Aid** The crucial role of grounding/earthing and circuit breakers (MCBs, RCCBs). Personal Protective Equipment (PPE) for electrical work. Emergency protocols and first aid for electrical shocks.

- **Unit 2: Tools of the Trade and Testing Equipment**

Mastering the digital multimeter (measuring continuity, voltage, resistance, and current). Proper use of clamp meters, wire strippers, and crimping tools. Soldering and desoldering techniques for circuit boards.

- **Unit 3: Components and Basic Circuits**

Identifying resistors, capacitors, diodes, and switches. Wiring series and parallel circuits. Understanding fuses, thermal cutoffs, and thermostats.

Note for paper setters for End Semester Examination:

Dept. of Physics, SKC GDC Poonch
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for the examination to be held in session 2026, 2027, 2028

Semester :	I	Type:	Major
Course Name:	Electrostatics and Magnetism	Course Code:	UMJPYT-201
Credits:	4	L T P:	4-0-0 (Theory) 0
Contact Hrs.	60		
Duration of Exam	3 Hours		
<u>For Theory :</u> End Semester Exam : 80 Marks, Mid Semester Exam : 20 Marks			

Syllabus for Theory (3 Credits)

Note : The Mid Semester Examination shall be conducted after completing 50% of syllabus.

Course learning outcomes:

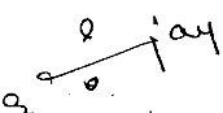
- Demonstrate Gauss's law, Coulomb's law for the electric field, and apply it to systems of point charges as well as line, surface, and volume distributions of charges.
- Explain and differentiate the vector (electric fields, Coulomb's law) and scalar (electric potential, electric potential energy) formalisms of electrostatics.
- Apply Gauss's law of electrostatics to solve a variety of problems.
- Describe the magnetic field produced by magnetic dipoles and electric currents.
- Explain Faraday's law and Maxwell's laws to articulate the relationship between electric and magnetic fields.
- Understand the dielectric properties, magnetic properties of materials and phenomena of electromagnetic induction.
- Understand the properties of EM Waves

Unit-I

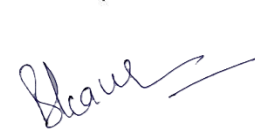
Scalar and Vector fields, line, surface and volume integral, del operator, gradient and its physical significance, divergence and its physical significance, solenoidal fields, curl and its physical significance, irrotational fields. Gauss's divergence theorem and Stoke's theorem, Concept of electric field, electric field due to point charge, superposition principle, potential, relation between electric intensity and potential, electric dipole and dipole moment.

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Semester :	I	Type:	Major
Course Name:	Electrostatics and Magnetism	Course Code:	UMJPYT-201
Credits:	4	L T P:	4-0-0 (Theory) 0
Contact Hrs.	60		
Duration of Exam	3 Hours		
<u>For Theory :</u> End Semester Exam : 80 Marks, Mid Semester Exam : 20 Marks			

Unit-II

Electric flux , Gauss's law of electrostatics (integral and differential form) **Dielectrics:** Non-polar molecules, polar molecules, polar and non-polar molecules in an electric field, polarization, polarization charges and polarization vector, electric susceptibility, displacement vector, electric field in dielectric, Gauss's law in dielectrics (integral and differential form), Relation between three electric vectors: displacement vector (D), electric vectors (E), and polarization vector (P).

Unit-III

Magnetostatics: Concept of magnetic field, Biot-Savart's law, applications of Biot-Savart's law, Ampere's circuital law (integral and differential form) and its limitations, divergence of magnetic field, magnetic scalar and vector potentials, divergence of vector potential, current loop as a magnetic dipole, magnetization vector , magnetization current, free and bound currents, relation between magnetic field (**B**), magnetism intensity(**H**) and magnetization vector (**M**), magnetic susceptibility and permeability.

Unit-IV

Time Varying Fields: integral and differential forms of Faraday's laws of electromagnetic induction, self and mutual inductance, self inductance of a solenoid, mutual inductance of two solenoids, reciprocity theorem of mutual inductance, relation between self and mutual inductances, coefficient of coupling, energy stored in magnetic field, Maxwell's equations (differential and integral forms) and their interpretation.

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Amey, M. S., N. S., Anil Kumar, Jay, N. S., Capt. S. S.

