(UGC- Recognized University as per section 2(f) of the UGC act 1956)

Course Outline

COURSE TITLE	Mathematical Physics	
Course Code	PHY-101	
Credits	4 (L: 4 ,P:0 ,T:4)	
Faculty Name	Mr. Kapil Sharma	
Program	M.Sc(Physics)	
Academic Year and	w.e.f. 2024-25, 1 st Semester	

1. Course Description

- 1. The students would get sufficient exposure /understanding of the linear vector space and applications of matrices to physical problems.
- 2. The students would be able to solve problems based on differential equations.

2. Student Learning Outcomes:

At the end of this course, students should be able to:

1. The analysis of special functions would equip a student for effective tackling of specific problems.

2. The students would be able to realize various applications with proper understanding of series expansion and integral transforms.

3. Required Textbook and Reference Material:

• Material will be provided by faculty.

4. Session Plan:

COMPONENT	WEIGHTAGE	DETAILS
Assignment	10%	Sheet Work(A-4 Size sheet in a well mannered way)
Tests	10%	Test would be taken to assess the knowledge about topics related to daily basis classes.
Attendance & Classroom participation	10%	Students should have at least 75% attendance
Mid- Sem Exam	20%	Mid- Term exam must be cleared by students for appearing in final examination.
End- Sem Exam	50%	The end term exam must be cleared for appearing in next semester with a minimum passing criteria .

6. Academic Integrity:

• Please note that students involved in academic dishonesty will receive a **ZERO** grade on the particular component in which the infraction occurred.

• Academic dishonesty consists of misrepresentation by deception or by other fraudulent means. In an academic setting this may take the form of copying or use of unauthorized aids in tests, assignments, examinations, term papers, or cases; plagiarism; talking during in-class examinations; submission of work that is not your own without citation; submission of work generated by another person; aiding and abetting another student's dishonesty; and giving false information for the purpose of gaining credits.

7. No Network Policy

(UGC- Recognized University as per section 2(f) of the UGC act 1956)

COURSE TITLE	Classical Mechanics
Course Code	PHY-102
Credits	4 (L: 4 ,P:0 ,T:4)
Faculty Name	Mr. Kapil Sharma
Program	M.Sc(Physics)
Academic Year and Semester	w.e.f. 2024-25, 1 st Semester

Course Outline

1. Course Description

1. Student would be able to describe and understand the motion of a mechanical system using Lagrange and Hamilton formalisms.

2. Students would become able to understand the concepts of central force motion and moving coordinate systems

2. Student Learning Outcomes:

At the end of this course, students should be able to:

1. Students would become able to understand the concepts of central force motion and moving coordinate systems.

2. Student would get basic ideas about the theory of small oscillations and use of Poisson's bracket which will lead to understand the concepts of quantum mechanics.

3. Required Textbook and Reference Material:

• Material will be provided by faculty.

4. Session Plan:

COMPONENT	WEIGHTAGE	DETAILS
Assignment	10%	Sheet Work(A-4 Size sheet in a well mannered way)
Tests	10%	Test would be taken to assess the knowledge about topics related to daily basis classes.
Attendance & Classroom participation	10%	Students should have at least 75% attendance
Mid- Sem Exam	20%	Mid- Term exam must be cleared by students for appearing in final examination.
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7. No Network Policy

(UGC- Recognized University as per section 2(f) of the UGC act 1956)

COURSE TITLE	Quantum Mechanics –I	
Course Code	PHY-103	
Credits	4 (L: 4 ,P:0 ,T:4)	
Faculty Name	Dr. Monika	
Program	M.Sc (Physics)	
Academic Year and Semester	w.e.f. 2024-25, 1 st Semester	

Course Outline

1. Course Description

- 1. Student would be able to understand the concepts of operators in Quantum mechanics.
- 2. Students would be able to apply Pauli spin matrices to explain angular momentum.

2. Student Learning Outcomes:

At the end of this course, students should be able to:

1. Students would be capable to solve problems such as hydrogen atom.

2. Students can determine energies and wave functions of first and second order.

3. Required Textbook and Reference Material:

• Material will be provided by faculty.

