Gyanmanjari Innovative University

Course Syllabus
Gyanmanjari Science College
Semester-3 (M.Sc.)

**Subject:** Practicals-MSCPH13517

**Type of course:** Major

**Prerequisite:** Basic knowledge of Nuclear Physics, Condensed matter physics, scientific programming, Numerical Techniques in Physics.

**Rationale:** Practical in this area can help students to develop the skills they need to design and conduct experiments in deferent branches of physics like Nuclear Physics, Condensed matter physics, scientific programming and Numerical Techniques in Physics by using scientific instruments.

## Teaching and Examination Scheme:

| Teaching Scheme | | | Credits | Examination Marks | | | | | Total Marks |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Theory Marks | | Practical Marks | | CA | |
| CI | T | P | C | ESE | MSE | V | P | ALA | |
| 0 | 0 | 12 | 6 | 00 | 00 | 40 | 80 | 30 | 150 |

*Legends: CI-Class Room Instructions; T – Tutorial; P - Practical; C – Credit; ESE - End Semester Examination; MSE- Mid Semester Examination; V – Viva; CA - Continuous Assessment; ALA- Active Learning Activities.*

## List of Practical:

| Sr. No | Descriptions | Hrs. |
|---|---|---|
| 1 | To design and test door locking and unlocking system using RFID and microcontroller | 12 |
| 2 | Read the value from gas sensor value when the smoke is around start the alarm when will you reach to the certain value and with increase and value indicated with LED's. | 12 |
| 3 | To run microcontroller based program using Arduino. | 12 |

| Sr. No | Descriptions | Hrs. |
|---|---|---|
| 4 | To synchronous local tune and data and also get the data using GPS module and Arduino. Display on LCD to get the position and based on the range of position turn the LED on/off. | 12 |
| 5 | To run microcontroller based program microcontroller kit for used LM-35 and LDR Display temperature and intensity on serial monitor as well as store it in SD card. | 12 |
| 6 | Draw the schematic in kicad and design its PCB which is double layer 1) Use 1 mm PCB track. 2) Use 1.5 mm or more diameter pad 3) on PCB write your seat no. or name. | 12 |
| 7 | With a given set up determine experimentally the energy of the first few excited state of the iodine molecules calibrate the spectrometer using Hg 1 amp. | 12 |
| 8 | To determine the g-factor by the NMR spectrometer of the given sample. | 12 |
| 9 | Determination of viscosity with the Ostwald capillary viscometer of the given sample. | 12 |
| 10 | To study amplitude modulation and demodulation and observe the effect of changing amplitude of modulating signal to the modulating index and set the frequency spectrum. | 12 |
| 11 | To study the dynamics of mono and diatomic lattice, study of the dispersion relation for the monoatomic letters comparison with theory. | 12 |
| 12 | To determine the cut of frequency of monoatomic lattice. | 12 |
| 13 | To study the dispersion relation for the diatomic lattice acoustical mode and optical mode energy gap comparison with theory. | 12 |
| 14 | Calculation of lower lying bands using empty lattice approximation | 12 |
| 15 | Gamma ray spectrometer (I) do the proper energy calibration of Gamma ray spectrometer using 137 Cs and 6° Co. (II) Perform the energy analysis of any given unknown Gamma source. (III) Find out the energy resolution of NaI (TE) detector also print proper spectrum and graph wherever required. | 12 |
| | **Total** | **180** |

## Continuous Assessment:

| Sr. No | Active Learning Activities | Marks |
|---|---|---|
| 1 | **Journal**<br>Unit wise Practical will be given by faculty and students will prepare Journal for the Practical and faculty will upload marks on GMIU web Portal. | 30 |
| | **Total** | **30** |

## Suggested Specification table with Marks (Theory):60

| Distribution of Theory Marks **(Revised Bloom's Taxonomy)** | | | | | | |
|---|---|---|---|---|---|---|
| Level | Remembrance (R) | Understanding (U) | Application (A) | Analyze (N) | Evaluate (E) | Create (C) |
| Weightage | 20% | 40% | 30% | 10% | - | - |

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

## Instructional Method:

The course delivery method will depend upon the requirement of content and the needs of students. The teacher, in addition to conventional teaching methods by black board, may also use any tools such as demonstration, role play, Quiz, brainstorming, MOOCs etc.

From the content 10% topics are suggested for flipped mode instruction.

Students will use supplementary resources such as online videos, NPTEL/SWAYAM videos, e-courses, Virtual Laboratory

The internal evaluation will be done on the basis of Active Learning Assignment

Practical/Viva examination will be conducted at the end of semester for evaluation of performance of students in the laboratory.