



V.V.VANNIAPERUMAL COLLEGE FOR WOMEN

(Belonging to Virudhunagar Hindu Nadars)

An Autonomous Institution Affiliated to Madurai Kamaraj University, Madurai

Re-accredited with 'A' Grade (3rd Cycle) by NAAC

VIRUDHUNAGAR - 626 001

PEOs, POs, PSOs and COs

B.Sc. PHYSICS

Programme Educational Objectives (PEOs)

PEOs are broad statements that describe the career and professional achievements that the Programme is preparing the graduates to achieve within the first few years after graduation. PEOs are framed for each Programme and should be consistent with the Mission of the Institution.

Programme Outcomes (POs)

POs shall be based on Graduate Attributes (GAs) of the Programme. The GAs are the attributes expected of a graduate from a Programme in terms of knowledge, skills, attitude and values. The Graduate Attributes include Disciplinary Knowledge, Communication Skills, Critical Thinking, Problem Solving, Analytical Reasoning, Research Related Skills, Co-operation/TeamWork, Scientific Reasoning, Reflective Thinking, Information/Digital Literacy, Multicultural Competence, Moral and Ethical Awareness/Reasoning, Leadership Qualities and Lifelong Learning.

On successful completion of the Programme, the students will be able to

- 1 Apply effectively the acquired knowledge and skill in the field of Arts, Physical Science, Life Science, Computer Science, Commerce and Management for higher studies and employment. (*Disciplinary Knowledge*)
- 2 Communicate proficiently and confidently with the ability to express original/complex ideas effectively in different situations. (*Communication Skills*)
- 3 Identify, formulate and solve problems in real life situations scientifically/systematically by adapting updated skills in using modern tools and techniques. (*Scientific Reasoning and Problem Solving*)

- 4 Critically analyse, synthesise and evaluate data, theories and ideas to provide valid suggestions for the betterment of the society. (*Critical Thinking and Analytical Reasoning*)
- 5 Use ICT in a variety of self-directed lifelong learning activities to face career challenges in the changing environment. (*Digital Literacy, Self - directed and Lifelong Learning*)
- 6 Self-manage and function efficiently as a member or a leader in diverse teams in a multicultural society for nation building. (*Co-operation/TeamWork and Multicultural Competence*)
- 7 Uphold the imbibed ethical and moral values in personal, professional and social life for a sustainable environment. (*Moral and Ethical Awareness*)

Programme Educational Objectives (PEOs)

The students will be able to

- acquire comprehensive knowledge and sound understanding of concepts in various branches of Physics and exhibit their abilities and skills leading to professional development and lifelong learning
- be empowered with a successful career in academia, research and industry by developing their scientific temper and communication skills
- possess cultural, social and spiritual values, sense of responsibility and Character integrity for better citizenship.

| Key Components of the Mission Statement | PEO1 | PEO2 | PEO3 |
|---|-------------|-------------|-------------|
| conceptual knowledge | √ | √ | - |
| logical thinking, problem solving, communication skills, research and employability | √ | √ | √ |
| sustainable development | - | √ | √ |

Programme Specific Outcomes (PSOs)

Based on the Programme Outcomes, Programme Specific Outcomes are framed for each UG Programme. Programme Specific Outcomes denote what the students would be

able to do at the time of graduation. They are programme specific. It is mandatory that each PO should be mapped to the respective PSO.

On completion of B.Sc. Physics Programme, the students will be able to

PO1 - *Disciplinary Knowledge*

PSO 1.a : apply the acquired core knowledge in the concepts, principles and theories of fundamental and advanced Physics to pursue higher studies or employment.

PSO 1.b: be able to demonstrate their technical and observational skills in handling the equipments/instruments with precautions and to interpret the data

PO2 – *Communication Skills*

PSO 2: exhibit oral and written communication skills in presenting complex and technical concepts of Physics to wider group of audience such as academic experts, professionals and society.

PO3 – *Scientific Reasoning and Problem Solving*

PSO 3.a: determine the various parameters in Physics by appropriate experimental methods and thereby updating their knowledge and skills.

PSO 3.b: enrich their problem-solving skills that prepare them to meet the challenges in higher studies/career

PO4 – *Critical Thinking and Analytical Reasoning*

PSO 4.a: analyze the equations / theories /models in different branches of Physics and realize their significance in Science and technology and industry.

PSO 4.b: apply the principles of various fields of Physics/ Interdisciplinary areas to design innovative experiments and thereby developing their analytical skills.

PO5 – *Digital Literacy, Self - Directed and Lifelong Learning*

PSO 5: be capable of utilizing modern digital tools, pertaining to their field of interest that enable them for self-directed lifelong learning.

PO6 – *Co-operation/Team Work and Multi-Cultural Competence*

PSO 6: build up their leadership qualities, team spirit and good interpersonal relations through their group practical, co-curricular and extra-curricular activities, internship and project work.

PO7 –*Moral and Ethical Awareness*

PSO 7: adhere the global standards of codes of conduct in Physics community and practice the imbibed moral values in their profession and society to attain sustainable environment



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| | | | |
|-----------------------------|---|----------------------|-----------------|
| Semester I | MECHANICS AND PROPERTIES OF MATTER | Hours/Week: 4 | |
| Core Course 1 | | Credits: 4 | |
| Course Code | | Internal | External |
| 20UPHC11 18UPHA31 | | 25 | 75 |

COURSE OUTCOMES

On completion of the course, the students will be able to

CO1: explain the laws, concepts and theorems in Mechanics and Properties of Matter. [K1]

CO2: derive mathematical relations involved in Mechanics, Gravitation and Properties of matter by applying the concepts. [K2]

CO3: discuss the experimental methods to determine the various physical parameters related to Gravitation and Properties of Matter. [K2]

CO4: use the learned concepts to solve problems in Mechanics and Properties of Matter. [K3]

CO5: analyze the applications of laws and concepts in Mechanics and Properties of matter. [K4]

| Course Code 20UPHC11 | PO1 | | PO2 | PO3 | | PO4 | | PO5 | PO6 | PO7 |
|-------------------------|---------|---------|-------|---------|---------|---------|---------|------|------|------|
| | PSO 1.a | PSO 1.b | PSO 2 | PSO 3.a | PSO 3.b | PSO 4.a | PSO 4.b | PSO5 | PSO6 | PSO7 |
| CO1 | H | - | H | - | - | L | - | - | - | M |
| CO2 | H | - | H | - | M | M | - | - | - | - |
| CO3 | H | M | H | M | - | M | M | M | - | - |
| CO4 | H | - | M | - | H | H | - | - | M | - |
| CO5 | H | L | M | - | H | H | - | H | - | - |



