

**KONGUNADU ARTS AND SCIENCE COLLEGE (AUTONOMOUS)**

*Re-accredited by NAAC with 'A' Grade – 3.64 CGPA out of 4 (3rd Cycle)*

*College of Excellence (UGC)*

*Coimbatore – 641 029*

**DEPARTMENT OF PHYSICS (Aided)**

**COURSE OUTCOMES (CO)**

**B.Sc. PHYSICS**

**For the students admitted  
In the  
Academic Year 2018-2019**

|                       |          |  |             |         |
|-----------------------|----------|--|-------------|---------|
| Programme Code: 03    |          | B.Sc Physics                                   |             |         |
| Course Code: 18UPH101 |          | Core Paper – 1. Properties of Matter and Sound |             |         |
| Batch                 | Semester | Hours/Week                                     | Total Hours | Credits |
| 2018-2019             | I        | 6  | 90          | 5       |

### Course Objective

To enable the learners to

1. Understand the basic concepts of gravitation.
2. Get exposure to the properties of liquids & solids.
3. Understand the properties of sound and applications.

### Course Outcome (CO)

|           |            |  |
|-----------|------------|--|
| <b>K1</b> | <b>CO1</b> | Understand the action of gravitational fields and potentials on different objects                                      |
| <b>K2</b> | <b>CO2</b> | Gain knowledge on elastic behavior of beams, rods and wires through the bending and torsional behaviors of the objects |
| <b>K3</b> | <b>CO3</b> | Compare the properties of liquids by surface tension and viscosity experiments   |
| <b>K4</b> | <b>CO4</b> | Production and application of ultrasonics and acoustics in different types of buildings.                               |

|                       |          |  |             |         |
|-----------------------|----------|--|-------------|---------|
| Programme Code: 03    |          | B.Sc Physics                           |             |         |
| Course Code: 18UPH202 |          | Core Paper - 2 Heat and Thermodynamics |             |         |
| Batch                 | Semester | Hours/Week                             | Total Hours | Credits |
| 2018-2019             | II       | 60                                     | 90          | 5       |

### Course Objective

To enable the learners to understand

1. Equation of states of a real gas, quantum theory of specific heat and basic theory of entropy.
2. Principle and different methods of production of low temperature and liquefaction of He.
3. Quantum theory of radiation and three types of thermodynamical statistics.

### Course Outcome (CO)

|           |            |   |
|-----------|------------|---|
| <b>K1</b> | <b>CO1</b> | Understand gas laws and its behavior. Understand the model system of an ideal gas and the principles of kinetic theory, Einstein's theory and Debye's theory. |
| <b>K2</b> | <b>CO2</b> | Gain knowledge on entropy of a system in reversible and irreversible process. Understand significance of thermodynamic properties and internal energy.        |
| <b>K3</b> | <b>CO3</b> | Compare the various methods of production of low temperature and liquefaction of gases. Will understand radiative heat transfer and radiation laws.           |
| <b>K4</b> | <b>CO4</b> | Analyze the concepts of microstate and macrostate of a model system. Understand the classical statistics and quantum mechanics.                               |

|                       |                    |                    |                   |              |
|-----------------------|--------------------|--------------------|-------------------|--------------|
| Programme Code: 03    |                    | B.Sc Physics       |                   |              |
| Course Code: 18UPH2CL |                    | CORE PRACTICAL - I |                   |              |
| Batch<br>2018-2019    | Semester<br>I & II | Hours/Week<br>3    | Total Hours<br>90 | Credits<br>2 |

### Course Objective

To enable the learners to:

1. Understand the Physical Phenomena and fundamentals of general physics.
2. Perform experiments in the field of general physics and gaining physical understanding of the results.
3. Interpret the practical result to support the theory

### Course Outcome (CO)

|           |            |  |
|-----------|------------|--|
| <b>K5</b> | <b>CO1</b> | Provide hands on experiences in conducting scientific investigations and laboratory experiments.   |
| <b>K5</b> | <b>CO2</b> | Develop the ability to analyse basic experiments and analyze the relationship between theory and experimental results.<br>Take measurements to compare experimental results in the laboratory with the theoretical analysis. |
| <b>K5</b> | <b>CO3</b> | Will be familiar to conduct experimental investigations of simple mechanical, heat and optical physics.  |
| <b>K5</b> | <b>CO4</b> | Practice record keeping of experimental work and data graphing   |

|                       |                 |                           |                   |              |
|-----------------------|-----------------|---------------------------|-------------------|--------------|
| Programme Code: 03    |                 | B.Sc Physics              |                   |              |
| Course Code: 18UPH303 |                 | Core Paper - 3: Mechanics |                   |              |
| Batch<br>2018-2019    | Semester<br>III | Hours/Week<br>4           | Total Hours<br>60 | Credits<br>5 |

### Course Objective

To enable the learners to

1. Understand the principles of rigid body dynamics
2. Understand the fundamental ideas of Projectile motions
3. Understand the statics, hydrostatics and hydrodynamics

### Course Outcome (CO)

|           |            |  |
|-----------|------------|--|
| <b>K1</b> | <b>CO1</b> | Rigid body dynamics will help the students to understand the behaviour of various bodies due to kinematic and dynamic forces acting on the body.             |
| <b>K2</b> | <b>CO2</b> | The study of projectiles enables the students to apply the knowledge of mathematics, fundamental sciences to obtain solution of complex mechanical problems. |
| <b>K3</b> | <b>CO3</b> | Study of statics promotes analysis and interpretation of numerical problems.   |
| <b>K4</b> | <b>CO4</b> | Students will gain knowledge on fundamental laws of floatation and hydrostatics.   |

|                       |                |   |                   |              |
|-----------------------|----------------|---|-------------------|--------------|
| Programme Code: 03    |                | B.Sc Physics                              |                   |              |
| Course Code: 18UPH404 |                | Core Paper - 4: Electricity and Magnetism |                   |              |
| Batch<br>2018-2019    | Semester<br>IV | Hours/Week<br>4                           | Total Hours<br>60 | Credits<br>5 |

#### Course Objective

To enable the learners to

1. Acquire basic knowledge of electrostatics and thermoelectricity
2. Study about magnetic properties of materials
3. Learn motion of charges and alternating current and its circuits

#### Course Outcome (CO)

|           |            |   |
|-----------|------------|---|
| <b>K1</b> | <b>CO1</b> | Acquire knowledge about electrostatics, magnetic and thermoelectric properties of materials                                   |
| <b>K2</b> | <b>CO2</b> | Understand the motion of charges in ac circuits and magnetic effect of electric current                                       |
| <b>K3</b> | <b>CO3</b> | Apply knowledge on fabrication of different types of capacitors, transformer, choke coil and thermoelectric power generators. |
| <b>K4</b> | <b>CO4</b> | Analyze the trouble shooting of ac circuits (LCR series and LCR parallel mode) and also analyze the thermoelectric diagrams   |

|                       |                |  |                   |              |
|-----------------------|----------------|--|-------------------|--------------|
| Programme Code: 03    |                | B.Sc Physics                                     |                   |              |
| Course Code: 18UPH4S2 |                | SKILL BASED SUBJECT II – Medical Instrumentation |                   |              |
| Batch<br>2018-2019    | Semester<br>IV | Hours/Week<br>2                                  | Total Hours<br>30 | Credits<br>3 |

#### Course Objective

To enable the learners to

1. Understand about ECG, ERG etc
2. Understand the concepts of the pacemaker and the batteries used in it, kidney machine etc
3. Know the role of the LASER in the medical field
4. Know the determination of the frequency of interference

#### Course Outcome (CO)

|           |            |   |
|-----------|------------|---|
| <b>K1</b> | <b>CO1</b> | Will get knowledge about the origin of biopotentials, electrical activity of excitable cells, action potentials, and membrane models. |
| <b>K2</b> | <b>CO2</b> | Will be able to understand the application of Laser and the origin of biopotentials: ECG, ERG, MEG, etc                               |
| <b>K3</b> | <b>CO3</b> | Will apply knowledge on measurement of blood flow and pressure.   |
| <b>K4</b> | <b>CO4</b> | Will be able to analyze the Clinical laboratory systems, Bio control and Electrical safety  |

|                       |                      |                     |                   |              |
|-----------------------|----------------------|---------------------|-------------------|--------------|
| Programme Code: 03    |                      | B.Sc Physics        |                   |              |
| Course Code: 18UPH4CM |                      | Core Practical - II |                   |              |
| Batch<br>2018-2019    | Semester<br>III & IV | Hours/Week<br>3     | Total Hours<br>90 | Credits<br>2 |

