Name of Institute: Indus Institute of Sciences, Humanities and Liberal Studies

Name of Department: Physics

Name of Faculty: Ronak Patel

Course code: MPH0308

Course name: Experimental Physics-V

Pre-requisites: 12th Std Physics & B.Sc. Physics Experiments

Credit points: 03

Offered Semester: III

Course Coordinator (weeks 01 - 17)

Full name: Dr. Tanushree Basak

Department with sitting location: Physics Department, Physics lab

Telephone: 3314 (sitting location), 937497989 (Mobile)

Email: tanushreebasak.gd@indusuni.ac.in

Consultation times: 1:30 pm to 4:45 pm (Monday)

Course Lecturer (weeks 01 – 17)

Full name: Prof. Ronak Patel

Department with sitting location: Staff room, 4th Floor, Bhanwar building

Telephone: 3327 (sitting location), 9429748939 (Mobile)

Email: ronakpatel.ec@indusuni.ac.in

Consultation times: 1:30 pm to 4:45 pm (Monday)

Students will be contacted throughout the Session via Mail with important information relating to this Course.

Course Lecturer (weeks 01 – 17)

Full name: Dr.manisha Vithalpura

Department with sitting location: Physics Lab,3rd floor

Telephone: 7874636405I(mobile)

Email: manishavithalpura.gd@indusuni.ac.in

Consultation times: 1:30 pm to 4:30 pm (Tuesday)

Students will be contacted throughout the Session via Mail with important information relating to this Course.

Course Lecturer (weeks 01 – 17)

Full name: Dr. Tanushree Basak

Department with sitting location: Physics Department, Physics lab

Telephone: 3314 (sitting location), 937497989 (Mobile)

Email: tanushreebasak.gd@indusuni.ac.in

Consultation times: 1:30 pm to 4:45 pm (Monday

Course Objectives

By participating in and understanding all facets of this Course a student will:

1. Demonstrate an ability to make physical measurements and understand the limits of precision in measurements.
2. Write, debug and simulate assembly language program.
3. Demonstrate the ability to use experimental statistics to determine the precision of a series of measurements.

Course Outcomes (CO):

After the completion of the course, the students would be able to:

1. Demonstrate understanding of principles of physics in general, and mechanics, thermal physics, properties of matter, and microprocessor
2. Apply this knowledge to analyze a variety of physical phenomena.
3. Recognize how and when physics methods and principles can help address problems in their major and then apply those methods and principles to solve them.
4. Solve diverse problems by using experimental, and/or theoretical methods and applying the relevant laws to the problem.
5. Develop a passion for participating in pushing the bounds of our knowledge even further.
6. Recall and apply a basic concept of digital fundamentals to Microprocessor based personal computer system

Course Outline

- **List of experiment:**

1) Single Crystal Rotation – X-ray diffraction

2) Laue Method

3) X-Ray Powder Method

4) Intensity of X-Ray Diffraction (Powder Pattern)

5) Powder Diffraction Pattern – Graphical Analysis

6) Ionic Conductivity of Alkali Halide Crystal

7) Salt analysis by spectroscopic method.

8) Isotopic shift in AgCl molecule.

9) Rotational analysis of CN molecule.

10) Doppler broadening.

11) Rotational analysis of CO molecule.

12) Raman Spectrum of CCl_4 .

13) UV – Vis Spectrum analysis.

14) Solar Spectrum analysis.