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| | | | |
|----------------------------------|---|------------------------|------------------------|
| Semester I | MECHANICS AND PROPERTIES OF MATTER | Hours/Week: 4 | |
| Core Course 1 | | Credits: 4 | |
| Course Code 20UPHC11N | | Internal 25 | External 75 |

COURSE OUTCOMES

On completion of the course, the students will be able to

CO1: explain the laws, concepts and theorems in Mechanics and Properties of Matter. [K1]

CO2: derive mathematical relations involved in Mechanics, Gravitation and Properties of matter by applying the concepts. [K2]

CO3: discuss the experimental methods to determine the various physical parameters related to Gravitation and Properties of Matter. [K2]

CO4: illustrate the applications of basic laws/theories related to properties of matter and to solve simple problems. [K3]

CO5: analyze the variation of physical parameters related to mechanics and properties of matter. [K4]

| Course Code 20UPHC11N | PO1 | | PO2 | PO3 | | PO4 | | PO5 | PO6 | PO7 |
|--------------------------|------------|------------|----------|------------|------------|------------|------------|----------|----------|----------|
| | PSO 1.a | PSO 1.b | PSO 2 | PSO 3.a | PSO 3.b | PSO 4.a | PSO 4.b | PSO 5 | PSO 6 | PSO 7 |
| CO 1 | H | - | H | - | - | L | - | - | - | M |
| CO 2 | H | - | H | - | M | M | - | - | - | - |
| CO 3 | H | M | H | M | - | M | M | M | - | - |
| CO 4 | H | - | M | - | H | H | - | - | M | - |
| CO 5 | H | L | M | - | H | H | - | H | - | - |



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| | | | |
|---------------------------------------|--------------------|------------------------------|------------------------------|
| Semester I | ELECTRICITY | Hours/Week: 4 | |
| Core Course 2 | | Credits: 4 | |
| Course Code 20UPHC12 | | Internal 25 | External 75 |

COURSE OUTCOMES

On completion of the course, the students will be able to

CO1: state the laws of electricity and magnetic effects of current. [K1]

CO2: derive the mathematical expression for electric field & potential in various charge distribution, capacitance of capacitors, sensitivity of bridge, thermodynamics of thermocouple and magnetic field due to current in different dimension. [K2]

CO3: explain the experimental methods for the determination of parameters related to electrostatics, current electricity, thermal and magnetic effects of current. [K2]

CO4: solve problems using the concepts learned in electricity. [K3]

CO5: analyze the capacitors of different configurations & combinations to determine the capacitance and to compute electrical parameters in current and thermoelectricity. [K4]

| Course Code 20UPHC12 | PO1 | | PO2 | PO3 | | PO4 | | PO5 | PO6 | PO7 |
|-------------------------|---------|---------|-------|---------|---------|---------|---------|------|------|------|
| | PSO 1.a | PSO 1.b | PSO 2 | PSO 3.a | PSO 3.b | PSO 4.a | PSO 4.b | PSO5 | PSO6 | PSO7 |
| CO1 | H | - | H | L | - | L | - | - | - | H |
| CO2 | H | M | H | M | - | - | - | - | M | - |
| CO3 | H | H | H | - | M | M | - | M | - | H |
| CO4 | H | H | H | H | - | M | - | H | - | - |
| CO5 | H | - | M | - | H | H | M | - | - | - |



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| | | | |
|---------------------------------------|-------------------------------|------------------------------|------------------------------|
| Semester I | ALLIED MATHEMATICS – I | Hours/Week: 6 | |
| Allied Course-I | | Credits: 4 | |
| Course Code 20UMTA11 | | Internal 25 | External 75 |

COURSE OUTCOMES

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

CO1: retrieve the fundamental principles, concepts in the areas of differential calculus, Integral calculus, differential equations and Algebra. [K1]

CO2: explain curvature & evolute of a curve, method of solving exact differential equations and linear differential equations with constant coefficients. [K2]

CO3: find the derivative and partial derivative of a given function, solution of simultaneous linear equations, eigen values and eigen vectors of a given matrix and double & triple integrals. [K2]

CO4: apply the knowledge gained in calculus, differential equations and algebra to other fields. [K3]

CO5: analyse the challenging problems in calculus, differential equations and algebra. [K4]

| Course Code 20UMTA11 | PO1 | PO 2 | PO3 | PO4 | PO5 | PO6 | PO 7 |
|---------------------------------------|------------|-------------|------------|------------|------------|------------|-------------|
| CO1 | H | M | H | M | L | M | - |
| CO2 | H | M | H | M | L | M | - |
| CO3 | M | M | H | M | L | M | - |
| CO4 | H | H | H | H | L | M | - |
| CO5 | H | M | H | M | L | H | - |



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| | | | |
|--|---|-------------------------|-----------------------|
| Semester I | VALUE EDUCATION (2020 -21 onwards) | Hours/Week: 2 | |
| Ability Enhancement Compulsory Course | | Credits: 2 | |
| Course Code 20UGVE11 | | Internal 100 | External 1 |

COURSE OUTCOMES

On completion of the course, students will be able to

CO1: describe the general human values and their associated values that are

essential to make them committed and responsible individuals. [K1]

CO2: indicate the importance and benefits of upholding human values. [K2]

CO3: explain the steps to be taken for upholding human values and human rights. [K2]

CO4: practice the individual values needed for maintaining harmonious relationship with members of family, institution, organization or society for preserving and transmitting its tradition and culture. [K3]

CO5: uphold the legal, moral, ethical and spiritual values for nurturing health and happiness leading to national integrity and peace and for the existence of human beings with humanity. [K3]

| Course Code 20UGVE11 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 |
|-------------------------------------|------------|------------|------------|------------|------------|------------|------------|
| CO1 | H | M | - | - | L | - | H |
| CO2 | H | M | - | - | L | - | H |
| CO3 | H | M | - | - | L | - | H |
| CO4 | H | M | - | - | H | H | H |
| CO5 | H | M | - | - | L | H | H |



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| | | | |
|-------------------------|------------------|----------------|----------------|
| Semester II | ELECTROMAGNETISM | Hours/Week: 4 | |
| Core Course 3 | | Credits: 4 | |
| Course Code 20UPHC21 | | Internal 25 | External 75 |

COURSE OUTCOMES

On completion of the course, the students will be able to

CO1: explain the concepts and principles in electromagnetism. [K1]

CO2: discuss the theories and experiments related to electromagnetism, principle of ac induction motor, ac circuits & ac bridges and magnetic materials. [K2]

CO3: derive the expressions related to transient response current and Maxwell's equations. [K2]

CO4: apply the learnt concepts and principles to solve problems in electromagnetism. [K3]