#### Course Objective

To enable the learners to:

1. Understand the Physical Phenomena and fundamentals of general physics.
2. Perform experiments in the field of general physics and gaining understanding of the results.
3. Interpret the practical result to support the theory

#### Course Outcome (CO)

|           |            |  |
|-----------|------------|--|
| <b>K5</b> | <b>CO1</b> | Provide hands on experiences in conducting scientific investigations and laboratory experiments.   |
| <b>K5</b> | <b>CO2</b> | Develop the ability to analyse basic experiments and analyze the relationship between theory and experimental results.<br>Take measurements to compare experimental results in the laboratory with the theoretical analysis. |
| <b>K5</b> | <b>CO3</b> | Will be familiar to conduct experimental investigations of simple mechanical, heat and optical physics.  |
| <b>K5</b> | <b>CO4</b> | Practice record keeping of experimental work and data graphing   |



|                       |               |                               |                   |              |
|-----------------------|---------------|-------------------------------|-------------------|--------------|
| Programme code: 03    |               | B.Sc., Physics                |                   |              |
| Course Code: 18UPH505 |               | Core Paper - 5 : Astrophysics |                   |              |
| Batch<br>2018-2019    | Semester<br>V | Hours/Week<br>4               | Total Hours<br>60 | Credits<br>4 |

### Course Objective

To enable the learners to

1. To know about the sun, star and planetary motion
2. To know about the astronomical instruments
3. To know about the age and evaluation of earth

### Course Outcome (CO)

|           |            |   |
|-----------|------------|---|
| <b>K1</b> | <b>CO1</b> | Understand the fundamental principles that underpins modern theoretical and observational astrophysics.       |
| <b>K2</b> | <b>CO2</b> | Know the importance of stellar astrophysics and evolution of universe.  |
| <b>K3</b> | <b>CO3</b> | Enhance the knowledge of our solar system and its members. To know the age and evolution of earth.            |
| <b>K4</b> | <b>CO4</b> | Understand stars luminosity, brightness, distance and magnitude and astronomical instruments and its working. |

|                       |               |  |                   |              |
|-----------------------|---------------|--|-------------------|--------------|
| Programme code: 03    |               | B.Sc., Physics                           |                   |              |
| Course Code: 18UPH506 |               | Core Paper - 6: Optics and Laser Physics |                   |              |
| Batch<br>2018-2019    | Semester<br>V | Hours/Week<br>4                          | Total Hours<br>60 | Credits<br>4 |

### Course Objective

To enable the learners to

1. Acquire knowledge in ray optics
2. Understand mechanism of energy transfer in the form of waves
3. Basic principles of laser physics

### Course Outcome (CO)

|           |            |   |
|-----------|------------|---|
| <b>K1</b> | <b>CO1</b> | Learn to use geometric approximation, the ray equations, understand the aberrations with an emphasis on image forming systems and how they can be reduced |
| <b>K2</b> | <b>CO2</b> | Be able to understand wave optics, interference, diffraction and polarization.  |
| <b>K3</b> | <b>CO3</b> | Be acquainted with Fresnel and Fraunhofer diffraction.  |
| <b>K4</b> | <b>CO4</b> | Have an understanding of the basic principles of Laser, operation and construction of different Laser systems.  |

|                       |               |  |                   |              |
|-----------------------|---------------|--|-------------------|--------------|
| Programme code: 03    |               | B.Sc., Physics   |                   |              |
| Course Code: 18UPH507 |               | Core Paper - 7 Principles of Electronic Devices and Circuits |                   |              |
| Batch<br>2018-2019    | Semester<br>V | Hours/Week<br>4  | Total Hours<br>60 | Credits<br>4 |

### Course Objective

To enable the learners to

1. Understand the action of semiconductor devices and their applications.
2. Know the principle and working of oscillators.

### Course Outcome (CO)

|           |            |   |
|-----------|------------|---|
| <b>K1</b> | <b>CO1</b> | Learn to use semiconductors and devices   |
| <b>K2</b> | <b>CO2</b> | Be able to understand transistor biasing and stabilization  |
| <b>K3</b> | <b>CO3</b> | Learned about the functioning of FET, MOSFET, UJT and SCR   |
| <b>K4</b> | <b>CO4</b> | Have an understanding of the basic principles of Operational Amplifiers, Amplifiers and Oscillators |

|                       |               |  |                   |              |
|-----------------------|---------------|--|-------------------|--------------|
| Programme code: 03    |               | B.Sc., Physics                                   |                   |              |
| Course Code: 18UPH508 |               | Core Paper – 8: Quantum Mechanics and Relativity |                   |              |
| Batch<br>2018-2019    | Semester<br>V | Hours/Week<br>4                                  | Total Hours<br>60 | Credits<br>5 |

### Course Objective

To enable the learners to

1. Know about DeBroglie concept and the uncertainty relation.
2. Know about the applications of Schrodinger's equation
3. Know about the postulates constancy of light as well as the mass-energy relationship

### Course Outcome (CO)

|           |            |  |
|-----------|------------|--|
| <b>K1</b> | <b>CO1</b> | Familiar with the main aspects of the historical development of Quantum Mechanics  |
| <b>K2</b> | <b>CO2</b> | Discuss and interpret experimental results that reveal the wave properties of matter.  |
| <b>K3</b> | <b>CO3</b> | Understand the basic principles in Quantum Mechanics such as the Schrodinger equation , the wave function, Uncertainty principle, elementary concepts in statistics such as expectation value. |
| <b>K4</b> | <b>CO4</b> | Understand the theory of relativity and to solve Schrodinger equation for simple systems in one to three dimensions  |

|                       |                |   |                   |              |
|-----------------------|----------------|---|-------------------|--------------|
| Programme code: 03    |                | B.Sc., Physics                            |                   |              |
| Course Code: 18UPH5S3 |                | Skill Based Subject III- Programming in C |                   |              |
| Batch<br>2018-2019    | Semester<br>VI | Hours/Week<br>3                           | Total Hours<br>45 | Credits<br>3 |

**Course Objective**

To enable the learner to

1. Know about basic in C language
2. Develop programming skill in C language
3. to exhibit multidisciplinary approach to solve problems.

**Course Outcome (CO)**

|           |            |  |
|-----------|------------|--|
| <b>K1</b> | <b>CO1</b> | work in interdisciplinary groups   |
| <b>K2</b> | <b>CO2</b> | gain expertise in identifying and solving problems related to computer language. |
| <b>K3</b> | <b>CO3</b> | develop programs for simple problems   |
| <b>K4</b> | <b>CO4</b> | involve in advanced software systems   |

|                       |                |  |                   |              |
|-----------------------|----------------|--|-------------------|--------------|
| Programme code: 03    |                | B.Sc., Physics                                 |                   |              |
| Course Code: 18UPH609 |                | Core Paper - 9: Atomic and Solid State Physics |                   |              |
| Batch<br>2018-2019    | Semester<br>VI | Hours/Week<br>4                                | Total Hours<br>60 | Credits<br>4 |

#### Course Objective

To enable the learners to

1. Know about the X – rays, Photoelectric effect and their application
2. Know about different coupling schemes and the effect of magnetic and electric fields on the spectrum of an atom and molecule
3. Understand the different crystal structure and their bindings

#### Course Outcome (CO)

|           |            |   |
|-----------|------------|---|
| <b>K1</b> | <b>CO1</b> | Get knowledge about electrostatics, magnetic and thermoelectric properties of materials                                       |
| <b>K2</b> | <b>CO2</b> | Understand the motion of charges in ac circuits and magnetic effect of electric current                                       |
| <b>K3</b> | <b>CO3</b> | Apply knowledge on fabrication of different types of capacitors, transformer, choke coil and thermoelectric power generators. |
| <b>K4</b> | <b>CO4</b> | Analyze the trouble shooting of ac circuits (LCR series and LCR parallel mode) and also analyze the thermoelectric diagrams   |

|                       |                |  |                   |              |
|-----------------------|----------------|--|-------------------|--------------|
| Programme code: 03    |                | B.Sc., Physics                                       |                   |              |
| Course Code: 18UPH610 |                | Core Paper - 10: Fundamentals of Digital Electronics |                   |              |
| Batch<br>2018-2019    | Semester<br>VI | Hours/Week<br>4                                      | Total Hours<br>60 | Credits<br>4 |