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Semester :	I	Type:	Major
Course Name:	Electrostatics and Magnetism	Course Code:	UMJPYT-201
Credits:	4	L T P:	4-0-0 (Theory) 0
Contact Hrs.	60		
Duration of Exam	3 Hours		
<u>For Theory :</u> End Semester Exam : 80 Marks, Mid Semester Exam : 20 Marks			

Examination Pattern shall be as under:

5. **20 marks shall be earmarked for Internal Assessment** (05 Marks for Attendance and 15 Marks for Assessment Test).

6. Scheme for award of marks for attendance:

- | | | |
|---------------------------|---|----------|
| a. Attendance of 75-80 % | = | 01 Marks |
| b. Attendance of 81-85 % | = | 02 Marks |
| c. Attendance of 86-90 % | = | 03 Marks |
| d. Attendance of 91-95 % | = | 04 Marks |
| e. Attendance of 96-100 % | = | 05 Marks |

7. Pattern of Internal Assessment Test of 15 marks:

d. The test shall comprise of two sections:

i. SECTION-A (Short Answer Type questions)

1. Attempt any five Questions of 02 Marks each out of eight Questions. **(5x2=10 Marks)**

ii. SECTION-B (Long Answer Type questions)

1. Attempt any one Question of 05 Marks out of two Questions. **(1x5=5 Marks)**

8. Pattern of External End-Semester Examination of 80 marks:

e. The Paper shall comprise of three Sections:

i. SECTION-A (Very short Answer Type Questions)

1. 06 questions of 01 mark each. **6x1=6 marks**

2. 05 questions of 02 mark each. **5x2=10 marks**

ii. SECTION-B (Short Answer Type Questions)

1. Total 08 questions (02 Questions from each unit) of 0

2. Attempt any one Question from each Unit. **4x4=16 marks**

iii. SECTION-C (Long Answer Type Questions)

1. Total 08 questions (02 Questions from each unit) of 12 marks each.

Attempt any one Question from each Unit. **4x12=48 marks**

Note for paper setters for Mid Semester Examination:

Text and Reference Books:

- Electricity and Magnetism, Edward M. Purcell, 1986, McGraw-Hill Education..
- Electricity and Magnetism, J.H. Fewkes & J. Yarwood. Vol. I, 1991, Oxford Univ. Press. .
- Electricity and Magnetism, D.C. Tayal, 1988, Himalaya Publishing House.
- University Physics, Ronald Lane Reese, 2003, Thomson Brooks/Cole.

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5. Electromagnetic Fields and Waves, P.Lorrain & D. Corson, W.H. Freeman & Co.
6. Introduction to Electrodynamics, D.J.Griffiths, 3rd Edition, 1998, Benjamin Cummings.

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M. ~~Amey~~ ~~Ma~~ ~~Ma~~

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Semester :	I	Type:	Major
Course Name:	Electrostatics and Magnetism	Course Code:	UMJPYPR-211
Credits:	2	L T P:	2-0-0 (Theory) 0
Contact Hrs.	60		
Duration of Exam	3 Hours		

Note : Perform any five of the following experiments as per the availability of equipments/ apparatus.

List of Experiments:

1. To determine a low resistance by Carey Foster's Bridge with/without calibration
2. To determine the ratio of two capacitances by de Sauty's bridge.
3. To determine self-inductance of a coil by Anderson's bridge using AC.
4. To determine self-inductance of a coil by Rayleigh's method.
5. To determine the impedance of Series LCR circuits
6. To determine the frequency of ac mains using electrical vibrator
7. To find the frequency of a tuning fork using Sonometer
8. To find the capacitance of a capacitor using electrical vibrator

Note: The concerned department may add some more practicals on the availability of some new equipments related to the course.

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Semester :	I	Type:	Major
Course Name:	Electrostatics and Magnetism	Course Code:	UMJPYPR-211
Credits:	2	L T P:	2-0-0 (Theory) 0
Contact Hrs.	60		
Duration of Exam	3 Hours		

Text Book sand References:

1. Geeta Sanon, B.Sc. Practical Physics, (R. Chand & Co).
2. B. L. Worsnop and H.T. Flint, Advanced Practical Physics, (Asia Publishing House, New Delhi).
3. Indu Prakash and Ramakrishna, A Text Book of Practical Physics, (Kitab Mahal, New Delhi).
4. D.P. Khandewal, A Laboratory Manual of Physics for Undergraduate Classes, (Vani Publication House, New Delhi).

Examination Pattern shall be as under:

9. **20 marks shall be earmarked for Internal Assessment** (05 Marks for Attendance and 15 Marks for Assessment Test).