CO5: analyze the transient current in simple electronic circuits, ac circuits with LCR series & parallel, transformers and magnetic properties of materials. [K4]

| Course Code 20UPHC21 | PO1 | | PO2 | PO3 | | PO4 | | PO5 | PO6 | PO7 |
|-------------------------|---------|---------|-------|---------|---------|---------|---------|-------|-------|------|
| | PSO 1.a | PSO 1.b | PSO 2 | PSO 3.a | PSO 3.b | PSO 4.a | PSO 4.b | PSO 5 | PSO 6 | PSO7 |
| CO1 | H | - | M | L | L | L | - | - | - | M |
| CO2 | H | H | H | M | M | M | - | - | - | - |
| CO3 | H | L | H | M | M | M | - | H | - | - |
| CO4 | H | L | M | M | H | H | - | - | L | - |
| CO5 | H | M | M | M | H | H | - | H | - | - |



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| | | | |
|-------------------------|------------------------------------|----------------|----------------|
| Semester II | HEAT AND THERMODYNAMICS | Hours/Week: 4 | |
| Core Course 4 | | Credits: 4 | |
| Course Code 20UPHC22 | | Internal 25 | External 75 |

COURSE OUTCOMES

On completion of the course, the students will be able to

CO1: explain laws, concepts and physical parameters related to Heat & thermodynamics.

[K1]

CO2: describe experimental methods related to calorimetry, heat transfer process and

liquefaction of gases. [K2]

CO3: derive the expressions for laws, physical parameters related to Heat &

Thermodynamics and liquefaction of gases. [K2]

CO4: apply the learned concepts to solve the problems in Heat and Thermodynamics. [K3]

CO5: analyse variation of specific heat capacity with temperature, isothermal & adiabatic

processes, change of entropy, applications of laws of thermodynamics and heat

transfer process. [K4]

| Course Code 20UPHC22 | PO1 | | PO2 | PO3 | | PO4 | | PO5 | PO6 | PO7 |
|-------------------------|---------|---------|-------|---------|---------|---------|---------|------|------|------|
| | PSO 1.a | PSO 1.b | PSO 2 | PSO 3.a | PSO 3.b | PSO 4.a | PSO 4.b | PSO5 | PSO6 | PSO7 |
| CO1 | H | - | H | - | L | L | - | - | - | M |
| CO2 | H | H | H | H | M | M | L | - | - | - |
| CO3 | H | - | H | L | M | M | - | - | - | L |
| CO4 | H | - | M | - | H | H | - | - | - | - |
| CO5 | H | M | M | M | H | H | M | H | - | - |



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| | | | |
|--------------------------------------|-------------------|----------------|----------------|
| Semester I/II | GENERAL PHYSICS I | Hours/Week: 2 | |
| Core Course Practical I | | Credits: 2 | |
| Course Code 20UPHC21P 18UPHA31 | | Internal 40 | External 60 |

COURSE OUTCOMES

On completion of the course, the students will be able to

CO1: apply the theoretical concepts in Properties of matter, Heat & Thermodynamics, electricity and Electromagnetism related experiments. [K3]

CO2: draw the circuit diagram /experimental set up with tabular column/model graph and write the formula to calculate the required physical parameters. [K3]

CO3: execute the technical skills in handling the equipment and observe the required measurements related to the experiment. [K3]

CO4: calculate the necessary parameters using the formula/graph and complete the record work [K3]

CO5: analyze the accuracy of the results obtained and compare it with the theoretical value. [K4]

| Course Code | PO1 | | PO2 | PO3 | | PO4 | | PO5 | PO6 | PO7 |
|-------------|---------|---------|-------|---------|---------|---------|---------|-------|-------|-------|
| | PSO 1.a | PSO 1.b | PSO 2 | PSO 3.a | PSO 3.b | PSO 4.a | PSO 4.b | PSO 5 | PSO 6 | PSO 7 |
| CO1 | H | M | L | H | - | - | L | - | - | M |
| CO2 | H | H | H | H | - | M | - | - | - | L |
| CO3 | H | H | H | H | - | M | - | L | H | - |
| CO4 | H | H | H | - | H | M | - | L | M | H |
| CO5 | M | M | M | M | H | H | M | M | M | H |



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| | | | |
|---------------------------------------|--------------------------------|------------------------------|------------------------------|
| Semester II | ALLIED MATHEMATICS - II | Hours/Week: 3 | |
| Allied Course-I | | Credits: 3 | |
| Course Code 20UMTA21 | | Internal 25 | External 75 |

COURSE OUTCOMES

On completion of this course, students will be able to

CO1: retrieve the basic concepts in differentiation, integration, algebraic equations and trigonometric functions. [K1]

CO2: explain the concepts in Algebra, Vector Calculus and Trigonometry. [K2]

CO3: apply vector differentiation, vector integration and trigonometric functions in various fields. [K3]

CO4: find approximate solutions, establish the relation between roots and coefficients of an equation. [K3]

CO5: analyze the challenging problems in Vector Calculus, Algebra and Trigonometry. [K4]

| Course Code 20UMTA21 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 |
|---------------------------------------|------------|------------|------------|------------|------------|------------|------------|
| CO1 | H | M | H | M | M | - | - |
| CO2 | H | L | H | M | M | L | - |
| CO3 | H | M | H | M | M | L | - |
| CO4 | M | M | L | M | M | - | - |
| CO5 | H | L | L | M | M | L | - |



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| | | | |
|---------------------------------------|---------------------------------|------------------------------|------------------------------|
| Semester II | ALLIED MATHEMATICS - III | Hours/Week: 3 | |
| Allied Course-I | | Credits: 3 | |
| Course Code 20UMTA22 | | Internal 25 | External 75 |

COURSE OUTCOMES

On completion of this course, students will be able to

CO1: retrieve the basic concepts in Statistics and Operations Research. [K1]

CO2: explain the techniques used to solve the problems in Statistics and Operations research. [K2]

CO3: calculate some statistical constants to get statistical inference and O.R techniques to solve real life problems.[K3]

CO4: examine the statistical data to draw conclusion in Correlation and Regression. [K4]

CO5: analyze the challenging problems in real life to get solutions. [K4]

| Course Code 20UMTA21 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 |
|---------------------------------------|------------|------------|------------|------------|------------|------------|------------|
| CO1 | H | M | H | H | H | H | - |
| CO2 | H | M | H | H | H | M | - |
| CO3 | H | H | H | H | H | H | - |
| CO4 | H | M | H | H | H | H | - |
| CO5 | H | M | H | H | H | H | |



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| | | | |
|-------------------------|------------------|----------------|----------------|
| Semester II | PROGRAMMING IN C | Hours/Week: 2 | |
| SEC1 | | Credits: 2 | |
| Course Code 20UPHS21 | | Internal 40 | External 60 |

COURSE OUTCOMES

On completion of the course, the students will be able to

CO 1: write the basics of 'C' fundamentals. [K1]