### Course Objective

To enable the learners to acquire knowledge about

1. Four different number systems & binary codes
2. Logic gates, Boolean algebra and Karnaugh map
3. Flip- flops, counters, arithmetic circuits, data processing circuits, shift registers, semiconductor memories, D\A converters and A\D converters

### Course Outcome (CO)

|           |            |  |
|-----------|------------|--|
| <b>K1</b> | <b>CO1</b> | Have the knowledge about number systems, binary arithmetic operations and binary codes   |
| <b>K2</b> | <b>CO2</b> | Have an understanding of logic gates, Demorgan's theorems and Karnaugh maps and simplification of Boolean expressions  |
| <b>K3</b> | <b>CO3</b> | Have the ability to apply the knowledge of the knowledge of logic gates to design flip-flops, counters, shift registers, arithmetic and data processing circuits |
| <b>K4</b> | <b>CO4</b> | Be familiar to analyze the semiconductor memories and some of the A/D and D/A converters   |

|                       |          |                                  |             |         |
|-----------------------|----------|----------------------------------|-------------|---------|
| Programme code: 03    |          | B.Sc., Physics                   |             |         |
| Course Code: 18UPH611 |          | Core Paper - 11: Nuclear Physics |             |         |
| Batch                 | Semester | Hours/Week                       | Total Hours | Credits |
| 2018-2019             | VI       | 4                                | 60          | 5       |

#### Course Objective

To enable the learner to know about

1. General properties of atomic nuclei, particle accelerators, Radioactivity,
2. Artificial transmutation of elements, nuclear transmutation,
3. Nuclear fission and fusion and (iv) Elementary particles.

#### Course Outcome (CO)

|           |            |  |
|-----------|------------|--|
| <b>K1</b> | <b>CO1</b> | The learners will know about basic nuclear properties and particle accelerators.   |
| <b>K2</b> | <b>CO2</b> | The learners will have knowledge about the differences between various decay modes and radioactive dating.   |
| <b>K3</b> | <b>CO3</b> | The learners will have knowledge about basic concepts and relations to calculate Q – values for nuclear reactions, production of radioisotopes and their uses. |
| <b>K4</b> | <b>CO4</b> | The learners will know about the nuclear fission, fusion and detection of nuclear radiations.  |



|                      |          |  |             |         |
|----------------------|----------|--|-------------|---------|
| Programme code: 03   |          | B.Sc., Physics   |             |         |
| Course Code:18UPH6S4 |          | Skill Based Subject IV: Introduction to Microprocessor |             |         |
| Batch                | Semester | Hours/Week   | Total Hours | Credits |
| 2018-2019            | VI       | 3  | 45          | 3       |

### Course Objective

To study about the

1. History, Origin and Development of Microprocessor
2. Architecture, instruction set and programming of 8085 microprocessors
3. Interfacing

### Course Outcome (CO)

|           |            |   |
|-----------|------------|---|
| <b>K1</b> | <b>CO1</b> | Able to know about introduction to microprocessor                         |
| <b>K2</b> | <b>CO2</b> | Able to understand architectural diagram                                  |
| <b>K3</b> | <b>CO3</b> | acquire the knowledge about programming and interfacing                   |
| <b>K4</b> | <b>CO4</b> | Able to understand the concept of stack and subroutine in the programming |

|                      |                    |  |                   |              |
|----------------------|--------------------|--|-------------------|--------------|
| Programme code: 03   |                    | B.Sc., Physics                             |                   |              |
| Course Code:18UPH6CN |                    | Core Practical – III – General Experiments |                   |              |
| Batch<br>2018-2019   | Semester<br>V & VI | Hours/Week<br>3                            | Total Hours<br>90 | Credits<br>2 |

### Course Objective

To enable the learners to:

1. Have a good foundation in the fundamentals and applications of general physics.
2. Acquire the skill of finding and developing practical scientific facts.
3. Employ the practical result to support the theory

### Course Outcome (CO)

|           |            |  |
|-----------|------------|--|
| <b>K5</b> | <b>CO1</b> | Develop the ability to analyse basic experiments. Work and coordinate effectively in a group to accomplish laboratory based tasks. |
| <b>K5</b> | <b>CO2</b> | Take measurements to compare experimental results in the laboratory with the theoretical analysis.                                 |
| <b>K5</b> | <b>CO3</b> | Will be familiar to conduct experimental investigations of simple electric, magnetic and optical phenomena.                        |
| <b>K5</b> | <b>CO4</b> | Practice record keeping of experimental work and data graphing   |

|                       |                    |   |                   |              |
|-----------------------|--------------------|---|-------------------|--------------|
| Programme code: 03    |                    | B.Sc., Physics  |                   |              |
| Course Code: 18UPH6CO |                    | Core Practical IV - Electronics, Digital Electronics & Microprocessor |                   |              |
| Batch<br>2018-2019    | Semester<br>V & VI | Hours/Week<br>2   | Total Hours<br>60 | Credits<br>2 |

### Course Objective

To enable the learners to

1. To design and construct small electronic circuits
2. To develop experimental skills and understand relation between experimental data and theoretical analysis.
3. Have a good foundation in the fundamentals and applications of experimental physics

### Course Outcome (CO)

|           |            |   |
|-----------|------------|---|
| <b>K5</b> | <b>CO1</b> | Acquire a basic knowledge in solid state electronics and to understand the ALP using 8085 processor |
| <b>K5</b> | <b>CO2</b> | Develop the ability to analyse and design analog electronic circuits using discrete components.     |
| <b>K5</b> | <b>CO3</b> | To acquire knowledge in digital electronics by constructing logic circuits                          |
| <b>K5</b> | <b>CO4</b> | Take measurements to compare experimental results in the laboratory with the theoretical analysis   |

|                       |                |                                       |                   |              |
|-----------------------|----------------|---------------------------------------|-------------------|--------------|
| Programme code: 03    |                | B.Sc., Physics                        |                   |              |
| Course Code: 18UPH6CP |                | CORE PRACTICAL - V : PROGRAMMING in C |                   |              |
| Batch<br>2018-2019    | Semester<br>VI | Hours/Week<br>2                       | Total Hours<br>60 | Credits<br>2 |

**Course objective**

To enable the learners to:

1. Have a good foundation in the fundamentals of C-programming
2. Acquire the skill of writing and executing programs.
3. Employ the practical result to support the theory

**Course Outcome (CO)**

|           |            |  |
|-----------|------------|--|
| <b>K5</b> | <b>CO1</b> | Develop the ability to write programs for simple problems.           |
| <b>K5</b> | <b>CO2</b> | Get familiarized to computer programming                             |
| <b>K5</b> | <b>CO3</b> | Gain expertise and will be able to work in multi-disciplinary groups |
| <b>K5</b> | <b>CO4</b> | Coordinate effectively in a group to accomplish computer based tasks |

|                    |          |                                     |             |         |
|--------------------|----------|-------------------------------------|-------------|---------|
| Programme code: 03 |          | B.Sc., Physics                      |             |         |
| Course Code:       |          | Principles of Communication Systems |             |         |
| Batch              | Semester | Hours/Week                          | Total Hours | Credits |
| 2018-2019          |          | 4                                   | 60          | 5       |

#### **Course Objective**

To enable the learners

1. To understand the basics idea about Modulation, demodulation
2. To gain knowledge on transmission lines and antennas
3. To know about the functioning of Radio, cellular, fiber optic, television and satellite communications

#### **Course Outcome (CO)**

|           |            |  |
|-----------|------------|--|
| <b>K1</b> | <b>CO1</b> | Get knowledge about wireless and fibre optic communication systems                             |
| <b>K2</b> | <b>CO2</b> | Understand the working principles of Radio, Cellular, Television and Ssatellite communications |
| <b>K3</b> | <b>CO3</b> | Apply knowledge on manufacturing of Radio, TV and antennas                                     |
| <b>K4</b> | <b>CO4</b> | Trouble shoot the different sections of a Radio, TV and transmission lines                     |

|                    |          |                                |             |         |
|--------------------|----------|--------------------------------|-------------|---------|
| Programme code: 03 |          | B.Sc., Physics                 |             |         |
| Course Code:       |          | Energy Sources and Nanoscience |             |         |
| Batch              | Semester | Hours/Week                     | Total Hours | Credits |
| 2018-2019          |          | 4                              | 60          | 5       |

### Course Objective

To enable the learner to

1. Know about the Conventional Energy Sources and Renewable energy sources.
2. Gain knowledge about Nanoscience and Nanotechnology.