4. Session Plan :

COMPONENT	WEIGHTAGE	DETAILS
Assignment	10%	Sheet Work(A-4 Size sheet in a well mannered way)
Tests	10%	Test would be taken to assess the knowledge about topics related to daily basis classes.
Attendance & Classroom participation	10%	Students should have at least 75% attendance
Mid -Sem Exam	20%	Mid- Term exam must be cleared by students for appearing in final examination.
End -Sem Exam	50%	The end term exam must be cleared for appearing in next semester with a minimum passing criteria .

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7. No Network Policy

(UGC- Recognized University as per section 2(f) of the UGC act 1956)

COURSE TITLE	Physics of Electronic Devices-1	
Course Code	PHY-104	
Credits	4 (L: 4 ,P:0 ,T:4)	
Faculty Name	Mr. Kapil Sharma	
Program	M.Sc (Physics)	
Academic Year and Semester	w.e.f. 2024-25, 1 st Semester	

Course Outline

1. Course Description

- 1. Students would get familiarity with semiconductor materials and charge transport in semiconductors.
- 2. Students would be able to appreciate the functioning and applications of various optoelectronic and memory devices.

2. Student Learning Outcomes:

At the end of this course, students should be able to:

1. Students would be able to explain the basic physics and application of different transistor types.

2. Students having familiarization with negative resistance devices and will be in a position to design switching circuits involving these device.

3. Required Textbook and Reference Material:

• Material will be provided by faculty.

4. Session Plan:

COMPONENT	WEIGHTAGE	DETAILS
Assignment	10%	Sheet Work(A-4 Size sheet in a well mannered way)
Tests	10%	
		Test would be taken to assess the knowledge
		about topics related to daily basis classes.
Attendance & Classroom participation	10%	Students should have at least 75% attendance
Mid- Sem Exam	20%	Mid- Term exam must be cleared by students for appearing in final examination.
End- Sem Exam	50%	The end term exam must be cleared for appearing in next semester with a minimum passing criteria .

6. Academic Integrity:

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7. No Network Policy

(UGC- Recognized University as per section 2(f) of the UGC act 1956)

COURSE TITLE	Practical: General Physics -I	
Course Code	PHY-105	
Credits	4 (L: 4 ,P:0 ,T:4)	
Faculty Name	Dr. Monika	
Program	M.Sc (Physics)	
Academic Year and Semester	w.e.f. 2024-25, 1 st Semester	

Course Outline

1. Course Description

1. Students would be able to determine the values of Stefan's constant, Boltzmann constant and e/m ratio of electron and experimental errors in each case.

2. Students would be able to understand magnetization and related aspects in a ferromagnetic material.

2. Student Learning Outcomes:

At the end of this course, students should be able to:

1. Students get familiarized with advanced spectroscopy.

2. Students would be able to understand the different harmonics and their amplitudes in a Fourier series experimentally which provide direct connect between theory and experiment.

3. Required Textbook and Reference Material:

• Material will be provided by faculty.

4. Session Plan:

COMPONENT	WEIGHTAGE	DETAILS
Assignment	10%	Sheet Work(A-4 Size sheet in a well mannered way)
Tests	10%	Test would be taken to assess the knowledge about topics related to daily basis classes.
Attendance & Classroom participation	10%	Students should have at least 75% attendance
Mid- Sem Exam	20%	Mid- Term exam must be cleared by students for appearing in final examination.
End- Sem Exam	50%	The end term exam must be cleared for appearing in next semester with a minimum passing criteria .

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7. No Network Policy

(UGC- Recognized University as per section 2(f) of the UGC act 1956)

COURSE TITLE	Practical: Electronics-I	
Course Code	PHY-106	
Credits	4 (L: 4 ,P:0 ,T:4)	
Faculty Name	Mr. Kapil Sharma	
Program	M.Sc (Physics)	
Academic Year and Semester	er w.e.f. 2024-25, 1 st Semester	

1. Course Description

The students would get hands on experience on experiments and relation to theory.
Theoretical results for different networks matched with experiments would enable students for

complex circuits

2. Student Learning Outcomes:

At the end of this course, students should be able to:

- 1. The students would get equipped for applications based on solid state devices
- 2. The students would be able to differentiate between analog and digital electronics.

3. Required Textbook and Reference Material:

• Material will be provided by faculty.