CO 2: explain the functions of structures, arrays, and unions. [K2]

CO 3: describe how to use functions, category of functions and nesting functions. [K2]

CO 4: demonstrate a program by applying syntax in C language. [K3]

CO 5: illustrate the concepts behind constants, variables, data types, control statements, functions, arrays and structure. [K4]

| Course Code 20UPHS21 | PO1 | | PO2 | PO3 | | PO4 | | PO5 | PO6 | PO7 |
|-------------------------|---------|---------|-------|---------|---------|---------|---------|-------|-------|-------|
| | PSO 1.a | PSO 1.b | PSO 2 | PSO 3.a | PSO 3.b | PSO 4.a | PSO 4.b | PSO 5 | PSO 6 | PSO 7 |
| CO1 | H | - | M | - | L | L | - | L | - | M |
| CO2 | H | - | H | - | L | L | - | M | - | M |
| CO3 | H | - | M | L | L | L | - | M | - | M |
| CO4 | H | H | M | H | H | H | M | H | L | - |
| CO5 | H | M | M | H | H | H | H | H | - | - |



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| | | | |
|-------------------------|--------|----------------|----------------|
| Semester III | OPTICS | Hours/Week: 5 | |
| Core Course5 | | Credits: 5 | |
| Course Code 20UPHC31 | | Internal 25 | External 75 |

COURSE OUTCOMES

On completion of the course, the students will be able to

- CO1: explain the principles and concepts in geometrical, physical optics and optical fibers. [K1]
- CO2: derive the expressions and discuss experimental methods related to geometrical & physical optics, propagation of light through optical fiber. [K2]
- CO3: apply the concepts to solve related problems in geometrical & physical optics and fiber optics. [K3]
- CO4: analyse the concepts regarding aberration in lens systems, factors influencing interference, diffraction & polarization of light, losses in optical fibers and solve related problems [K4]
- CO5: Correlate optical phenomena with real life situation and apply learnt concepts to solve related problems. [K5]

| Course Code 20UPHC31 | PO1 | | PO2 | PO3 | | PO4 | | PO5 | PO6 | PO7 |
|-------------------------|--------|--------|-------|--------|--------|--------|--------|-------|-------|-------|
| | PSO 1a | PSO 1b | PSO 2 | PSO 3a | PSO 3b | PSO 4a | PSO 4b | PSO 5 | PSO 6 | PSO 7 |
| CO1 | H | - | M | - | M | M | - | H | - | M |
| CO2 | H | H | H | M | - | M | M | - | - | H |
| CO3 | H | - | M | L | H | H | L | - | - | - |
| CO4 | H | - | M | M | H | H | L | M | - | - |
| CO5 | H | M | M | H | H | H | H | H | - | L |



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| | | | |
|--|---------------|------------------------------|------------------------------|
| Semester III | OPTICS | Hours/Week: 5 | |
| Core Course5 | | Credits: 5 | |
| Course Code 20UPHC31N | | Internal 25 | External 75 |

COURSE OUTCOMES

On completion of the course, the students will be able to

CO1: explain the principles and concepts in geometrical, physical optics and optical fibers.

[K1]

CO2: derive the expressions and discuss experimental methods related to geometrical & physical optics, propagation of light through optical fiber. [K2]

CO3: illustrate the applications of optical phenomena in various systems. [K3]

CO4: analyze the concepts regarding aberration in lens systems, factors influencing interference, diffraction & polarization of light, losses in optical fibers [K4]

CO5: Correlate optical phenomena with real life situation and apply learnt concepts to solve the problems [K5]

| Course Code 20UPHC31N | PO1 | | PO2 | PO3 | | PO4 | | PO5 | PO6 | PO7 |
|--------------------------|-----------|-----------|----------|-----------|-----------|-----------|-----------|----------|----------|----------|
| | PSO 1a | PSO 1b | PSO 2 | PSO 3a | PSO 3b | PSO 4a | PSO 4b | PSO 5 | PSO 6 | PSO 7 |
| CO 1 | H | - | M | - | M | M | - | H | - | M |
| CO 2 | H | H | H | M | - | M | M | - | - | H |
| CO 3 | H | - | M | L | H | H | L | - | - | - |
| CO 4 | H | - | M | M | H | H | L | M | - | - |
| CO 5 | H | M | M | H | H | H | H | H | - | L |



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| | | | |
|-------------------------|-------------------|----------------|----------------|
| Semester III | BASIC ELECTRONICS | Hours/Week: 4 | |
| Allied Course II | | Credits: 4 | |
| Course Code 20UEIA31 | | Internal 25 | External 75 |

COURSE OUTCOMES

On completion of the course, the students will be able to

CO1: explain the basic concepts of passive circuit elements, semiconductor elements, network theorems and transistor amplifiers. [K1]

CO2: derive expressions involved in semiconductor elements, network theorems, biasing of transistor and transistor amplifiers. [K2]

CO3: describe the working of active and passive circuit elements and semiconductor components, biasing of transistor and transistor amplifiers. [K2]

CO4: apply the concepts to solve related problems of passive circuit elements, semiconductor components, circuit theorems, biasing of transistor and transistor amplifiers. [K3]

CO5: analyze the operation of semiconductor components, network theorems, biasing of transistor and transistor amplifiers. [K4]

| Course Code | PO1 | | PO2 | PO3 | | PO4 | | PO5 | PO6 | PO7 |
|-------------|---------|---------|-------|---------|---------|---------|---------|-------|-------|-------|
| | PSO 1.a | PSO 1.b | PSO 2 | PSO 3.a | PSO 3.b | PSO 4.a | PSO 4.b | PSO 5 | PSO 6 | PSO 7 |
| CO1 | H | - | M | L | - | L | - | - | - | - |
| CO2 | H | - | M | - | M | M | L | - | - | M |
| CO3 | H | M | H | M | - | L | - | M | - | M |
| CO4 | H | - | M | - | H | H | - | - | - | - |
| CO5 | H | - | M | - | H | H | - | H | - | - |



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| | | | |
|---------------------------------|----------------------------|------------------------|------------------------|
| Semester III | GENERAL CHEMISTRY-I | Hours/Week: 4 | |
| Allied Course-II | | Credits: 4 | |
| Course Code 20UCHA31 | | Internal 25 | External 75 |

COURSE OUTCOMES

On completion of the course, the students shall be able to

CO1: describe the terminologies involved in periodic table, reagents, adsorption, catalysis, colloids, purification of organic compounds, types of reagents, reactions and pollution.

[K1]

CO2: infer about the periodic properties, different grades, reagents in laboratory, concentration of solution, types of adsorption, catalysis and colloids, types of purification, organic reactions electrophiles and nucleophiles and types of pollution.

