



DEPARTMENT OF PHYSICS
SRI Y.N.COLLEGE (AUTONOMOUS)-NARSAPUR
(Affiliated to Adikavi Nannaya University)
Twice Accredited by NAAC at 'A' Grade
Recognized by UGC as 'College with Potential for Excellence'
For 2022-2023 Admitted Batch [2020-21admitted Batch onwards]



COURSE OUTCOMES (CO's)

Program objectives, outcomes, co-curricular and assessment methods

1. Aim and objectives of UG program in Subject: To align with emerging and employment areas.
2. Course outcomes of Subject

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| BSc | Semester: I | Credits: 4 |
| Course: 1 | Mechanics: Waves and Oscillations | Hrs/Wk: 4 |

Semester - 1: Paper-I : Mechanics, Waves & Oscillations

On successful completion of this course, the students will be able to:

- Understand Newton's laws of motion and motion of variable mass system and its application to rocket motion and the concepts of impact parameter, scattering cross section.
- Apply the rotational kinematic relations, the principle and working of gyroscope and its applications and the precessional motion of a freely rotating symmetric top.
- Comprehend the general characteristics of central forces and the application of Kepler's laws to describe the motion of planets and satellite in circular orbit through the study of law of Gravitation.
- Understand postulates of Special theory of relativity and its consequences such as length contraction, time dilation, relativistic mass and mass-energy equivalence.
- Examine phenomena of simple harmonic motion and the distinction between undamped, damped and forced oscillations and the concepts of resonance and quality factor with reference to damped harmonic oscillator.
- Appreciate the formulation of the problem of coupled oscillations and solve them to obtain normal modes of oscillation and their frequencies in simple mechanical systems.
- Figure out the formation of harmonics and overtones in a stretched string and acquire the knowledge on Ultrasonic waves, their production and detection and their applications in different fields.

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| B Sc | Semester: 2 | Credits: 4 |
| Course: 2 | Wave Optics | Hrs/Wk: 4 |

Semester - 2: Paper II: Wave Optics:

On successful completion of this course, the student will be able to:

- Understand the phenomenon of interference of light and its formation in (i) Lloyd's single mirror due to division of wave front and (ii) Thin films, Newton's rings and Michelson interferometer due to division of amplitude.
- Distinguish between Fresnel's diffraction and Fraunhofer diffraction and observe the diffraction patterns in the case of single slit and the diffraction grating.
- Describe the construction and working of zone plate and make the comparison of zone plate with convex lens.
- Explain the various methods of production of plane, circularly and polarized light and their detection and the concept of optical activity..
- Comprehend the basic principle of laser, the working of He-Ne laser and Ruby lasers and their applications in different fields.
- Explain about the different aberrations in lenses and discuss the methods of minimizing them.
- Understand the basic principles of fibreoptic communication and explore the field of Holography and Nonlinear optics and their applications.

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| B Sc | Semester: 3 | Credits: 4 |
| Course: 3 | Heat and thermodynamics | Hrs/Wk: 4 |

Semester-3: Paper III: Heat and Thermodynamics:

On successful completion of this course, the student will be able to:

- Understand the basic aspects of kinetic theory of gases, Maxwell-Boltzmann distribution law, equipartition of energies, mean free path of molecular collisions and the transport phenomenon in ideal gases
- Gain knowledge on the basic concepts of thermodynamics, the first and the second law of thermodynamics, the basic principles of refrigeration, the concept of entropy, the thermodynamic potentials and their physical interpretations.
- Understand the working of Carnot's ideal heat engine, Carnot cycle and its efficiency
- Develop critical understanding of concept of Thermodynamic potentials, the formulation of Maxwell's equations and its applications.
- Differentiate between principles and methods to produce low temperature and liquefy air and also understand the practical applications of substances at low temperatures.

- Examine the nature of black body radiations and the basic theories.

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| B Sc | Semester: 4 | Credits: 4 |
| Course: 4 | Electricity, Magnetism & Electronics | Hrs/Wk: 4 |

Semester - 4: Paper IV: Electricity, Magnetism and Electronics:

On successful completion of this course, the students will be able to:

- ❖ Understand the Gauss law and its application to obtain electric field in different cases and formulate the relationship between electric displacement vector, electric polarization, Susceptibility, Permittivity and Dielectric constant.
- ❖ Distinguish between the magnetic effect of electric current and electromagnetic induction and apply the related laws in appropriate circumstances.
- ❖ Understand Biot and Savart's law and Ampere's circuital law to describe and explain the generation of magnetic fields by electrical currents.
- ❖ Develop an understanding on the unification of electric and magnetic fields and Maxwell's equations governing electromagnetic waves.
- ❖ Phenomenon of resonance in LCR AC-circuits, sharpness of resonance- factor, Power factor and the comparative study of series and parallel resonant circuits.
- ❖ Describe the operation of p-n junction diodes, Zener diodes, light emitting diodes and transistors
- ❖ Understand the operation of basic logic gates and universal gates and their truth tables.