10. Scheme for award of marks for attendance:

- | | | |
|---------------------------|---|----------|
| a. Attendance of 75-80 % | = | 01 Marks |
| b. Attendance of 81-85 % | = | 02 Marks |
| c. Attendance of 86-90 % | = | 03 Marks |
| d. Attendance of 91-95 % | = | 04 Marks |
| e. Attendance of 96-100 % | = | 05 Marks |

11. Pattern of Internal Assessment Test of 15 marks:

- f. The test shall comprise of two sections:
- i. SECTION-A (Short Answer Type questions)
 1. Attempt any five Questions of 02 Marks each out of eight Questions. **(5x2=10 Marks)**
 - ii. SECTION-B (Long Answer Type questions)
 1. Attempt any one Question of 05 Marks out of two Questions. **(1x5=5 Marks)**

12. Pattern of External End-Semester Examination of 80 marks:

- g. The Paper shall comprise of three Sections:
- i. SECTION-A (Very short Answer Type Questions)
 1. 06 questions of 01 mark each. **6x1=6 marks**
 2. 05 questions of 02 mark each. **5x2=10 marks**
 - ii. SECTION-B (Short Answer Type Questions)
 1. Total 08 questions (02 Questions from each unit) of 0
 2. Attempt any one Question from each Unit. **4x4=16 marks**
 - iii. SECTION-C (Long Answer Type Questions)
 1. Total 08 questions (02 Questions from each unit) of 12 marks each.
 - Attempt any one Question from each Unit. **4x12=48 marks**

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Semester :	II	Type:	Minor
Course Name:	Electromagnetism	Course Code:	UMIPYTH-221
Credits:	4 (Theory)	L T P:	4-0-0 (Theory)
Contact Hrs.	60		
Duration of Exam	3 Hours (Theory)		
<u>For Theory :</u> End Semester Exam : 80 Marks Mid Semester Exam: 20 Marks			

Syllabus for Theory (4 Credits)

Note : The Mid Semester Examination shall be conducted after completing 50% of syllabus.

Course learning outcomes:

- Understanding of Gauss's law for electrostatics and its application.
- Knowledge about the vector (electric fields, Coulomb's law) and scalar (electric potential, electric potential energy) formalisms of electrostatics.
- Explanation of the magnetic field produced by magnetic dipoles and electric currents.
- Explain Faraday's law and Maxwell's laws to articulate the relationship between electric and magnetic fields.
- Understand the dielectric properties, magnetic properties of materials and phenomena of electromagnetic induction.
- Understand the properties of EM Waves

Unit- I

Review of vector algebra, Scalar and vector fields, Gradient of a scalar field and its physical interpretation, Divergence of a vector field and its physical significance, solenoidal field, Vector integration, Line, surface and volume integrals of vector fields, Gauss divergence theorem, Curl of a vector field and its significance, Stoke's theorem of vectors, irrotational vector field, Vector identities.

Unit- II

Concept of electric field, electric field due to point charge, superposition principle, potential, relation between electric intensity and potential, electric dipole and dipole moment. Electric flux, Differential and integral Gauss's law of electrostatics, electric potential, electric potential as line integral of electric field, potential due to a point charge. Dielectrics, polar and non-polar molecules in an electric field, polarization and polarization vector, electric susceptibility, electric field in dielectric, Gauss's law in dielectrics, Relation between three electric vectors: displacement vector (D), electric field (E), and polarization vector (P).

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Dept. of Physics, SKC GDC Poonch
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for the examination to be held in session 2026, 2027, 2028

Semester :	II	Type:	Minor
Course Name:	Electromagnetism	Course Code:	UMIPYTH-221
Credits:	4 (Theory)	L T P:	4-0-0 (Theory)
Contact Hrs.	60		
Duration of Exam	3 Hours (Theory)		
For Theory : End Semester Exam : 80 Marks Mid Semester Exam: 20 Marks			