### Course Outcome (CO)

|           |            |  |
|-----------|------------|--|
| <b>K1</b> | <b>CO1</b> | The learners will know about basic nuclear properties and particle accelerators.   |
| <b>K2</b> | <b>CO2</b> | The learners will have knowledge about the differences between various decay modes and radioactive dating.   |
| <b>K3</b> | <b>CO3</b> | The learners will have knowledge about basic concepts and relations to calculate Q – values for nuclear reactions, production of radioisotopes and their uses. |
| <b>K4</b> | <b>CO4</b> | The learners will know about the nuclear fission, fusion and detection of nuclear radiations.  |

|                    |          |                            |                   |              |
|--------------------|----------|----------------------------|-------------------|--------------|
| Programme code: 03 |          | B.Sc., Physics             |                   |              |
| Course Code:       |          | Electronic Instrumentation |                   |              |
| Batch<br>2018-2019 | Semester | Hours/Week<br>4            | Total Hours<br>60 | Credits<br>5 |

### Course Objective

To enable the learners to

1. impart knowledge on various electronic instruments
2. study about different current indicating instruments
3. understand the working of electronic instruments

### Course Outcome (CO)

|           |            |   |
|-----------|------------|---|
| <b>K1</b> | <b>CO1</b> | Able to identify direct current indicating instruments  |
| <b>K2</b> | <b>CO2</b> | Able to describe the working of alternating current indicating instruments  |
| <b>K3</b> | <b>CO3</b> | Able to design the circuits of various parts of oscilloscope  |
| <b>K4</b> | <b>CO4</b> | Able to apply the knowledge of different electronic instruments and Able to demonstrate the types of transducers. |

|                    |          |                      |             |         |
|--------------------|----------|----------------------|-------------|---------|
| Programme code: 03 |          | B.Sc., Physics       |             |         |
| Course Code:       |          | Mathematical Physics |             |         |
| Batch              | Semester | Hours/Week           | Total Hours | Credits |
| 2018-2019          | V        | 4                    | 60          | 5       |

### Course Objective

To enable the learners to about

1. Know about the differential equations
2. Know about the special functions, curvilinear coordinates, errors etc
3. Having completed the course the student will

### Course Outcome (CO)

|           |            |   |
|-----------|------------|---|
| <b>K1</b> | <b>CO1</b> | Be familiar to find the series solution of second order homogenous differential equations   |
| <b>K2</b> | <b>CO2</b> | Have knowledge about the various recurrence relations, generating functions and orthonormality conditions for different special functions |
| <b>K3</b> | <b>CO3</b> | Have an understanding about curvilinear coordinates and geometrical application of different calculus.                                    |
| <b>K4</b> | <b>CO4</b> | Know about error functions and extremum of functions  |



|                    |          |                                    |             |         |
|--------------------|----------|------------------------------------|-------------|---------|
| Programme code: 03 |          | B.Sc., Physics                     |             |         |
| Course Code:       |          | Object Oriented Programming in C++ |             |         |
| Batch              | Semester | Hours/Week                         | Total Hours | Credits |
| 2018-2019          |          | 4                                  | 60          | 5       |

### Course Objective

To enable the learners to

1. Know about the basic in C++ language
2. Develop programming skill in C++ language
3. Understand about various Functions and operators.

### Course Outcome (CO)

|           |            |  |
|-----------|------------|--|
| <b>K1</b> | <b>CO1</b> | Acquire basic knowledge about various data types, variables, operators and solving programs for real data.           |
| <b>K2</b> | <b>CO2</b> | understand about function prototyping and function overloading   |
| <b>K3</b> | <b>CO3</b> | To acquire relevant information about various classes, objects and programming with various functions and arguments. |
| <b>K4</b> | <b>CO4</b> | have a good knowledge about various Constructors, Destructors <b>P</b> olymorphism and inheritance                   |

|                    |          |                            |             |         |
|--------------------|----------|----------------------------|-------------|---------|
| Programme code: 03 |          | B.Sc., Physics             |             |         |
| Course Code:       |          | Introduction to Biophysics |             |         |
| Batch              | Semester | Hours/Week                 | Total Hours | Credits |
| 2018-2019          |          | 4                          | 60          | 5       |

**Course Objective**

To enable the learners to:

1. Biophysics of Muscle
2. Biophysics of Human Ear
3. Physics of Vision

**Course Outcome (CO)**

|           |            |  |
|-----------|------------|--|
| <b>K1</b> | <b>CO1</b> | Able to know about biomechanics, biostatics, biodynamics         |
| <b>K2</b> | <b>CO2</b> | Able to understand biophysics and fluidrun                       |
| <b>K3</b> | <b>CO3</b> | To acquire the knowledge about Biophysics and gas transport      |
| <b>K4</b> | <b>CO4</b> | To know the concept of physics of audition and physics of vision |

|                        |          |  |             |         |
|------------------------|----------|--|-------------|---------|
| Programme code: 03     |          | For B.Sc Mathematics and B.Sc Chemistry  |             |         |
| Course Code: 18UPH63A1 |          | Allied Subject I -Physics–I<br>(MECHANICS, HEAT, SOUND, MAGNETISM AND ELECTRICITY) |             |         |
| Batch                  | Semester | Hours/Week   | Total Hours | Credits |
| 2018-2019              | III      | 4  | 60          | 4       |

**Course Objective**

To enable the learners to

1. know about mechanics, properties of matter and sound
2. understand thermal physics
3. know about the light, electricity and electromagnetism

**Course Outcome (CO)**

|           |            |  |
|-----------|------------|--|
| <b>K1</b> | <b>CO1</b> | Able to know about simple harmonic motion and projectile motion                                  |
| <b>K2</b> | <b>CO2</b> | To understand about elasticity and propagation of sound waves                                    |
| <b>K3</b> | <b>CO3</b> | To know about specific heat of solids and liquids  |
| <b>K4</b> | <b>CO4</b> | To acquire the knowledge of Interference, Diffraction, current electricity and Electromagnetism. |

|                       |          |  |             |         |
|-----------------------|----------|--|-------------|---------|
| Programme code: 03    |          | For B.Sc Mathematics and B.Sc Chemistry  |             |         |
| Course Code: 18UPH4A2 |          | Allied Subject II -Physics–II<br>(MODERN PHYSICS, ELECTRONICS AND DIGITAL ELECTRONICS) |             |         |
| Batch                 | Semester | Hours/Week   | Total Hours | Credits |
| 2018-2019             | IV       | 4  | 60          | 4       |

### Course Objective

To enable the learners to

1. know about quantum Physics, nuclear & atomic Physics,
2. understand the concept of relativity
3. know the basics of electronics and communication Physics

### Course Outcome (CO)

|           |            |  |
|-----------|------------|--|
| <b>K1</b> | <b>CO1</b> | Will understand the central concepts and principles in quantum physics. At the end of the module, students will be able to describe the properties and structure of stable nuclei.     |
| <b>K2</b> | <b>CO2</b> | Able to understand the theory of atomic structure, importance of periodic table and familiar with the fundamentals principles of the general theory of relativity and inertial frames. |
| <b>K3</b> | <b>CO3</b> | Will understand the principles and design considerations of various LASERs , modes of their operation and areas of their applications  |
| <b>K4</b> | <b>CO4</b> | Acquire a basic knowledge in solid state electronics including diodes, FET, UJT. Will understand number system, amplification circuits and communication physics.                      |

|                       |          |   |             |         |
|-----------------------|----------|---|-------------|---------|
| Programme code: 03    |          | For B.Sc Mathematics and B.Sc Chemistry |             |         |
| Course Code: 18UPH4AL |          | Allied Physics Practical                |             |         |
| Batch                 | Semester | Hours/Week                              | Total Hours | Credits |
| 2018-2019             | III & IV | 3                                       | 90          | 2       |

### Course Objective

To enable the learners to:

1. Understand the Physical Phenomena and fundamentals of general physics.
2. Perform experiments in the field of general physics and gaining physical understanding of the results.
3. Interpret the practical result to support the theory

### Course Outcome (CO)

|           |            |  |
|-----------|------------|--|
| <b>K5</b> | <b>CO1</b> | Provide hands on experiences in conducting scientific investigations and laboratory experiments.   |
| <b>K5</b> | <b>CO2</b> | Develop the ability to analyse basic experiments and analyze the relationship between theory and experimental results.<br>Take measurements to compare experimental results in the laboratory with the theoretical analysis. |
| <b>K5</b> | <b>CO3</b> | Will be familiar to conduct experimental investigations of simple mechanical, heat and optical physics.  |
| <b>K5</b> | <b>CO4</b> | Practice record keeping of experimental work and data graphing   |

**KONGUNADU ARTS AND SCIENCE COLLEGE (AUTONOMOUS)**

*Re-accredited by NAAC with 'A' Grade – 3.64 CGPA out of 4 (3rd Cycle)*

*College of Excellence (UGC)*

*Coimbatore – 641 029*

**DEPARTMENT OF PHYSICS (Aided)**

**COURSE OUTCOMES (CO)**

**B.Sc. PHYSICS**

**For the students admitted  
In the  
Academic Year 2019-2020**

|                       |               |  |                   |              |
|-----------------------|---------------|--|-------------------|--------------|
| Programme Code: 03    |               | B.Sc Physics                                   |                   |              |
| Course Code: 19UPH101 |               | Core Paper – 1. Properties of Matter and Sound |                   |              |
| Batch<br>2019-2020    | Semester<br>I | Hours/Week<br>6                                | Total Hours<br>90 | Credits<br>5 |

### Course Objective

To enable the learners to

1. Understand the basic concepts of gravitation.
2. Get exposure to the properties of liquids & solids.
3. Understand the properties of sound and applications.