4. Session Plan:

COMPONENT	WEIGHTAGE	DETAILS
Assignment	10%	Sheet Work(A-4 Size sheet in a well mannered way)
Tests	10%	Test would be taken to assess the knowledge about topics related to daily basis classes.
Attendance & Classroom participation	10%	Students should have at least 75% attendance
Mid- Sem Exam	20%	Mid- Term exam must be cleared by students for appearing in final examination.
End- Sem Exam	50%	The end term exam must be cleared for appearing in next semester with a minimum passing criteria .

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7. No Network Policy

(UGC- Recognized University as per section 2(f) of the UGC act 1956)

Course Outline

COURSE TITLE	Statistical Mechanics	
Course Code	PHY-201	
Credits	4 (L: 4 ,P:0 ,T:4)	
Faculty Name	Mr. Kapil Sharma	
Program	M.Sc (Physics)	
Academic Year and Semester	w.e.f. 2024-25, 2 nd Semester	

1. Course Description

1. The students are able to appreciate cellular nature of phase space and interface of Statistical Mechanics with Thermodynamics

2. Knowledge of ensemble theory would result in greater insight into solutions of various complex problems

2. Student Learning Outcomes:

At the end of this course, students should be able to:

1. The students would be able to analyses the peculiar gas behavior and are in a position to extend the treatment to complex problems

2. The students would be equipped to explore the applications of Ising Model and to understand different approximations.

3. Required Textbook and Reference Material:

• Material will be provided by faculty.

4. Session Plan:

COMPONENT	WEIGHTAGE	DETAILS
Assignment	10%	Sheet Work(A-4 Size sheet in a well mannered way)
Tests	10%	Test would be taken to assess the knowledge about topics related to daily basis classes.
Attendance & Classroom participation	10%	Students should have at least 75% attendance
Mid- Sem Exam	20%	Mid- Term exam must be cleared by students for appearing in final examination.
End- Sem Exam	50%	The end term exam must be cleared for appearing in next semester with a minimum passing criteria .

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7. No Network Policy

(UGC- Recognized University as per section 2(f) of the UGC act 1956)

Course	Outline	

COURSE TITLE	Quantum Mechanics –II	
Course Code	PHY-202	
Credits	4 (L: 4 ,P:0 ,T:4)	
Faculty Name	Mr. Kapil Sharma	
Program	M.Sc (Physics)	
Academic Year and Semester	w.e.f. 2024-25, 2 nd Semester	

2. Course Description

- 1. Students would be able to explain ground state of hydrogen and helium molecules.
- 2. Students get enabled to analyse various transitions and their selection rules.

2. Student Learning Outcomes:

At the end of this course, students should be able to:

- 1. Students would be capable to understand 3D collisions.
- 2. Students would be capable to calculate spin states of identical particles.

3. Required Textbook and Reference Material:

• Material will be provided by faculty.

4. Session Plan:

COMPONENT	WEIGHTAGE	DETAILS
Assignment	10%	Sheet Work(A-4 Size sheet in a well mannered way)
Tests	10%	Test would be taken to assess the knowledge about topics related to daily basis classes.
Attendance & Classroom participation	10%	Students should have at least 75% attendance
Mid- Sem Exam	20%	Mid- Term exam must be cleared by students for appearing in final examination.
End- Sem Exam	50%	The end term exam must be cleared for appearing in next semester with a minimum passing criteria .

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7. No Network Policy

(UGC- Recognized University as per section 2(f) of the UGC act 1956)

Course Outline

COURSE TITLE	Atomic and Molecular Physics	
Course Code	PHY-203	
Credits	4 (L: 4 ,P:0 ,T:4)	
Faculty Name	Mr. Kapil Sharma	
Program	M.Sc (Physics)	
Academic Year and Semester	w.e.f. 2024-25, 2 nd Semester	

1. Course Description

- 1. Atomic spectra of one and two electron atoms.
- 2. The change in behaviour of atoms in external applied electric and magnetic field.

2. Student Learning Outcomes:

At the end of this course, students should be able to:

- 1. Diatomic molecules and their rotational vibrational and rotational vibrational spectra.
- 2. Energy levels and spectrum in diatomic molecules.

3. Required Textbook and Reference Material:

• Material will be provided by faculty.