Unit-III

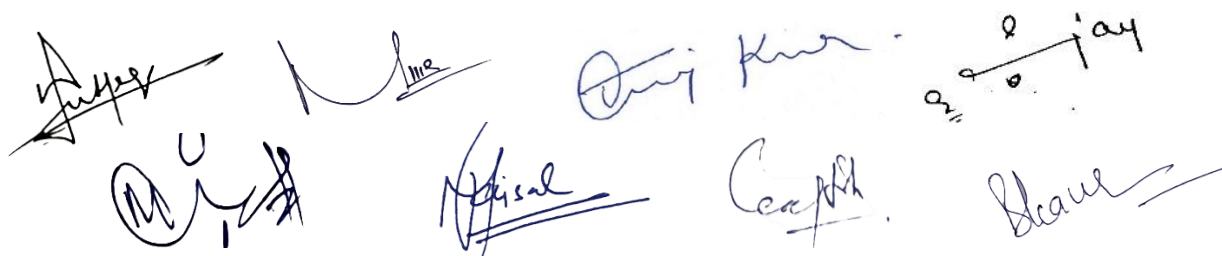
Concept of magnetic field, Biot-Savart's law, application of Biot-Savart's law, Ampere's circuital law (integral and differential form) and its limitations, modified form of ampere's circuital law, displacement current, divergence of magnetic field, magnetic scalar and vector potentials, divergence of vector potential, Integral and differential forms of Faraday's laws of electromagnetic induction, Self inductance of a solenoid, Mutual inductance of two solenoids.

Unit-IV

Maxwell equations and their interpretation, Poynting vector, Electromagnetic waves in vacuum; The wave equations for $\vec{E}$ and $\vec{B}$, Monochromatic plane electromagnetic waves and their transverse nature, Electromagnetic waves in conductors; Modified wave equations, Skin Depth and Characteristic impedance.

Reference Books:

1. Electricity and Magnetism, Edward M. Purcell, 1986, McGraw-Hill Education..
2. Electricity and Magnetism, J.H. Fewkes & J. Yarwood. Vol. I, 1991, Oxford Univ. Press. .
3. Electricity and Magnetism, D.C. Tayal, 1988, Himalaya Publishing House.
4. University Physics, Ronald Lane Reese, 2003, Thomson Brooks/Cole.
5. Electromagnetic Fields and Waves, P.Lorrain & D. Corson, W.H. Freeman & Co.
6. Introduction to Electrodynamics, D.J.Griffiths, 3rd Edition, 1998, Benjamin Cummings.



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Semester :	II	Type:	Minor
Course Name:	Electromagnetism	Course Code:	UMIPYTH-221
Credits:	4 (Theory)	L T P:	4-0-0 (Theory)
Contact Hrs.	60		
Duration of Exam	3 Hours (Theory)		
<u>For Theory :</u> End Semester Exam : 80 Marks Mid Semester Exam: 20 Marks			

Examination Pattern shall be as under:

13. **20 marks shall be earmarked for Internal Assessment** (05 Marks for Attendance and 15 Marks for Assessment Test).

14. Scheme for award of marks for attendance:

- | | | |
|---------------------------|---|----------|
| a. Attendance of 75-80 % | = | 01 Marks |
| b. Attendance of 81-85 % | = | 02 Marks |
| c. Attendance of 86-90 % | = | 03 Marks |
| d. Attendance of 91-95 % | = | 04 Marks |
| e. Attendance of 96-100 % | = | 05 Marks |

15. Pattern of Internal Assessment Test of 15 marks:

- h. The test shall comprise of two sections:
- SECTION-A (Short Answer Type questions)**
 - Attempt any five Questions of 02 Marks each out of eight Questions. **(5x2=10 Marks)**
 - SECTION-B (Long Answer Type questions)**
 - Attempt any one Question of 05 Marks out of two Questions. **(1x5=5 Marks)**

16. Pattern of External End-Semester Examination of 80 marks:

- i. The Paper shall comprise of three Sections:
- SECTION-A (Very short Answer Type Questions)**
 - 06 questions of 01 mark each. **6x1=6 marks**
 - 05 questions of 02 mark each. **5x2=10 marks**
 - SECTION-B (Short Answer Type Questions)**
 - Total 08 questions (02 Questions from each unit) of 04 marks each.
 - Attempt any one Question from each Unit. **4x4=16 marks**
 - SECTION-C (Long Answer Type Questions)**
 - Total 08 questions (02 Questions from each unit) of 12 marks each.
- Attempt any one Question from each Unit. **4x12=48 marks**

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Semester :	II	Type:	Minor
Course Name:	Electromagnetism	Course Code:	UMIPYPR-231
Credits:	2 (Practical)	L T P:	2-0-0 (Practical)
Contact Hrs.	60		
Duration of Exam	3 Hours (Practical)		

Note : Perform any five of the following experiments as per the availability of equipments/ apparatus.