### Course Outcome (CO)

|           |            |  |
|-----------|------------|--|
| <b>K1</b> | <b>CO1</b> | Understand the action of gravitational fields and potentials on different objects                                      |
| <b>K2</b> | <b>CO2</b> | Gain knowledge on elastic behavior of beams, rods and wires through the bending and torsional behaviors of the objects |
| <b>K3</b> | <b>CO3</b> | Compare the properties of liquids by surface tension and viscosity experiments   |
| <b>K4</b> | <b>CO4</b> | Production and application of ultrasonics and acoustics in different types of buildings.                               |

|                       |                |  |                   |              |
|-----------------------|----------------|--|-------------------|--------------|
| Programme Code: 03    |                | B.Sc Physics                           |                   |              |
| Course Code: 19UPH202 |                | Core Paper - 2 Heat and Thermodynamics |                   |              |
| Batch<br>2019-2020    | Semester<br>II | Hours/Week<br>60                       | Total Hours<br>90 | Credits<br>5 |

#### Course Objective

To enable the learners to understand

1. Equation of states of a real gas, quantum theory of specific heat and basic theory of entropy.
2. Principle and different methods of production of low temperature and liquefaction of He.
3. Quantum theory of radiation and three types of thermodynamical statistics.

#### Course Outcome (CO)

|           |            |   |
|-----------|------------|---|
| <b>K1</b> | <b>CO1</b> | Understand gas laws and its behavior. Understand the model system of an ideal gas and the principles of kinetic theory, Einstein's theory and Debye's theory. |
| <b>K2</b> | <b>CO2</b> | Gain knowledge on entropy of a system in reversible and irreversible process. Understand significance of thermodynamic properties and internal energy.        |
| <b>K3</b> | <b>CO3</b> | Compare the various methods of production of low temperature and liquefaction of gases. Will understand radiative heat transfer and radiation laws.           |
| <b>K4</b> | <b>CO4</b> | Analyze the concepts of microstate and macrostate of a model system. Understand the classical statistics and quantum mechanics.                               |



|                       |                    |                    |                   |              |
|-----------------------|--------------------|--------------------|-------------------|--------------|
| Programme Code: 03    |                    | B.Sc Physics       |                   |              |
| Course Code: 19UPH2CL |                    | CORE PRACTICAL - I |                   |              |
| Batch<br>2019-2020    | Semester<br>I & II | Hours/Week<br>3    | Total Hours<br>90 | Credits<br>2 |

### Course Objective

To enable the learners to:

1. Understand the Physical Phenomena and fundamentals of general physics.
2. Perform experiments in the field of general physics and gaining physical understanding of the results.
3. Interpret the practical result to support the theory

### Course Outcome (CO)

|           |            |  |
|-----------|------------|--|
| <b>K5</b> | <b>CO1</b> | Provide hands on experiences in conducting scientific investigations and laboratory experiments.   |
| <b>K5</b> | <b>CO2</b> | Develop the ability to analyse basic experiments and analyze the relationship between theory and experimental results.<br>Take measurements to compare experimental results in the laboratory with the theoretical analysis. |
| <b>K5</b> | <b>CO3</b> | Will be familiar to conduct experimental investigations of simple mechanical, heat and optical physics.  |
| <b>K5</b> | <b>CO4</b> | Practice record keeping of experimental work and data graphing   |

|                       |                 |                           |                   |              |
|-----------------------|-----------------|---------------------------|-------------------|--------------|
| Programme Code: 03    |                 | B.Sc Physics              |                   |              |
| Course Code: 19UPH303 |                 | Core Paper - 3: Mechanics |                   |              |
| Batch<br>2019-2020    | Semester<br>III | Hours/Week<br>4           | Total Hours<br>60 | Credits<br>5 |

**Course Objective**

To enable the learners to

1. Understand the principles of rigid body dynamics
2. Understand the fundamental ideas of Projectile motions
3. Understand the statics, hydrostatics and hydrodynamics

**Course Outcome (CO)**

|           |            |  |
|-----------|------------|--|
| <b>K1</b> | <b>CO1</b> | Rigid body dynamics will help the students to understand the behaviour of various bodies due to kinematic and dynamic forces acting on the body.             |
| <b>K2</b> | <b>CO2</b> | The study of projectiles enables the students to apply the knowledge of mathematics, fundamental sciences to obtain solution of complex mechanical problems. |
| <b>K3</b> | <b>CO3</b> | Study of statics promotes analysis and interpretation of numerical problems.   |
| <b>K4</b> | <b>CO4</b> | Students will gain knowledge on fundamental laws of floatation and hydrostatics.   |

|                       |                |   |                   |              |
|-----------------------|----------------|---|-------------------|--------------|
| Programme Code: 03    |                | B.Sc Physics                              |                   |              |
| Course Code: 19UPH404 |                | Core Paper - 4: Electricity and Magnetism |                   |              |
| Batch<br>2019-2020    | Semester<br>IV | Hours/Week<br>4                           | Total Hours<br>60 | Credits<br>5 |

**Course Objective**

To enable the learners to

1. Acquire basic knowledge of electrostatics and thermoelectricity
2. Study about magnetic properties of materials
3. Learn motion of charges and alternating current and its circuits

**Course Outcome (CO)**

|           |            |   |
|-----------|------------|---|
| <b>K1</b> | <b>CO1</b> | Acquire knowledge about electrostatics, magnetic and thermoelectric properties of materials                                   |
| <b>K2</b> | <b>CO2</b> | Understand the motion of charges in ac circuits and magnetic effect of electric current                                       |
| <b>K3</b> | <b>CO3</b> | Apply knowledge on fabrication of different types of capacitors, transformer, choke coil and thermoelectric power generators. |
| <b>K4</b> | <b>CO4</b> | Analyze the trouble shooting of ac circuits (LCR series and LCR parallel mode) and also analyze the thermoelectric diagrams   |

|                       |                |  |                   |              |
|-----------------------|----------------|--|-------------------|--------------|
| Programme Code: 03    |                | B.Sc Physics                                     |                   |              |
| Course Code: 19UPH4S2 |                | SKILL BASED SUBJECT II – Medical Instrumentation |                   |              |
| Batch<br>2019-2020    | Semester<br>IV | Hours/Week<br>2                                  | Total Hours<br>30 | Credits<br>3 |

#### Course Objective

To enable the learners to

1. Understand about ECG, ERG etc
2. Understand the concepts of the pacemaker and the batteries used in it, kidney machine etc
3. Know the role of the LASER in the medical field
4. Know the determination of the frequency of interference

#### Course Outcome (CO)

|           |            |   |
|-----------|------------|---|
| <b>K1</b> | <b>CO1</b> | Will get knowledge about the origin of biopotentials, electrical activity of excitable cells, action potentials, and membrane models. |
| <b>K2</b> | <b>CO2</b> | Will be able to understand the application of Laser and the origin of biopotentials: ECG, ERG, MEG, etc                               |
| <b>K3</b> | <b>CO3</b> | Will apply knowledge on measurement of blood flow and pressure.   |
| <b>K4</b> | <b>CO4</b> | Will be able to analyze the Clinical laboratory systems, Bio control and Electrical safety  |

|                       |                      |                     |                   |              |
|-----------------------|----------------------|---------------------|-------------------|--------------|
| Programme Code: 03    |                      | B.Sc Physics        |                   |              |
| Course Code: 19UPH4CM |                      | Core Practical - II |                   |              |
| Batch<br>2019-2020    | Semester<br>III & IV | Hours/Week<br>3     | Total Hours<br>90 | Credits<br>2 |