4. Session Plan:

COMPONENT	WEIGHTAGE	DETAILS
Assignment	10%	Sheet Work(A-4 Size sheet in a well mannered way)
Tests	10%	Test would be taken to assess the knowledge about topics related to daily basis classes.
Attendance & Classroom participation	10%	Students should have at least 75% attendance
Mid- Sem Exam	20%	Mid- Term exam must be cleared by students for appearing in final examination.
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7. No Network Policy

(UGC- Recognized University as per section 2(f) of the UGC act 1956)

Course Outline

COURSE TITLE	Solid State Physics	
Course Code	PHY-204	
Credits	4 (L: 4 ,P:0 ,T:4)	
Faculty Name	Mr. Kapil Sharma	
Program	M.Sc (Physics)	
Academic Year and Semester	w.e.f. 2024-25, 2 nd Semester	

1. Course Description

- 1. Differentiate between different lattice types and explain the concept of reciprocal lattice and crystal diffraction using X-rays
- 2. Explain motion of electron in periodic lattice of solids under different binding conditions, concept of energy band and effect of same on electrical properties.

2. Student Learning Outcomes:

At the end of this course, students should be able to:

1. Lattice vibrations in solids and identity different types of defects in crystals.

2. Explain various types of magnetic phenomena, superconductivity, Physics behind them and their possible applications.

3. Required Textbook and Reference Material:

• Material will be provided by faculty.

4. Session Plan:

COMPONENT	WEIGHTAGE	DETAILS
Assignment	10%	Sheet Work(A-4 Size sheet in a well mannered way)
Tests	10%	Test would be taken to assess the knowledge about topics related to daily basis classes.
Attendance & Classroom participation	10%	Students should have at least 75% attendance
Mid- Sem Exam	20%	Mid- Term exam must be cleared by students for appearing in final examination.
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7. No Network Policy

(UGC- Recognized University as per section 2(f) of the UGC act 1956)

COURSE TITLE	Practical: General Physics –II	
Course Code	PHY-205	
Credits	4 (L: 4 ,P:0 ,T:4)	
Faculty Name	Mr. Kapil Sharma	
Program	M.Sc (Physics)	
Academic Year and Semester	w.e.f. 2024-25, 2 nd Semester	

Course Outline

1. Course Description

1. Students would be able to determine the values of Ionization potential of Hg, Planks and e/m ratio of electron and experimental errors in each case.

2. Students would be able determine band gap energy of semiconductor crystals.

2. Student Learning Outcomes:

At the end of this course, students should be able to:

1. Students get familiarized with LEDs

2. Students would be able to understand the working of p-n junction solar cells

3. Students will be able to measure dielectric constant of ferroelectric solids and their ferroelectric transition temperature.

3. Required Textbook and Reference Material:

• Material will be provided by faculty.

4. Session Plan:

COMPONENT	WEIGHTAGE	DETAILS
Assignment	10%	Sheet Work(A-4 Size sheet in a well mannered way)
Tests	10%	Test would be taken to assess the knowledge about topics related to daily basis classes.
Attendance & Classroom participation	10%	Students should have at least 75% attendance
Mid- Sem Exam	20%	Mid- Term exam must be cleared by students for appearing in final examination.
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7. No Network Policy

(UGC- Recognized University as per section 2(f) of the UGC act 1956)

Course Outline

COURSE TITLE	Practical: Electronics-II	
Course Code	PHY-206	
Credits	4 (L: 4 ,P:0 ,T:4)	
Faculty Name	Dr. Monika	
Program	M.Sc (Physics)	
Academic Year and Semester	w.e.f. 2024-25, 2 nd Semester	

1. Course Description

1. To understand about natural resources, their types and realize the importance of resources.

2. To acquire deep knowledge about land and forest resources.

2. Student Learning Outcomes:

At the end of this course, Students should be able to:

1. Students will be able to practically verify the frequency response of single and multistage amplifiers

2. Measurement of various analog circuits and comparison of experimental results with Theoretical analysis enables the student for problem solving.

3. Required Textbook and Reference Material:

• Material will be provided by faculty.

4. Session Plan:

COMPONENT	WEIGHTAGE	DETAILS
Assignment	10%	Sheet Work(A-4 Size sheet in a well mannered way)
Tests	10%	Test would be taken to assess the knowledge about topics related to daily basis classes.
Attendance & Classroom participation	10%	Students should have at least 75% attendance
Mid- Sem Exam	20%	Mid- Term exam must be cleared by students for appearing in final examination.
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