List of Experiments:

1. To determine self-inductance of a coil by Anderson's bridge using AC.
2. To determine self-inductance of a coil by Rayleigh's method.
3. To find impedance of a series LCR circuit
4. To compare capacitances of two capacitors using De'Sauty's bridge.
5. To study the variation of magnetic field with distance along the axis of a circular coil carrying current.
6. To study the Characteristics of a Series RC Circuit.
7. To study the a series LCR circuit and determine its (a) Resonant Frequency, (b) Quality Factor
8. To study a parallel LCR circuit and determine its (a) Anti-resonant frequency and (b) Quality factor Q.
9. To determine a Low Resistance by Carey Foster's Bridge
10. To find the capacitance of a capacitor using electric vibrator.

Note: The concerned department may add some more practical on the availability of some new practical as per Lab title.

Pattern of Exam: Continuous Assessment: 10 marks

Final Examination: 15 marks

Text and Reference Books:

1. B. Sc Practical Physics by C. L. Arora.
2. Practical Physics by G L Squires Cambridge University Press
3. Advanced Practical Physics for Students by Worsnop and Flint
4. Practical Physics by R K Shukla
5. B.Sc Practical Physics by Harnam Singh
6. B.Sc. Practical Physics(R.Chand and Co.) by Geeta Sanon

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Semester :	II	Type:	Multi-disciplinary
Course Name:	Renewable Energy and Energy Harvesting	Course Code:	UMDPYT-241
Credits:	3	L T P:	3-0-0
Contact Hrs.	45		
Duration of Exam	3 hours	End Semester Exam	60 marks
		Mid Semester Exam	15 marks
<i>Mid Semester Exam shall be conducted after completing 50% of syllabus.</i>			

Course Outcomes:

The aim of this course is to enable the students to have knowledge about various sources of energy and their harvesting

Unit-I

Energy sources: Energy concept-sources in general, its significance & necessity, Classification of energy sources: Primary and Secondary energy, Commercial and Non-commercial energy, Renewable and Non-renewable energy, Importance of renewable energy resources.

Unit-II

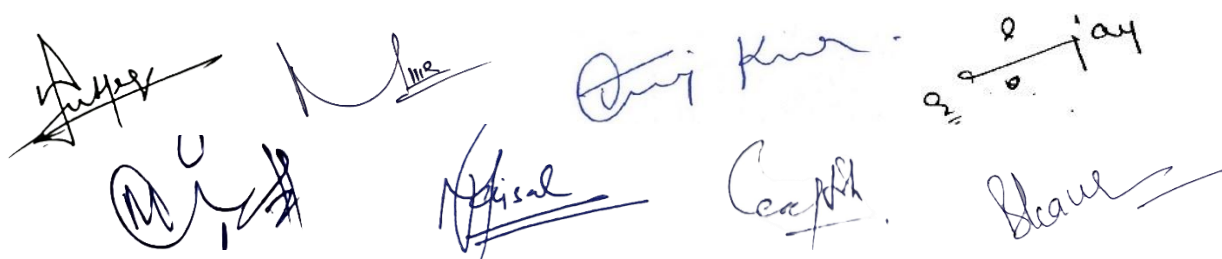
Conventional energy sources: Fossil fuels & Nuclear energy- production & extraction, usage rate and limitations. Impact on environment and their issues & challenges, Overview of Indian & world energy scenario with latest statistics- consumption & necessity. Need of eco-friendly & green energy.

Unit-III

Renewable energy sources: Need of renewable energy, non-conventional energy sources. An overview of developments in Offshore Wind Energy, Tidal Energy, Wave energy systems, Ocean Thermal Energy Conversion, solar energy, biomass, biochemical conversion, biogas generation, geothermal energy tidal energy, principle of generation of Hydroelectricity.

Unit-IV

Solar energy: Solar Energy-Key features and its importance, Merits & demerits of solar energy, Applications of solar energy. Solar water heater, solar cooker, solar green houses, solar cell - brief discussion of each. Importance and characteristics of photovoltaic (PV) systems, and Sun-tracking systems.