#### Course Objective

To enable the learners to:

1. Understand the Physical Phenomena and fundamentals of general physics.
2. Perform experiments in the field of general physics and gaining understanding of the results.
3. Interpret the practical result to support the theory

#### Course Outcome (CO)

|           |            |  |
|-----------|------------|--|
| <b>K5</b> | <b>CO1</b> | Provide hands on experiences in conducting scientific investigations and laboratory experiments.   |
| <b>K5</b> | <b>CO2</b> | Develop the ability to analyse basic experiments and analyze the relationship between theory and experimental results.<br>Take measurements to compare experimental results in the laboratory with the theoretical analysis. |
| <b>K5</b> | <b>CO3</b> | Will be familiar to conduct experimental investigations of simple mechanical, heat and optical physics.  |
| <b>K5</b> | <b>CO4</b> | Practice record keeping of experimental work and data graphing   |

|                              |                       |  |                           |                      |
|------------------------------|-----------------------|--|---------------------------|----------------------|
| <b>Programme code: 03</b>    |                       | <b>B.Sc., Physics</b>                        |                           |                      |
| <b>Course Code: 19UPH505</b> |                       | <b>Core Paper - 5 : Mathematical Physics</b> |                           |                      |
| <b>Batch<br/>2019-2020</b>   | <b>Semester<br/>V</b> | <b>Hours/Week<br/>4</b>                      | <b>Total Hours<br/>60</b> | <b>Credits<br/>4</b> |

**Course Objective**

To enable the learners to

1. Know about applying Fourier series and vector analysis to physical problems
2. Know about differential operators in various coordinates systems
3. To apply Lagrangian formulation to physical bodies

**Course Outcome (CO)**

|           |            |   |
|-----------|------------|---|
| <b>K1</b> | <b>CO1</b> | To understand physical examples of Fourier series                     |
| <b>K2</b> | <b>CO2</b> | To understand co-ordinates of operators in vectors                    |
| <b>K3</b> | <b>CO3</b> | To apply the vectors for physical examples                            |
| <b>K4</b> | <b>CO4</b> | To solve the problems in Classical Mechanics and Lagrange's Equations |

|                       |          |                        |             |         |
|-----------------------|----------|------------------------|-------------|---------|
| Programme code: 03    |          | B.Sc., Physics         |             |         |
| Course Code: 19UPH506 |          | Core Paper - 6: Optics |             |         |
| Batch                 | Semester | Hours/Week             | Total Hours | Credits |
| 2019-2020             | V        | 4                      | 60          | 4       |

#### Course Objective

To enable the learners to

1. Acquire knowledge in ray optics
2. Understand mechanism of energy transfer in the form of waves
3. Basic principles of laser physics

#### Course Outcome (CO)

|           |            |   |
|-----------|------------|---|
| <b>K1</b> | <b>CO1</b> | Learn to use geometric approximation, the ray equations, understand the aberrations with an emphasis on image forming systems and how they can be reduced |
| <b>K2</b> | <b>CO2</b> | Be able to understand wave optics, interference, diffraction and polarization.  |
| <b>K3</b> | <b>CO3</b> | Be acquainted with Fresnel and Fraunhofer diffraction.  |
| <b>K4</b> | <b>CO4</b> | Have an understanding of the basic principles of Laser, operation and construction of different Laser systems.  |

|                       |               |  |                   |              |
|-----------------------|---------------|--|-------------------|--------------|
| Programme code: 03    |               | B.Sc., Physics   |                   |              |
| Course Code: 19UPH507 |               | Core Paper - 7 Principles of Electronic Devices and Circuits |                   |              |
| Batch<br>2019-2020    | Semester<br>V | Hours/Week<br>4  | Total Hours<br>60 | Credits<br>4 |

#### Course Objective

To enable the learners to

1. Understand the action of semiconductor devices and their applications.
2. Know the principle and working of oscillators.

#### Course Outcome (CO)

|           |            |   |
|-----------|------------|---|
| <b>K1</b> | <b>CO1</b> | Learn to use semiconductors and devices   |
| <b>K2</b> | <b>CO2</b> | Be able to understand transistor biasing and stabilization  |
| <b>K3</b> | <b>CO3</b> | Learned about the functioning of FET, MOSFET, UJT and SCR   |
| <b>K4</b> | <b>CO4</b> | Have an understanding of the basic principles of Operational Amplifiers, Amplifiers and Oscillators |



|                       |               |  |                   |              |
|-----------------------|---------------|--|-------------------|--------------|
| Programme code: 03    |               | B.Sc., Physics                                   |                   |              |
| Course Code: 19UPH508 |               | Core Paper – 8: Quantum Mechanics and Relativity |                   |              |
| Batch<br>2019-2020    | Semester<br>V | Hours/Week<br>4                                  | Total Hours<br>60 | Credits<br>5 |

**Course Objective**

To enable the learners to

1. Know about DeBroglie concept and the uncertainty relation.
2. Know about the applications of Schrodinger's equation
3. Know about the postulates constancy of light as well as the mass-energy relationship

**Course Outcome (CO)**

|           |            |  |
|-----------|------------|--|
| <b>K1</b> | <b>CO1</b> | Familiar with the main aspects of the historical development of Quantum Mechanics  |
| <b>K2</b> | <b>CO2</b> | Discuss and interpret experimental results that reveal the wave properties of matter.  |
| <b>K3</b> | <b>CO3</b> | Understand the basic principles in Quantum Mechanics such as the Schrodinger equation , the wave function, Uncertainty principle, elementary concepts in statistics such as expectation value. |
| <b>K4</b> | <b>CO4</b> | Understand the theory of relativity and to solve Schrodinger equation for simple systems in one to three dimensions  |

|                       |          |   |             |         |
|-----------------------|----------|---|-------------|---------|
| Programme code: 03    |          | B.Sc., Physics                            |             |         |
| Course Code: 19UPH5S3 |          | Skill Based Subject III- Programming in C |             |         |
| Batch                 | Semester | Hours/Week                                | Total Hours | Credits |
| 2019-2020             | VI       | 3   | 45          | 3       |

### Course Objective

To enable the learner to

1. Know about basic in C language
2. Develop programming skill in C language
3. to exhibit multidisciplinary approach to solve problems.

### Course Outcome (CO)

|           |            |  |
|-----------|------------|--|
| <b>K1</b> | <b>CO1</b> | work in interdisciplinary groups   |
| <b>K2</b> | <b>CO2</b> | gain expertise in identifying and solving problems related to computer language. |
| <b>K3</b> | <b>CO3</b> | develop programs for simple problems   |
| <b>K4</b> | <b>CO4</b> | involve in advanced software systems   |

|                       |          |  |             |         |
|-----------------------|----------|--|-------------|---------|
| Programme code: 03    |          | B.Sc., Physics                                 |             |         |
| Course Code: 19UPH609 |          | Core Paper - 9: Atomic and Solid State Physics |             |         |
| Batch                 | Semester | Hours/Week                                     | Total Hours | Credits |
| 2019-2020             | VI       | 4  | 60          | 4       |

### Course Objective

To enable the learners to

1. Know about the X – rays, Photoelectric effect and their application
2. Know about different coupling schemes and the effect of magnetic and electric fields on the spectrum of an atom and molecule
3. Understand the different crystal structure and their bindings

### Course Outcome (CO)

|           |            |   |
|-----------|------------|---|
| <b>K1</b> | <b>CO1</b> | Get knowledge about electrostatics, magnetic and thermoelectric properties of materials                                       |
| <b>K2</b> | <b>CO2</b> | Understand the motion of charges in ac circuits and magnetic effect of electric current                                       |
| <b>K3</b> | <b>CO3</b> | Apply knowledge on fabrication of different types of capacitors, transformer, choke coil and thermoelectric power generators. |
| <b>K4</b> | <b>CO4</b> | Analyze the trouble shooting of ac circuits (LCR series and LCR parallel mode) and also analyze the thermoelectric diagrams   |

|                       |          |  |             |         |
|-----------------------|----------|--|-------------|---------|
| Programme code: 03    |          | B.Sc., Physics                                       |             |         |
| Course Code: 19UPH610 |          | Core Paper - 10: Fundamentals of Digital Electronics |             |         |
| Batch                 | Semester | Hours/Week   | Total Hours | Credits |
| 2019-2020             | VI       | 4  | 60          | 4       |