15) To determination Wavelength of Sodium Light using Michelson's Interferometer

- Microprocessor Based Experiments:

  1. Store 8 bit data in the memory
  2. Exchange the content of memory locations
  3. Addition of Two 8-bit Numbers and Sum is 8-bit and 16-bit.
  4. Addition of Two 16-Bit Numbers and Sum is 16-bit
  5. Subtract two 8 bit numbers
  6. Decimal Addition of Two 8-Bit Numbers and Sum is 8-bit
  7. One's Complement of an 8-bit Number

8. Two's Complement of an 8-bit Number

Method of delivery

(Conducting experiment, working with instruments, hands on experiments, preparing lab manuals, Power Point Presentation, Self assessment, Active Learning Techniques)

Study time

(6 hours per week for laboratories)

Graduate Qualities and Capabilities covered

(Qualities graduates harness crediting this Course)

General Graduate Qualities	Specific Department of _____Graduate Capabilities
Informed Have a sound knowledge of an area of study or profession and understand its current issues, locally and internationally. Know how to apply this knowledge. Understand how an area of study has developed and how it relates to other areas.	**1 Professional knowledge, grounding & awareness** **To develop the practical approach of experimental physics**
Independent learners Engage with new ideas and ways of thinking and critically analyze issues. Seek to extend knowledge through ongoing research, enquiry and reflection. Find and evaluate information, using a variety of sources and technologies. Acknowledge the work and ideas of others.	**2 Information literacy, gathering & processing** Critical and logical thinking is developed through numerical practice and analytical calculations Used various sources of the material and technology to perform the experimental part.
Problem solvers Take on challenges and opportunities. Apply creative, logical and critical thinking skills to respond effectively. Make and implement decisions. Be flexible, thorough, innovative and aim for high standards.	**4 Problem solving skills Various Numerical practicing experimental work is involved which develops logical and critical thinking.**

Effective communicators Articulate ideas and convey them effectively using a range of media. Work collaboratively and engage with people in different settings. Recognize how culture can shape communication.	**5 Written communication**
	6 Oral communication **Arranging presentation on different physics topics throughout the semester**
	7 Teamwork **Group discussion in class and lab is arranged**
Responsible Understand how decisions can affect others and make ethically informed choices. Appreciate and respect diversity. Act with integrity as part of local, national, global and professional communities.	**10 Sustainability, societal & environmental impact**

Lecture slot:

Attendance Requirements

The University norms states that it is the responsibility of students to attend all lectures, tutorials, seminars and practical work as stipulated in the Course outline. Minimum attendance requirement as per university norms is compulsory for being eligible for end semester examinations.

Details of referencing system to be used in written work

Students has to refer reference book suggested by the faculty. Also they can access online courses video lecture i.e. NPTEL etc. for the reference study.

Text books

1. An Advanced Course in Practical Physics by D. Chattopadhyay, P. C. Rakshit; New Central Book Agency (P) Ltd., 2007 (8e)
2. A Textbook of Advanced Practical Physics by S. K. Ghosh; New Central, 2000 (4e)

Additional Materials:

1. Microprocessor Architecture, Programming and Applications with 8085, Ramesh S. Gaonkar, Penram International Publishing India Private LTD. (Fifth edition)
2. Fundamentals of Microprocessors & Microcomputers, B. Ram ,Dhanpat Rai & Sons.
3. Microprocessor 8085 and its Interfacing, By Sunil Mathur, Second Edition, PHI Learning Pvt. Ltd.
4. Advanced practical physics for students, by B. L. Worsnop and H. T. Flint; Littlehampton Book Services Ltd., 1951 (9e)
5. Advanced Practical Physics, V-I & II by Chauhan and Singh; Pragati Prakashan.
6. Physical Methods, Instruments and Measurements, Vol. 1-4, Edited by Yuri M. Tsipenyuk; Russian Academy of Sciences, Russia
7. Handbook of Physical Measurements, by Judith Hall, Judith Allanson, Karen Gripp, Anne Slavotinek; Oxford, 2e (2006)
8. Encyclopedia of Physical Science and Technology: Measurements Techniques and Instrumentation, by Robert Allen Meyers; Academic Press (2007)ASSESSMENT GUIDELINES

Your final course mark will be calculated from the following:

Continuous Internal Evaluation	
Daily basis evaluation as per performance (50)	80% Objective (1-6)
Viva (10)	20% Objective (1-6)
Final exam	100% Objectives (1-6)

SUPPLEMENTARY ASSESSMENT

Students who receive an overall mark less than 50% in CIE or end semester will be considered for supplementary assessment in the respective components (i.e CIE or end semester) of semester concerned. Students must make themselves available during the supplementary examination period to take up the respective components (CIE or end semester) and need to obtain the required minimum 50% marks to clear the concerned components.