[K2]

CO3: explain the periodicity of elements, preparation of reagents, different units of concentration of solution, methods of purification of organic compounds, sources and control of pollution. [K2]

CO4: interpret the elements with respect to properties, chemicals with respect to grades, concentration with respect to molarity, molality and molar mass, catalyst, colloids with respect to their characteristics along with their applications and types, techniques of purification, reagents used for the reaction, causes and effects of pollution. [K3]

CO5: analyze the various trends of the periodic table, purity of chemicals, reagents with various concentration, catalyst used in the reaction, sols, gels, emulsion, methods of purification of organic compounds, characteristics of adsorption, preventive measures and effects of pollution. [K4]

| Course Code 20UCHA31 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 |
|---------------------------------|------------|------------|------------|------------|------------|------------|------------|
| CO1 | H | M | H | M | M | L | H |
| CO2 | H | M | H | M | M | L | H |
| CO3 | H | M | H | M | M | L | H |
| CO4 | H | M | H | M | M | L | H |
| CO5 | H | M | H | M | M | L | H |



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| | | | |
|-------------------------|--------------|----------------|----------------|
| Semester III | SOLAR ENERGY | Hours/Week: 2 | |
| SEC 2 | | Credits: 2 | |
| Course Code 20UPHS31 | | Internal 40 | External 60 |

COURSE OUTCOMES

On completion of the course, the students will be able to

CO1: explain the concepts of non-conventional energy, principles and types of solar thermal gadgets and solar cells. [K1]

CO2: discuss the construction and working of solar thermal gadgets. [K2]

CO3: describe the construction and working of PV cell and module. [K2]

CO4: apply the learned concepts to calculate the efficiency of solar thermal devices and reveal the applications of PV module. [K3]

CO5: analyze the models of cookers, and collectors, for various applications. [K4]

| Course Code 20UPHS31 | PO1 | | PO2 | PO3 | | PO4 | | PO5 | PO6 | PO7 |
|-------------------------|---------|---------|-------|---------|---------|--------|---------|-------|-------|-------|
| | PSO 1.a | PSO 1.b | PSO 2 | PSO 3.a | PSO 3.b | PSO 4a | PSO 4.b | PSO 5 | PSO 6 | PSO 7 |
| CO1 | H | - | M | - | - | M | - | - | - | L |
| CO2 | H | M | H | H | M | M | - | - | - | - |
| CO3 | H | M | H | H | M | M | M | - | - | - |
| CO4 | H | L | M | M | H | H | H | - | L | - |
| CO5 | H | M | M | M | H | H | H | H | L | - |



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| | | |
|----------------------------------|------------------------------------|-------------------------|
| Semester III | Introduction to Electronics | Hours/Week: 0 |
| Extra Credit Course-1 | | Credits: 2 |
| Course Code 20UPHO31 | | Internal 100 |

COURSE OUTCOMES

On completion of the course students will be able to

- CO1 : identify the terminals of various electronic components
- CO2 : understand the principle of electronic components such as resistor, inductor, diodes transistors, FET and UJT
- CO3 : describe the working of various electronic components

- CO4 : explain linear and non-linear circuit elements and their sources
- CO5 : apply relevant theorems to simplify electronic circuits



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| | | | |
|-------------------------|--------------------------|----------------|----------------|
| Semester III | PHYSICS IN EVERYDAY LIFE | Hours/Week: 2 | |
| NMEC 1 | | Credits: 2 | |
| Course Code 20UPHN31 | | Internal 40 | External 60 |

COURSE OUTCOMES

On completion of the course, students will be able to

CO1: explain the principles of home appliances used in daily life. [K1]

CO 2: describe the construction and working of electrical appliances. [K2]

CO 3: discuss the physical parameters related to electrical appliances. [K2]

CO 4: apply the learned concepts to solve problems. [K3]

CO 5: make use of the related concepts for the applications of various electronic gadgets.

[K3]

| Course Code 20UPHN31 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 |
|-------------------------|-----|-----|-----|-----|-----|-----|-----|
| CO1 | H | L | L | L | M | L | L |
| CO2 | H | M | M | L | L | - | - |
| CO3 | H | M | M | M | L | - | - |
| CO4 | H | M | H | M | M | - | - |
| CO5 | H | M | M | M | M | M | - |



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| | | | |
|-------------------------|-------------------------------------|------------------------|------------------------|
| Semester III | PHYSICS IN EVERYDAY LIFE - I | Hours/Week: 2 | |
| NMEC 1 | | Credits: 2 | |
| Course Code 22UPHN31 | | Internal 40 | External 60 |

COURSE OUTCOMES

On completion of the course, the students will be able to

CO1: explain the laws and concepts behind the basic physics [K1]

CO2: describe the working principle of various appliances used in daily life [K2]

CO3: discuss the physical parameters related to the appliances [K2]

CO4: illustrate the practical applications of mechanics and properties of matter [K3]

CO5: demonstrate the applications of electrostatics, electricity and magnetostatics [K3]

| PO/CO Course Code (22UPHN31) | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 |
|------------------------------------|-----|-----|-----|-----|-----|-----|-----|
| CO 1 | H | L | L | L | M | L | L |
| CO 2 | H | M | M | L | L | - | - |
| CO 3 | H | M | M | M | L | - | - |
| CO 4 | H | M | H | M | M | - | - |
| CO 5 | H | M | M | M | M | M | - |



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| | | |
|---------------------------------------|---------------------|----------------------|
| Semester III | HUMAN RIGHTS | Hours/Week: 1 |
| Generic Elective Course - 1 | | Credit : 1 |
| Course Code 20UGEH31 | | Internal 100 |

COURSE OUTCOMES

On completion of the course, the students will be able to

CO1: recall the importance of Human Rights as a citizen. [K1]

CO2: recognise the concepts, laws and violations of Human Rights. [K1]

CO3: summarise their knowledge on evolution and growth Human Rights. [K2]

CO4: paraphrase the historical values of Human Rights in Peace building. [K2]

CO5: identify the works of National an Human Rights. [K3]

| Course Code 20UGEH31 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 |
|---------------------------------------|------------|------------|------------|------------|------------|------------|------------|
| CO1 | H | M | - | - | - | - | - |
| CO2 | H | M | - | - | - | - | - |
| CO3 | H | M | - | - | - | M | - |
| CO4 | H | M | - | - | M | M | H |
| CO5 | H | M | - | - | M | M | H |



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| | | | |
|---------------------------------|---------------------------------|------------------------|------------------------|
| Semester IV | MATHEMATICAL PHYSICS | Hours/Week : 5 | |
| Core Course - 6 | | Credits : 5 | |
| Course Code 20UPHC41 | | Internal 25 | External 75 |

COURSE OUTCOMES

On completion of the course, the students will be able to

CO1: explain basic concepts in vector calculus, types of matrices, special functions and Fourier series. [K1]