### Course Objective

To enable the learners to acquire knowledge about

1. Four different number systems & binary codes
2. Logic gates, Boolean algebra and Karnaugh map
3. Flip- flops, counters, arithmetic circuits, data processing circuits, shift registers, semiconductor memories, D\A converters and A\D converters

### Course Outcome (CO)

|           |            |  |
|-----------|------------|--|
| <b>K1</b> | <b>CO1</b> | Have the knowledge about number systems, binary arithmetic operations and binary codes   |
| <b>K2</b> | <b>CO2</b> | Have an understanding of logic gates, Demorgan's theorems and Karnaugh maps and simplification of Boolean expressions  |
| <b>K3</b> | <b>CO3</b> | Have the ability to apply the knowledge of the knowledge of logic gates to design flip-flops, counters, shift registers, arithmetic and data processing circuits |
| <b>K4</b> | <b>CO4</b> | Be familiar to analyze the semiconductor memories and some of the A/D and D/A converters   |

| Programme code: 03    |          | B.Sc., Physics                   |             |         |
|-----------------------|----------|----------------------------------|-------------|---------|
| Course Code: 19UPH611 |          | Core Paper - 11: Nuclear Physics |             |         |
| Batch                 | Semester | Hours/Week                       | Total Hours | Credits |
| 2019-2020             | VI       | 4                                | 60          | 5       |

### Course Objective

To enable the learner to know about

1. General properties of atomic nuclei, particle accelerators, Radioactivity,
2. Artificial transmutation of elements, nuclear transmutation,
3. Nuclear fission and fusion and (iv) Elementary particles.

### Course Outcome (CO)

|           |            |  |
|-----------|------------|--|
| <b>K1</b> | <b>CO1</b> | The learners will know about basic nuclear properties and particle accelerators.   |
| <b>K2</b> | <b>CO2</b> | The learners will have knowledge about the differences between various decay modes and radioactive dating.   |
| <b>K3</b> | <b>CO3</b> | The learners will have knowledge about basic concepts and relations to calculate Q – values for nuclear reactions, production of radioisotopes and their uses. |
| <b>K4</b> | <b>CO4</b> | The learners will know about the nuclear fission, fusion and detection of nuclear radiations.  |

|                      |          |  |             |         |
|----------------------|----------|--|-------------|---------|
| Programme code: 03   |          | B.Sc., Physics   |             |         |
| Course Code:19UPH6S4 |          | Skill Based Subject IV: Introduction to Microprocessor |             |         |
| Batch                | Semester | Hours/Week   | Total Hours | Credits |
| 2019-2020            | VI       | 3  | 45          | 3       |

### Course Objective

To study about the

1. History, Origin and Development of Microprocessor
2. Architecture, instruction set and programming of 8085 microprocessors
3. Interfacing

### Course Outcome (CO)

|           |            |   |
|-----------|------------|---|
| <b>K1</b> | <b>CO1</b> | Able to know about introduction to microprocessor                         |
| <b>K2</b> | <b>CO2</b> | Able to understand architectural diagram                                  |
| <b>K3</b> | <b>CO3</b> | acquire the knowledge about programming and interfacing                   |
| <b>K4</b> | <b>CO4</b> | Able to understand the concept of stack and subroutine in the programming |

|                      |          |  |             |         |
|----------------------|----------|--|-------------|---------|
| Programme code: 03   |          | B.Sc., Physics                             |             |         |
| Course Code:19UPH6CN |          | Core Practical – III – General Experiments |             |         |
| Batch                | Semester | Hours/Week                                 | Total Hours | Credits |
| 2019-2020            | V & VI   | 3  | 90          | 2       |

#### **Course Objective**

To enable the learners to:

1. Have a good foundation in the fundamentals and applications of general physics.
2. Acquire the skill of finding and developing practical scientific facts.
3. Employ the practical result to support the theory

#### **Course Outcome (CO)**

|           |            |  |
|-----------|------------|--|
| <b>K5</b> | <b>CO1</b> | Develop the ability to analyse basic experiments. Work and coordinate effectively in a group to accomplish laboratory based tasks. |
| <b>K5</b> | <b>CO2</b> | Take measurements to compare experimental results in the laboratory with the theoretical analysis.                                 |
| <b>K5</b> | <b>CO3</b> | Will be familiar to conduct experimental investigations of simple electric, magnetic and optical phenomena.                        |
| <b>K5</b> | <b>CO4</b> | Practice record keeping of experimental work and data graphing   |

|                       |          |   |             |         |
|-----------------------|----------|---|-------------|---------|
| Programme code: 03    |          | B.Sc., Physics  |             |         |
| Course Code: 19UPH6CO |          | Core Practical IV - Electronics, Digital Electronics & Microprocessor |             |         |
| Batch                 | Semester | Hours/Week  | Total Hours | Credits |
| 2019-2020             | V & VI   | 2   | 60          | 2       |

### Course Objective

To enable the learners to

1. To design and construct small electronic circuits
2. To develop experimental skills and understand relation between experimental data and theoretical analysis.
3. Have a good foundation in the fundamentals and applications of experimental physics

### Course Outcome (CO)

|           |            |   |
|-----------|------------|---|
| <b>K5</b> | <b>CO1</b> | Acquire a basic knowledge in solid state electronics and to understand the ALP using 8085 processor |
| <b>K5</b> | <b>CO2</b> | Develop the ability to analyse and design analog electronic circuits using discrete components.     |
| <b>K5</b> | <b>CO3</b> | To acquire knowledge in digital electronics by constructing logic circuits                          |
| <b>K5</b> | <b>CO4</b> | Take measurements to compare experimental results in the laboratory with the theoretical analysis   |



|                              |                 |  |                    |                |
|------------------------------|-----------------|--|--------------------|----------------|
| <b>Programme code: 03</b>    |                 | <b>B.Sc., Physics</b>  |                    |                |
| <b>Course Code: 19UPH6CP</b> |                 | <b>Core Practical - V : Digital Electronics &amp; Microprocessor</b> |                    |                |
| <b>Batch</b>                 | <b>Semester</b> | <b>Hours/Week</b>  | <b>Total Hours</b> | <b>Credits</b> |
| <b>2019-2020</b>             | <b>VI</b>       | <b>2</b>   | <b>60</b>          | <b>2</b>       |

#### **Course objective**

To enable the learners to:

1. Have good foundations in the fundamentals of digital Electronics.
2. Acquire the skill of writing and executing assembly language programming using 8085 microprocessors
3. Employ the practical results for controlling mechanical and electrical and electronic devices.

#### **Course Outcome (CO)**

|           |            |   |
|-----------|------------|---|
| <b>K5</b> | <b>CO1</b> | Develop the ability to construct basic logic gates and other digital electronics devices. |
| <b>K5</b> | <b>CO2</b> | Get familiarized for developing microprocessor based programming.                         |
| <b>K5</b> | <b>CO3</b> | Gain expertise and will be able to work in multi-disciplinary groups                      |
| <b>K5</b> | <b>CO4</b> | Coordinate effectively in a group to accomplish computer based tasks.                     |

|                              |                 |   |                    |                |
|------------------------------|-----------------|---|--------------------|----------------|
| <b>Programme Code: 03</b>    |                 | <b>B.Sc Physics</b>   |                    |                |
| <b>Course Code: 19UPH5E1</b> |                 | <b>Major Elective Paper 1: Laser Physics and Fiber Optics</b> |                    |                |
| <b>Batch</b>                 | <b>Semester</b> | <b>Hours/Week</b>   | <b>Total Hours</b> | <b>Credits</b> |
| <b>2019-2020</b>             | <b>V</b>        | <b>4</b>  | <b>60</b>          | <b>5</b>       |

### Course Objectives

To enable the learners to

1. Acquire basic knowledge about lasing action, types of lasers and the applications of lasers.
2. Understand about fabrication of optical fibers, fiber optic sensors and their applications in medical fields.