Practical Work Report/Laboratory Report:

Lab manual will be prepared by students during lab hours.

Late Work

Late assignments will not be accepted without supporting documentation. Late submission of the reports will result in a deduction of -% of the maximum mark per calendar day

Format

All assignments must be presented in a neat, legible format with all information sources correctly referenced. **Assignment material handed in throughout the session that is not neat and legible will not be marked and will be returned to the student.**

Retention of Written Work

Written assessment work will be retained by the Course coordinator/lecturer for two weeks after marking to be collected by the students.

University and Faculty Policies

Students should make themselves aware of the University and/or Faculty Policies regarding plagiarism, special consideration, supplementary examinations and other educational issues and student matters.

Plagiarism - Plagiarism is not acceptable and may result in the imposition of severe penalties. Plagiarism is the use of another person's work, or idea, as if it is his or her own - if you have any doubts at all on what constitutes plagiarism, please consult your Course coordinator or lecturer. Plagiarism will be penalized severely.

Do not copy the work of other students.

Do not share your work with other students (except where required for a group activity or assessment.

Course schedule (subject to change)

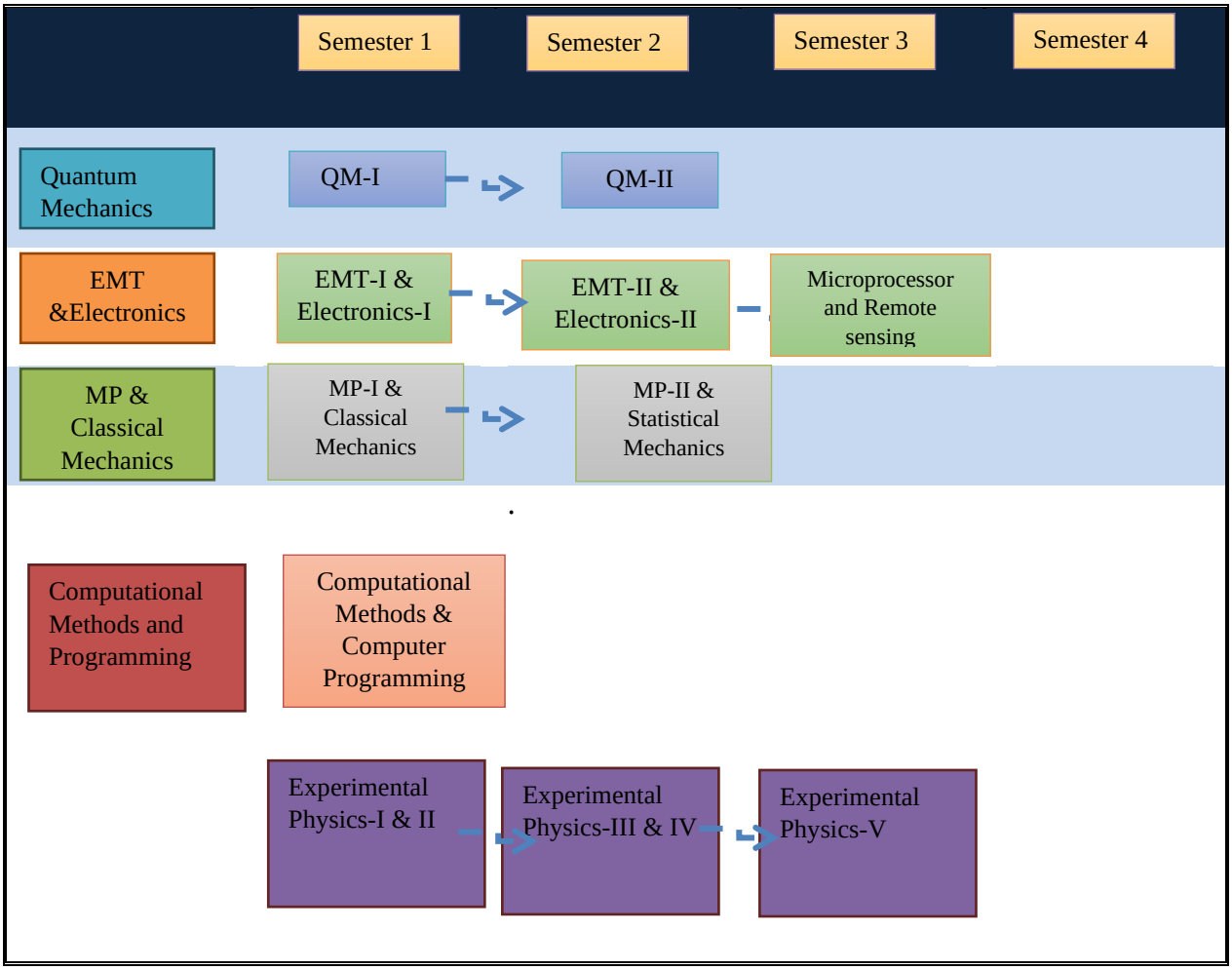
	Week #	Topic & contents	CO Addressed	Teaching Learning Activity (TLA)
	Weeks 1	➢ Single Crystal Rotation – X-ray diffraction	1 to 6	Hands on Experiment ,Simulation
	Weeks 2	➢ Laue Method	1 to 6	Hands on Experiment ,Simulation
	Week 3	➢ X-Ray Powder Method	1 to 6	Hands on Experiment ,Simulation
	Week 4	➢ Intensity of X-Ray Diffraction (Powder Pattern)	1 to 6	Hands on Experiment ,Simulation
	Week 5	➢ Powder Diffraction Pattern – Graphical Analysis	1 to 6	Hands on Experiment ,Simulation
	Week 6	➢ Ionic Conductivity of Alkali Halide Crystal ➢ Store 8 bit data in the memory	1 to 6	Hands on Experiment ,Simulation
	Week 7	➢ Salt analysis by spectroscopic method. ➢ Exchange the content of memory locations	1 to 6	Hands on Experiment ,Simulation
	Week 8	➢ Isotopic shift in AgCl molecule. ➢ Addition of Two 8-bit Numbers and Sum is 8-bit and 16-bit.	1 to 6	Hands on Experiment ,Simulation