CO2: derive the theorems in vector calculus, properties of matrices, beta and gamma function and Fourier series in different intervals. [K2]

CO3: solve the problems in vector calculus, matrices, beta and gamma function and Fourier series. [K3]

CO4: demonstrate the applications of vector calculus, matrices, beta and gamma function and Fourier series in different branches of Physics. [K4]

CO5: apply MATLAB software to solve the problems in matrices and Fourier series. [K5]

| Course Code 20UPHC41 | PO1 | | PO2 | PO3 | | PO4 | | PO5 | PO6 | PO7 |
|-------------------------|---------|---------|-------|---------|---------|---------|---------|-------|-------|-------|
| | PSO 1.a | PSO 1.b | PSO 2 | PSO 3.a | PSO 3.b | PSO 4.a | PSO 4.b | PSO 5 | PSO 6 | PSO 7 |
| CO1 | H | - | H | - | L | L | - | - | - | M |
| CO2 | H | - | H | L | M | M | - | M | - | - |
| CO3 | H | - | H | - | H | M | - | M | - | - |
| CO4 | H | - | M | - | H | H | L | - | - | - |
| CO5 | M | M | L | M | M | M | L | H | M | - |



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| | | | |
|--------------------------|--------------------|----------------|----------------|
| Semester III/IV | GENERAL PHYSICS II | Hours/Week: 2 | |
| Core Course Practical II | | Credits: 2 | |
| Course Code 20UPHC41P | | Internal 40 | External 60 |

COURSE OUTCOMES

On completion of the practical, the students will be able to

CO1: apply the theoretical concepts in Electricity, Electromagnetism, Heat & Thermodynamics and Optics related experiments. [K3]

CO2: draw the circuit diagram /experimental set up with tabular column/model graph and write the formula to calculate the required physical parameters. [K3]

CO3: execute the technical skills in handling the equipment and observe the required measurements related to the experiment. [K3]

CO4: calculate the necessary parameters using the formula/graph and complete the record work [K3]

CO5: analyze the accuracy of the results obtained and compare it with the theoretical value. [K4]

| Course Code 20UPHC41P | PO1 | | PO2 | PO3 | | PO4 | | PO5 | PO6 | PO7 |
|--------------------------|---------|---------|-------|---------|---------|---------|---------|-------|-------|-------|
| | PSO 1.a | PSO 1.b | PSO 2 | PSO 3.a | PSO 3.b | PSO 4.a | PSO 4.b | PSO 5 | PSO 6 | PSO 7 |
| CO1 | H | M | L | H | - | - | L | - | - | M |
| CO2 | H | H | H | H | - | M | - | - | - | L |
| CO3 | H | H | H | H | - | M | - | L | H | - |
| CO4 | H | H | H | - | H | M | - | L | M | H |
| CO5 | M | M | M | M | H | H | M | M | M | H |



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| | | | |
|-------------------------|---|----------------|----------------|
| Semester IV | ELECTRONIC DEVICES AND INSTRUMENTATION | Hours/Week: 4 | |
| Allied Course II | | Credits: 4 | |
| Course Code 20UEIA41 | | Internal 25 | External 75 |

COURSE OUTCOMES

On completion of the course, the students will be able to

CO1: explain the basic concepts involved in performance characteristics of the instruments, measuring meters, cathode ray oscilloscope, power electronics and transducers. [K1]

CO2: discuss the construction and working of electronic measuring meters and cathode ray oscilloscopes. [K2]

CO3: describe the working and characteristics of power electronic devices and transducers. [K2]

CO4: demonstrate the applications of electronic, cathode ray oscilloscope, power electronic devices and transducers. [K3]

CO5: analyze the operation of CRO, power electronic devices and transducers. [K4]

| Course Code 20UEIA41 | PO1 | | PO2 | PO3 | | PO4 | | PO5 | PO6 | PO7 |
|-------------------------|---------|---------|-------|---------|---------|---------|---------|-------|-------|-------|
| | PSO 1.a | PSO 1.b | PSO 2 | PSO 3.a | PSO 3.b | PSO 4.a | PSO 4.b | PSO 5 | PSO 6 | PSO 7 |
| CO1 | H | - | M | L | M | L | - | - | - | M |
| CO2 | H | M | H | M | - | M | M | - | - | - |
| CO3 | H | M | H | M | - | M | M | M | - | M |
| CO4 | H | - | M | - | M | M | L | - | - | - |
| CO5 | M | - | M | - | M | H | - | H | - | - |



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| | | | |
|-------------------------------|--|----------------|----------------|
| Semester III/IV | APPLIED ELECTRONICS & INSTRUMENTATION | Hours/Week: 2 | |
| Allied Course II Practical | | Credits: 2 | |
| Course Code 20UEIA41P | | Internal 40 | External 60 |

COURSE OUTCOMES

On completion of the practical, the students will be able to

- CO1: apply the theoretical concepts in passive, active elements and semiconductor devices and its related experiments. [K3]
- CO2: draw the circuit diagram /experimental set up with tabular column/model graph and formula to calculate the necessary electrical parameters. [K3]
- CO3: develop technical skills in handling the equipment and components and observe required measurements related to the experiment. [K3]
- CO4: calculate the necessary parameters using the formula/graph and complete the record work [K3]
- CO5: analyze the accuracy of the results obtained and compare theoretical value with the measured value. [K4]

| Course Code 20UEIA41P | PO1 | | PO2 | PO3 | | PO4 | | PO5 | PO6 | PO7 |
|--------------------------|---------|---------|-------|---------|---------|---------|---------|-------|-------|-------|
| | PSO 1.a | PSO 1.b | PSO 2 | PSO 3.a | PSO 3.b | PSO 4.a | PSO 4.b | PSO 5 | PSO 6 | PSO 7 |
| CO1 | H | H | H | M | M | M | - | H | - | M |
| CO2 | - | H | H | M | M | H | M | - | - | - |
| CO3 | - | H | M | H | - | M | M | - | H | M |
| CO4 | - | H | H | H | M | M | L | - | - | M |
| CO5 | - | H | H | H | M | M | M | M | M | M |



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| | | | |
|-------------------------|----------------------|----------------|----------------|
| Semester IV | GENERAL CHEMISTRY-II | Hours/Week: 4 | |
| Allied Course-II | | Credits: 4 | |
| Course Code 20UCHA41 | | Internal 25 | External 75 |

COURSE OUTCOMES

On completion of the course, the students will be able to

CO1: recognize the biomolecules, ores, minerals, soaps, detergents, oils, fats, water, fuels, fertilizer and principles of spectroscopy. [K1]

CO2: describe the concept of carbohydrates, amino acids, proteins, nucleic acids, metallurgical process, soaps, detergents, hardness of water, fuels, fertilizers and UV, IR, NMR spectroscopy. [K2]