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| B Sc | Semester: 4 | Credits: 4 |
| Course: 5 | Modern Physics | Hrs/Wk: 4 |

Semester - 4: Paper V: Modern Physics :

On successful completion of this course, the students will be able to:

- ❖ Develop an understanding on the concepts of Atomic and Modern Physics, basic elementary quantum mechanics and nuclear physics.
- ❖ Develop critical understanding of concept of Matter waves and Uncertainty principle.
- ❖ Get familiarized with the principles of quantum mechanics and the formulation of Schrodinger wave equation and its applications.

- ❖ Examine the basic properties of nuclei, characteristics of Nuclear forces, salient features of nuclear models and different nuclear radiation detectors.
- ❖ Classify Elementary particles based on their mass, charge, spin, half life and interaction.
- ❖ Get familiarized with the nano materials, their unique properties and applications.
- ❖ Increase the awareness and appreciation of superconductors and their practical applications.

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| B Sc | Semester: 5 | Credits: 3 |
| Course: 6 | Low Temperature Physics & Refrigeration | Hrs/Wk: 3 |

Semester - 5: Paper VI: Low Temperature Physics & Refrigeration

Course Outcomes: Students after successful completion of the course will be able to

1. Identify various methods and techniques used to produce low temperatures in the Laboratory.
2. Acquire a critical knowledge on refrigeration and air conditioning.
3. Demonstrate skills of Refrigerators through hands on experience and learn about refrigeration components and their accessories.
4. Understand the classification, properties of refrigerants and their effects on environment.
5. Comprehend the applications of Low Temperature Physics and refrigeration.

Course Outcomes: On completion of practical course, student shall be able to

6. List out, identify and handle equipment used in refrigeration and low temperature lab.
7. Learn the procedures of preparation of Freezing Mixtures.
8. Demonstrate skills on developing various Freezing mixtures and materials and their applications in agriculture, medicine and day to day life.
9. Acquire skills in observing and measuring various methodologies of very low temperatures
10. Perform some techniques related to Refrigeration and Freezing in daily life.

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| B Sc | Semester: 5 | Credits: 3 |
| Course: 7 | Solar Energy and Applications | Hrs/Wk: 3 |

Semester - 5: Paper VII: Solar Energy and Applications

Course Outcomes: After successful completion of the course, the student will be able to:

1. Understand Sun structure, forms of energy coming from the Sun and its measurement.
2. Acquire a critical knowledge on the working of thermal and photovoltaic collectors.
3. Demonstrate skills related to cell culture through hands on experience
4. Understand testing procedures and fault analysis of thermal collectors and PV modules.
5. Comprehend applications of thermal collectors and PV modules.

Course Outcomes: On successful completion of this practical course, student shall be able to:

1. List out and identify various components of solar thermal collectors and systems, solar photovoltaic modules and systems.

2. Learn the procedures for measurement of direct, global and diffuse solar radiation, I -V characteristics and efficiency analysis of solar cells and modules.
 3. Demonstrate skills acquired in evaluating the performance of solar cell / module in connecting them appropriately to get required power output.
 4. Acquire skills in identification and elimination of the damaged panels without affecting the output power in a module / array.
 5. Perform procedures and techniques related to general maintenance of solar thermal and photovoltaic modules.
3. Recommended Skill Enhancement Courses: (Titles of the courses given below and details of the syllabus for 4 credits (i.e., 2 units for theory and Lab/Practical) for 5 hrs class-cum-lab work

NO

4. Recommended Co-curricular activities: (Co-curricular Activities should not promote copying from text book or from others' work and shall encourage self/independent and group learning)

A. Measurable:

1. Assignments on:
 2. Student seminar: (Individual presentation of Courses) on topics relating to: Quiz Programmes on: Individual Field Studies/projects: Motion of Rocket, SHM applications
3. Group discussion on:
4. Group/Team Projects on:

B General

1. Collection of news reports and maintaining a record of Course-cuttings relating to topics covered in syllabus
2. Group Discussions on:
3. Watching TV discussions and preparing summary points recording personal observations etc., under guidance from the Lecturers
4. Any similar activities with imaginative thinking.

Recommended Continuous Assessment methods:

1) 11 hrs

2) 2 hrs

3) Mrs. Sridhar 3/9/22

4) 25 hrs

5)

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PROGRAMME OUTCOMES (PO's)

After completion of the Programme, the students would be able to acquire

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|-------|---|
| PO 1 | Conceptual and In-depth Knowledge: Students get equipped with the conceptual and in-depth knowledge of the domain subjects. |
| PO 2 | Analysis and Evaluation Techniques: Students would be able to understand, analyse and evaluate various aspects pragmatically. |
| PO 3 | Decision making and Entrepreneurial Skills: Students would acquire decision making skills and entrepreneurial abilities. |
| PO 4 | Communication and Soft Skills: Students would be able to express their thoughts and ideas confidently to impart their knowledge efficiently by making use of the Soft Skills they have learnt. |
| PO 5 | Life Skills: Students would be able to design appropriate solutions to various problems they may encounter in their personal and professional lives. |
| PO 6 | Usage of ICT Tools: Students would be able to make use of ICT tools effectively and they would be able to make use of technology to meet the local, regional and national needs. |
| PO 7 | Eco-friendly and Environment sustainability practices: Students would be able to adopt eco-friendly practices for environmental sustainability. |
| PO 8 | Team Spirit: Student would function effectively as an individual and work with harmony and integrate diverse teams. |
| PO 9 | Employability Skills and Leadership traits: Student would learn the required Employability Skills and become competent to face the competitive world and can be assured of good careers. |
| PO 10 | Human values and Professional Ethics: Students would emerge as vibrant, ethical and socially responsible citizens. |