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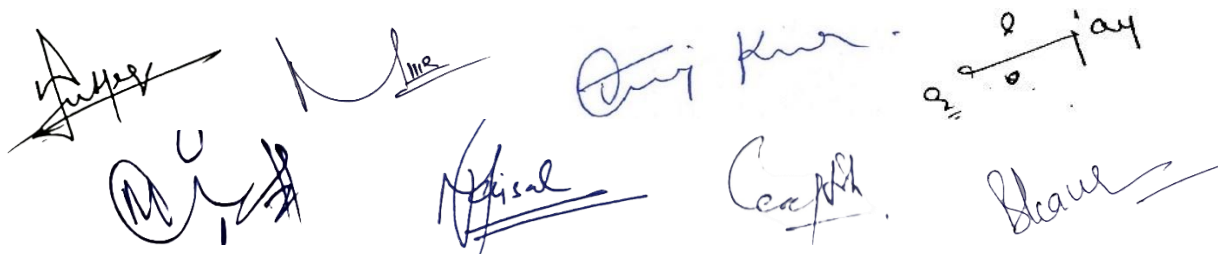
Semester :	II	Type:	Multi-disciplinary
Course Name:	Renewable Energy and Energy Harvesting	Course Code:	UMDPYT203
Credits:	3	L T P:	3-0-0
Contact Hrs.	45		
Duration of Exam	3 hours	End Semester Exam	60 marks
		Mid Semester Exam	15 marks
<i>Mid Semester Exam shall be conducted after completing 50% of syllabus.</i>			

Reference Books

1. Non-conventional energy sources - G.D Rai - Khanna Publishers, New Delhi
2. Solar energy - M P Agarwal - S Chand and Co. Ltd.
3. Solar energy - Suhas P Sukhative Tata McGraw - Hill Publishing Company Ltd.
4. Godfrey Boyle, "Renewable Energy, Power for a sustainable future", 2004, Oxford University Press, in association with The Open University.
5. Dr. P Jayakumar, Solar Energy: Resource Assessment Handbook, 2009
6. J.Balfour, M.Shaw and S. Jarosek, Photovoltaics, Lawrence J Goodrich (USA).
7. http://en.wikipedia.org/wiki/Renewable_energy

Note for paper setters for End Semester Examination:

Note for paper setters for Mid Semester Examination:

A collection of handwritten signatures in blue ink, likely representing the faculty members who approved the syllabus. The signatures are arranged in two rows. The top row includes signatures that appear to be 'Anurag', 'R. Me', 'Anil Kumar', and 'S. Jay'. The bottom row includes signatures that appear to be 'M. U.', 'Rajal', 'C. P. S.', and 'S. Jay'.

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Semester :	II	Type:	Skill Enhancement Course
Course Name:	<i>Small Domestic Appliances (Heating & Motorized)</i>	Course Code:	USEPYT-251
Credits:	3	L T P:	1-0-2
Contact Hrs.	30		
Duration of Exam	2½ Hours	End Semester Exam	40 Marks
		Mid Semester Exam	35 Marks
<i>Mid Semester Exam shall be conducted after completing 50% of syllabus.</i>			

Course Outcomes:

The aim of this course is to enable the students to be familiar with Mechanical, Electrical and Electronic skills.

Semester 2: Small Domestic Appliances (Heating & Motorized)

- **Unit 1: Thermal Appliance Principles**

How nichrome heating elements and bimetallic thermostats work. Reading appliance wiring diagrams and schematics.

- **Unit 2: Repairing Heating Appliances**

- **Electric Irons (Dry & Steam):** Testing soleplates, replacing thermal fuses, fixing water leaks. **Electric Kettles & Coffee Makers:** Diagnosing base-plate failures, descaling, replacing heating coils. **Toasters & Room Heaters:** Fixing electromagnet release mechanisms, repairing quartz/halogen heater rods, checking tilt-switches.

- **Unit 3: Electric Motor Fundamentals**

- Basic principles of magnetism and induction. Identifying parts of universal motors and induction motors (stator, rotor, carbon brushes).

- **Unit 4: Repairing Motor-Driven Appliances**

- **Ceiling & Table Fans:** Replacing capacitors, changing bearings, rewinding basics. **Mixer Grinders & Blenders:** Replacing carbon brushes, fixing jammed rotors, changing couplers and overload switches. **Vacuum Cleaners:** Checking suction loss, cleaning/replacing HEPA filters, servicing high-speed motors.

- **Semester 2 Practical Lab:**

- Tear-down and reassembly of heating and motorized appliances. Continuity testing to isolate faults in a broken appliance. Replacing worn-out carbon brushes and faulty thermal fuses.

Reference Books:

- A text book in Electrical Technology - B L Theraja – S. Chand and Company.
- Performance and design of AC machines – M.G. Say, ELBS Edn.
- Mechanical workshop practice, K.C. John, 2010, PHI Learning Pvt. Ltd.
- Workshop Processes, Practices and Materials, Bruce J Black 2005, 3rd Edn., Editor Newnes [ISBN: 0750660732]
- New Engineering Technology, Lawrence Smyth/Liam Hennessy, The Educational Company of Ireland [ISBN: 0861674480]