CO3: explain the classification of carbohydrates, amino acids, proteins, nucleic acids, Methods of extraction of metals, soaps, detergents, hardness of water, fuels, fertilizers and illustrate the theory of different spectroscopic techniques. [K2]

CO4: apply the chemistry of biomolecules in daily life along with their functions, Metallurgical process in metal extraction, oils in soap and detergent preparation, hardness removal in water, constituents of fuels, fertilizers in plants growth, spectroscopy in compounds interpretation. [K3]

CO5: analyze the structure and synthesis of biomolecules, techniques of extraction of metalloids, quality of oils used in soaps and detergents, purity of water, percentage of constituents in gaseous fuels, composition of elements in fertilizers, spectral data of UV, IR and NMR. [K4]

| Course Code 20UCHA41 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 |
|-------------------------|-----|-----|-----|-----|-----|-----|-----|
| CO1 | H | H | M | H | M | L | L |
| CO2 | H | H | M | H | M | L | L |
| CO3 | H | H | M | H | L | L | L |
| CO4 | H | H | L | H | M | L | L |
| CO5 | H | H | M | H | M | L | L |



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| | | | |
|--------------------------------------|---------------------|----------------|----------------|
| Semester IV | VOLUMETRIC ANALYSIS | Hours/Week: 2 | |
| Allied Course II Practical Course | | Credits: 2 | |
| Course Code 20UCHA41P | | Internal 40 | External 60 |

COURSE OUTCOMES

On completion of the course, the students will be able to

CO1: apply the principles involved in the volumetric analysis [K3]

CO2: find out the strength of standard solutions [K3]

CO3: estimate the amount of the substance present in the given solution by volumetric analysis [K3]

CO4: determine the concentration of the unknown solutions. [K4]

CO5: analyse and evaluate the accuracy of the results. [K4]

| Course Code 20UCHA41P | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 |
|--------------------------|-----|-----|-----|-----|-----|-----|-----|
| CO1 | H | M | H | M | L | L | M |
| CO2 | M | M | H | M | M | M | H |
| CO3 | M | M | H | M | M | M | H |
| CO4 | H | M | H | M | L | M | H |
| CO5 | H | M | H | M | L | M | H |



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| | | | |
|-------------------------|--------------|----------------|----------------|
| Semester IV | ASTROPHYSICS | Hours/Week: 2 | |
| SEC 3 | | Credits: 2 | |
| Course Code 20UPHS41 | | Internal 40 | External 60 |

COURSE OUTCOMES

On completion of the course, the students will be able to

CO1: describe the properties of sun, chemical composition of stars, cosmological models, galaxies and astronomical instruments. [K1]

CO2: understand the physical process that governs the universe, its constituents, and their origin using different theories. [K2]

CO3: discuss the structure of sun, star, galaxy and various astronomical instruments. [K2]

CO4: apply relevant theories to unravel the properties of astronomical matters. [K3]

CO5: infer the facts about perception of universe. [K4]

| Course Code 20UPHS41 | PO1 | | PO2 | PO3 | | PO4 | | PO5 | PO6 | PO7 |
|-------------------------|---------|---------|-------|---------|---------|---------|---------|-------|-------|-------|
| | PSO 1.a | PSO 1.b | PSO 2 | PSO 3.a | PSO 3.b | PSO 4.a | PSO 4.b | PSO 5 | PSO 6 | PSO 7 |
| CO1 | H | - | M | L | - | - | L | - | - | M |
| CO2 | H | - | H | L | L | M | - | - | - | - |
| CO3 | H | L | H | H | M | M | - | M | - | - |
| CO4 | H | - | M | L | M | H | - | - | - | - |
| CO5 | H | - | L | M | - | M | - | H | - | - |



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|----------------------------------|--|-------------------------------------|
| Semester IV | Internship / Field Project (2020 -21 onwards) | Hours/Week: 0 |
| PART IV | | Credit: 1 |
| Course Code 20UPHI41G | | Internal 100 External 60 |

COURSE OUTCOMES

On completion of the Internship/Field Project, students will be able to

CO1: relate their theoretical insights with hands-on experience. [K3]

CO2: develop technical skills to their respective field of study. [K3]

CO3: demonstrate the attributes such as observational skills, team spirit and inter personal skills built through site visits. [K3]

CO4: exhibit the written communication skills acquired through internship/field project. [K3]

CO5: analyze the observations and results and communicate their academic and technological knowledge appropriately oral means. [K4]

| Course Code 20UPHI41G | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 |
|----------------------------------|------------|------------|------------|------------|------------|------------|------------|
| CO1 | H | M | M | M | M | H | - |
| CO2 | H | M | M | M | M | H | |
| CO3 | H | M | - | - | - | H | |
| CO4 | H | H | M | M | - | M | H |
| CO5 | H | M | H | H | M | - | |



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|-------------------------------------|------------------------------------|------------------------|------------------------|
| Semester IV | FUNDAMENTALS OF ELECTRONICS | Hours/Week: 2 | |
| Non Major Elective Course -2 | | Credits: 2 | |
| Course Code 20UPHN41 | | Internal 40 | External 60 |

COURSE OUTCOMES

On completion of the course, students will be able to

CO1: explain the basic concepts of passive and active components, amplifiers, oscillators and needs for modulation. [K1]

CO2: discuss the functions of active and passive electronic components, op-amp, oscillators, AM & FM. [K2]

CO3: determine the characteristics of pn junction & Zener diodes and transistor. [K2]

CO4: demonstrate the applications of active & passive electronic components, amplifiers and op-amps. [K3]

CO5: apply the learned concepts to solve related problems in active & passive electronic components, amplifiers, oscillators, op-amps and modulation. [K3]

| Course Code 20UPHN41 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 |
|---------------------------------|------------|------------|------------|------------|------------|------------|------------|
| CO1 | H | H | L | M | - | - | M |
| CO2 | H | L | M | M | - | - | - |
| CO3 | H | M | M | M | - | - | - |
| CO4 | H | M | L | L | - | - | - |
| CO5 | H | M | L | L | M | L | - |



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| | | | |
|----------------------------------|------------------------------------|------------------------|------------------------|
| Semester IV | FUNDAMENTALS OF ELECTRONICS | Hours/Week: 2 | |
| NMEC 2 | | Credits: 2 | |
| Course Code 20UPHN41N | | Internal 40 | External 60 |

COURSE OUTCOMES

CO1: explain the basic concepts of active and passive components, digital number System and logic gates [K1]

CO2: discuss the functions of active and passive components, logic gates and also the conversion of codes and number systems in digital electronics [K2]

CO3: determine the characteristics of pn junction & zener diode and transistor [K2]

CO4: illustrate the applications of semiconducting devices and transistor [K3]