	Week 9	➢ Rotational analysis of CN molecule. ➢ Addition of Two 16-Bit Numbers and Sum is 16-bit	1 to 6	Hands on Experiment ,Simulation
	Week 10	➢ Doppler broadening. ➢ Subtract two 8 bit numbers	1 to 6	Hands on Experiment ,Simulation
	Week 11	➢ Rotational analysis of CO molecule. ➢ Decimal Addition of Two 8-Bit Numbers and Sum is 8-bit	1 to 6	Hands on Experiment ,Simulation
	Week 12	➢ Raman Spectrum of CCl 4 . ➢ One's Complement of an 8-bit Number	1 to 6	Hands on Experiment ,Simulation
	Week 13	➢ UV – Vis Spectrum analysis ➢ Two's Complement of an 8-bit Number	1 to 6	Hands on Experiment ,Simulation
	Week 14	➢ Solar Spectrum analysis.	1 to 6	Hands on Experiment ,Simulation
	Week 15	➢ To determination Wavelength of Sodium Light using Michelson's Interferometer	1 to 6	Hands on Experiment ,Simulation
	Week 16	➢ Revision of experiments	1 to 6	Hands on Experiment ,Simulation
	Week 17	➢ Revision of experiments	1 to 6	Hands on experiments

PROGRAM MAP for M.Sc. Physics

(Indus Institute of Sciences, Humanities and Liberal Studies)

Subject Mind Mapping



To be used for the M.Sc. Physics students