1) 10.2.22

4) 4.5.22

2) 2.2.22

5)

3) Mrs. Naidu
3/9/22

R. Naidu
3/9/22

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2. Learn the procedures for measurement of direct, global and diffuse solar radiation, I -V characteristics and efficiency analysis of solar cells and modules.
 3. Demonstrate skills acquired in evaluating the performance of solar cell / module in connecting them appropriately to get required power output.
 4. Acquire skills in identification and elimination of the damaged panels without affecting the output power in a module / array.
 5. Perform procedures and techniques related to general maintenance of solar thermal and photovoltaic modules.
3. Recommended Skill Enhancement Courses: (Titles of the courses given below and details of the syllabus for 4 credits (i.e., 2 units for theory and Lab/Practical) for 5 hrs class-cum-lab work

NO

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A. Measurable:

1. Assignments on:

2. Student seminar: (Individual presentation of Courses) on topics relating to:
Quiz Programmes on: Individual Field Studies/projects: Motion of Rocket, SHM applications

3. Group discussion on:

4. Group/Team Projects on:

B General

1. Collection of news reports and maintaining a record of Course-cuttings relating to topics covered in syllabus
2. Group Discussions on:
3. Watching TV discussions and preparing summary points recording personal observations etc., under guidance from the Lecturers
4. Any similar activities with imaginative thinking.

Recommended Continuous Assessment methods:

1) $\frac{1}{2}$ L.A.

2) $\frac{1}{2}$ L.A.

3) $\frac{1}{2}$ L.A. 3/9/22

4) $\frac{1}{2}$ L.A.

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B.Sc. Mathematics, Physics & Computer Science (MPCs)

PROGRAMME SPECIFIC OUTCOMES

These are statements that define the outcomes of a Programme which makes students realize the fact that the knowledge and techniques learnt in this Programme will have direct implication for the betterment of society.

| | |
|-------|--|
| PSO 1 | Proficiency in high level Numerical methods: Students would develop proficiency in high level Mathematical methods. They would also acquire Analytical and Logical thinking skills. |
| PSO 2 | Knowledge in Experimentation: The students would acquire necessary skills to carry out experiments in order to verify the laws and concepts of Physics. |
| PSO 3 | Problem Solving and Programming Skills: Students would get hands-on experience in various practical aspects. They would also learn problem solving and programming techniques. |

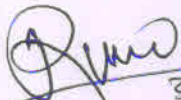
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B.Sc. Mathematics, Physics & Chemistry (MPC)

PROGRAMME SPECIFIC OUTCOMES (PSO's)

| | |
|-------|---|
| PSO 1 | Becomes professionally skilled for higher studies in research institutions and to work in chemical industries. |
| PSO 2 | In-depth knowledge helps to qualify in competitive exams. |
| PSO 3 | Gains complete knowledge about all fundamental aspects of Chemistry. |
| PSO 4 | Understands the background of organic reaction mechanisms, complex chemical Structures, and instrumental method of chemical analysis, molecular rearrangements and separation techniques. |
| PSO 5 | Ability to interlink the skills and knowledge in mathematics, physics and chemistry and develop an aptitude to address the problems in various fields. |
| PSO 6 | Analyse the concepts of mathematics, physics and chemistry and understand the relation among them like physical chemistry, mathematical modelling of physics and chemistry problems. |
| PSO 7 | Understand the theoretical concepts of physical and chemical properties of materials and the role of importance. |

1) 10. 10. 10

4) 25/10

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3) 25/10/22

25/10/22

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B.Sc. Mathematics, Physics & Electronics (MPE)

PROGRAMME SPECIFIC OUTCOMES (PSO's)

| | |
|-------|--|
| PSO 1 | To prepare students to excel in postgraduate programs or to succeed in industry/technical profession through global and comprehensive education. |
| PSO 2 | To provide students with a solid foundation in scientific and quantitative electronics fundamentals required to solve technical problems and also to pursue higher studies. |
| PSO 3 | To train students with good technical and scientific breadth so as to comprehend, analyze, design and create novel products and solutions for real life problems. |
| PSO 4 | To inculcate in students professional and ethical attitude, effective communication skills, teamwork skills, multidisciplinary approach and an ability to relate Science and engineering issues to broader social context. |
| PSO 5 | To prepare student with an academic environment aware of excellence, leadership, written ethical codes and guidelines and the life-long learning needed for a successful professional career. |

1) 10.2.22

4) 4.5.22

2) 2.6.22

5)

3) 3.9.22

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