### Course outcome (CO)

|    |     |   |
|----|-----|---|
| K1 | CO1 | WILL BE ABLE TO UNDERSTAND THE BASIC THEORY OF LASER ACTION AND APPLY THEM TO CLASSIFY AND EXPLAIN THE FUNDAMENTALS OF LASER.                     |
| K2 | CO2 | Will be able to explain the concept of q-switching and illustrate the working of various advanced lasers available.                               |
| K3 | CO3 | Will be able to illustrate the application of lasers in various fields.   |
| K4 | CO4 | Would have learnt the fabrication of different types of optical fibers, Different types of loss, sensor types and applications of optical fibers. |

|                              |                 |   |                    |                |
|------------------------------|-----------------|---|--------------------|----------------|
| <b>Programme code: 03</b>    |                 | <b>B.Sc., Physics</b>   |                    |                |
| <b>Course Code: 19UPH6E2</b> |                 | <b>Major Elective Paper 2-Measurement and Instrumentation</b> |                    |                |
| <b>Batch</b>                 | <b>Semester</b> | <b>Hours/Week</b>   | <b>Total Hours</b> | <b>Credits</b> |
| <b>2019-2020</b>             | <b>VI</b>       | <b>4</b>  | <b>60</b>          | <b>5</b>       |

**Course Objectives**

1. To impart knowledge on various measurement parameters
2. To understand the working of electronic instruments
3. To impart knowledge on transducers

**Course outcome (CO)**

|    |     |  |
|----|-----|--|
| K1 | CO1 | Able to identify the different type of measurement parameters  |
| K2 | CO2 | Able to describe the working of analog instruments   |
| K3 | CO3 | Able to design the circuits using wattmeter  |
| K4 | CO4 | Able to apply the knowledge of different electronic instruments using cro and to demonstrate the types of transducers. |

|   |                 |                               |                                 |                            |
|---|-----------------|-------------------------------|---------------------------------|----------------------------|
| <b>Programme code: 03</b>   |                 | <b>B.Sc., Physics</b>         |                                 |                            |
| <b>Major Elective Paper 3 - Principles of Communication Systems</b> |                 |                               |                                 |                            |
| <b>Batch</b><br><b>2019-2020</b>                                    | <b>Semester</b> | <b>Hours/Week</b><br><b>4</b> | <b>Total Hours</b><br><b>60</b> | <b>Credits</b><br><b>5</b> |

**Course Objective**

To enable the learners

1. To understand the basics idea about Modulation, demodulation
2. To gain knowledge on transmission lines and antennas
3. To know about the functioning of Radio, cellular, fiber optic, television and satellite communications

**Course Outcome (CO)**

|    |     |   |
|----|-----|---|
| K1 | CO1 | Get knowledge about wireless and fiber optic communication systems                            |
| K2 | CO2 | Understand the working principles of radio, cellular, television and satellite communications |
| K3 | CO3 | Apply knowledge on manufacturing of radio, tv and antennas                                    |
| K4 | CO4 | Trouble shoot the different sections of a radio, tv and transmission lines                    |

|  |                 |                               |                                 |                            |
|--|-----------------|-------------------------------|---------------------------------|----------------------------|
| <b>Programme code: 03</b>                                |                 | <b>B.Sc., Physics</b>         |                                 |                            |
| <b>Major Elective Paper 4 - Renewable Energy Sources</b> |                 |                               |                                 |                            |
| <b>Batch</b><br><b>2019-2020</b>                         | <b>Semester</b> | <b>Hours/Week</b><br><b>4</b> | <b>Total Hours</b><br><b>60</b> | <b>Credits</b><br><b>5</b> |

### Course Objectives

To enable the learner to

1. Know about the conventional energy sources and its impact on the environment.
2. Know about renewable energy sources, its availability, technology and advantages.

### Course outcome (CO)

|           |            |   |
|-----------|------------|---|
| <b>K1</b> | <b>CO1</b> | Will be able to understand the commercial energy sources, its availability, merits and demerits   |
| <b>K2</b> | <b>CO2</b> | Study various renewable energy sources, its principle and applications  |
| <b>K3</b> | <b>CO3</b> | Will be familiar with the various methods of production and storage of energy for nation development  |
| <b>K4</b> | <b>CO4</b> | Develop the ability to analyze the effects of conventional energy sources in the environment and how to preserve the resources for future generation. |

|                    |          |                            |             |         |
|--------------------|----------|----------------------------|-------------|---------|
| Programme code: 03 |          | B.Sc., Physics             |             |         |
| Course Code:       |          | Introduction to Biophysics |             |         |
| Batch              | Semester | Hours/Week                 | Total Hours | Credits |
| 2019-2020          |          | 4                          | 60          | 5       |

### Course Objective

To enable the learners to:

1. Biophysics of Muscle
2. Biophysics of Human Ear
3. Physics of Vision

### Course Outcome (CO)

|           |            |  |
|-----------|------------|--|
| <b>K1</b> | <b>CO1</b> | Able to know about biomechanics, biostatics, biodynamics         |
| <b>K2</b> | <b>CO2</b> | Able to understand biophysics and fluidrun                       |
| <b>K3</b> | <b>CO3</b> | To acquire the knowledge about Biophysics and gas transport      |
| <b>K4</b> | <b>CO4</b> | To know the concept of physics of audition and physics of vision |

|                       |          |  |             |         |
|-----------------------|----------|--|-------------|---------|
| Programme code: 03    |          | For B.Sc Mathematics and B.Sc Chemistry  |             |         |
| Course Code:19UPH63A1 |          | Allied Subject I -Physics–I<br>(MECHANICS, HEAT, SOUND, MAGNETISM AND ELECTRICITY) |             |         |
| Batch                 | Semester | Hours/Week   | Total Hours | Credits |
| 2019-2020             | III      | 4  | 60          | 4       |

### Course Objective

To enable the learners to

1. know about mechanics, properties of matter and sound
2. understand thermal physics
3. know about the light, electricity and electromagnetism

### Course Outcome (CO)

|           |            |  |
|-----------|------------|--|
| <b>K1</b> | <b>CO1</b> | Able to know about simple harmonic motion and projectile motion                                  |
| <b>K2</b> | <b>CO2</b> | To understand about elasticity and propagation of sound waves                                    |
| <b>K3</b> | <b>CO3</b> | To know about specific heat of solids and liquids  |
| <b>K4</b> | <b>CO4</b> | To acquire the knowledge of Interference, Diffraction, current electricity and Electromagnetism. |

|                       |          |  |             |         |
|-----------------------|----------|--|-------------|---------|
| Programme code: 03    |          | For B.Sc Mathematics and B.Sc Chemistry  |             |         |
| Course Code: 19UPH4A2 |          | Allied Subject II -Physics–II<br>(MODERN PHYSICS, ELECTRONICS AND DIGITAL ELECTRONICS) |             |         |
| Batch                 | Semester | Hours/Week   | Total Hours | Credits |
| 2019-2020             | IV       | 4  | 60          | 4       |

### Course Objective

To enable the learners to

1. know about quantum Physics, nuclear & atomic Physics,
2. understand the concept of relativity
3. know the basics of electronics and communication Physics

### Course Outcome (CO)

|           |            |  |
|-----------|------------|--|
| <b>K1</b> | <b>CO1</b> | Will understand the central concepts and principles in quantum physics. At the end of the module, students will be able to describe the properties and structure of stable nuclei.     |
| <b>K2</b> | <b>CO2</b> | Able to understand the theory of atomic structure, importance of periodic table and familiar with the fundamentals principles of the general theory of relativity and inertial frames. |
| <b>K3</b> | <b>CO3</b> | Will understand the principles and design considerations of various LASERs , modes of their operation and areas of their applications  |
| <b>K4</b> | <b>CO4</b> | Acquire a basic knowledge in solid state electronics including diodes, FET, UJT. Will understand number system, amplification circuits and communication physics.                      |



|                       |          |   |             |         |
|-----------------------|----------|---|-------------|---------|
| Programme code: 03    |          | For B.Sc Mathematics and B.Sc Chemistry |             |         |
| Course Code: 19UPH4AL |          | Allied Physics Practical                |             |         |
| Batch                 | Semester | Hours/Week                              | Total Hours | Credits |
| 2019-2020             | III & IV | 3                                       | 90          | 2       |

### Course Objective

To enable the learners to:

1. Understand the Physical Phenomena and fundamentals of general physics.
2. Perform experiments in the field of general physics and gaining physical understanding of the results.
3. Interpret the practical result to support the theory

### Course Outcome (CO)

|           |            |  |
|-----------|------------|--|
| <b>K5</b> | <b>CO1</b> | Provide hands on experiences in conducting scientific investigations and laboratory experiments.   |
| <b>K5</b> | <b>CO2</b> | Develop the ability to analyse basic experiments and analyze the relationship between theory and experimental results.<br>Take measurements to compare experimental results in the laboratory with the theoretical analysis. |
| <b>K5</b> | <b>CO3</b> | Will be familiar to conduct experimental investigations of simple mechanical, heat and optical physics.  |
| <b>K5</b> | <b>CO4</b> | Practice record keeping of experimental work and data graphing   |