CO5: demonstrate the applications of number systems and logic gates [K3]

| PO/CO Course Code (20UPHN41N) | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 |
|--|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| CO 1 | H | H | L | M | - | - | M |
| CO 2 | H | L | M | M | - | - | - |
| CO 3 | H | M | M | M | - | - | - |
| CO 4 | H | M | L | L | - | - | - |
| CO 5 | H | M | L | L | M | L | - |



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| | | | |
|-------------------------|-------------------------------|----------------|----------------|
| Semester III | PHYSICS IN EVERYDAY LIFE - II | Hours/Week: 2 | |
| NMEC 2 | | Credits: 2 | |
| Course Code 22UPHN41 | | Internal 40 | External 60 |

COURSE OUTCOMES

On completion of the course, the students will be able to

CO1: explain the laws and concepts behind the basic physics [K1]

CO 2: describe the construction and working of appliances used in daily life [K2]

CO 3: discuss the generation of electricity from various non-conventional energy sources [K2]

CO4: illustrate the applications of basic laws/concepts in electromagnetism, heat and number systems [K3]

CO5: demonstrate the applications of energy sources [K3]

| PO/CO Course Code (22UPHN41) | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 |
|---------------------------------|---------|---------|---------|---------|---------|---------|---------|
| CO 1 | H | H | L | M | - | - | M |
| CO 2 | H | L | M | M | - | - | - |
| CO 3 | H | M | M | M | - | - | - |
| CO 4 | H | M | L | L | - | - | - |
| CO 5 | H | M | L | L | M | L | - |



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| | | |
|---------------------------------|------------------------------|----------------------|
| Semester IV | CONSTITUTION OF INDIA | Hours/Week: 1 |
| Generic Elective Course | | Credit : 1 |
| Course Code 20UGEC41 | | Internal 100 |

COURSE OUTCOMES

On completion of the course, the students will be able to

CO1: identify the importance of Constitution in a State. [K1]

CO2: recognize the concepts and features of Indian constitutions. [K1]

CO3: discuss the forms and functions of Government and its political institutions. [K2]

CO4: trace the functions of legislative, executive and judiciary in the Constitution. [K2]

CO5: construct knowledge over the Indian Constitution. [K3]

| Course Code 20UGEC41 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 |
|---------------------------------|------------|------------|------------|------------|------------|------------|------------|
| CO1 | H | M | - | - | - | - | M |
| CO2 | H | M | - | - | - | - | M |
| CO3 | H | M | - | - | - | M | M |
| CO4 | H | M | - | - | - | - | M |
| CO5 | H | M | - | - | M | M | M |



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| | | | |
|-------------------------|--|----------------|----------------|
| Semester V | CLASSICAL AND STATISTICAL MECHANICS | Hours/Week: 4 | |
| Core Course-7 | | Credits: 4 | |
| Course Code 20UPHC51 | | Internal 25 | External 75 |

COURSE OUTCOMES

On completion of the course, the students will be able to

- CO1 : explain the concept of Newtonian, Lagrangian, Hamiltonian approach, laws in statistical mechanics and distribution laws. [K1]
- CO2 : derive the conservation theorems based on Newtonian mechanics, equations of motion for mechanical systems using Lagrangian, Hamiltonian and the distribution laws in classical and quantum statistics. [K2]
- CO3 : find the equations of motion for different mechanical systems by applying Newtonian, Lagrangian, Hamiltonian approach in classical mechanics and the parameters in statistical basis, energy level of various systems in classical & quantum statistics. [K3]
- CO4 : adopt the learned concepts to solve problems in classical and statistical mechanics. [K4]
- CO5 : predict the applications of Newtonian mechanics in inclined plane, Lagrangian in electrical circuits and classical statistics in Doppler effect. [K5]

| Course Code 20UPHC51 | PO1 | | PO2 | PO3 | | PO4 | | PO5 | PO6 | PO7 |
|-------------------------|--------|--------|-------|--------|--------|--------|--------|-------|-------|-------|
| | PSO 1a | PSO 1b | PSO 2 | PSO 3a | PSO 3b | PSO 4a | PSO 4b | PSO 5 | PSO 6 | PSO 7 |
| CO1 | H | - | H | - | - | - | - | H | - | H |
| CO2 | H | - | H | - | H | M | - | - | - | M |
| CO3 | H | - | H | - | H | H | - | - | - | - |
| CO4 | H | - | M | H | H | H | - | M | - | - |
| CO5 | H | - | M | M | H | H | - | H | - | - |



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| | | | |
|--------------------------|--|------------------------|------------------------|
| Semester V | CLASSICAL AND STATISTICAL MECHANICS | Hours/Week: 4 | |
| Core Course-7 | | Credits: 4 | |
| Course Code 20UPHC51N | | Internal 25 | External 75 |

COURSE OUTCOMES

On completion of the course, the students will be able to

- CO1 : explain the concept of Newtonian, Lagrangian, Hamiltonian approach, laws in statistical mechanics and distribution laws. [K1]
- CO2 : derive the conservation theorems based on Newtonian mechanics, equations of motion for mechanical systems using Lagrangian, Hamiltonian and the distribution laws in classical and quantum statistics. [K2]
- CO3 : find the equations of motion for different mechanical systems by applying Newtonian, Lagrangian, Hamiltonian approach in classical mechanics and the parameters in statistical basis, energy level of various systems in classical & quantum statistics. [K3]
- CO4 : adopt the learned concepts to solve simple problems in classical and statistical mechanics. [K4]
- CO5 : predict the applications of Newtonian mechanics in inclined plane, Lagrangian in electrical circuits and classical statistics in Doppler effect. [K5]

| Course Code 20UPHC51N | PO1 | | PO2 | PO3 | | PO4 | | PO5 | PO6 | PO7 |
|--------------------------|-----------|-----------|----------|-----------|-----------|-----------|-----------|----------|----------|----------|
| | PSO 1a | PSO 1b | PSO 2 | PSO 3a | PSO 3b | PSO 4a | PSO 4b | PSO 5 | PSO 6 | PSO 7 |
| CO 1 | H | - | H | - | - | - | - | H | - | H |
| CO 2 | H | - | H | - | H | M | - | - | - | M |
| CO 3 | H | - | H | - | H | H | - | - | - | - |
| CO 4 | H | - | M | H | H | H | - | M | - | - |
| CO 5 | H | - | M | M | H | H | - | H | - | - |



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| | | | |
|-------------------------|----------------|----------------|----------------|
| Semester V | MODERN PHYSICS | Hours/Week: 4 | |
| Core Course-8 | | Credits: 4 | |
| Course Code 20UPHC52 | | Internal 25 | External 75 |

COURSE OUTCOMES

On completion of the course, the students will be able to

- CO1 : explain concepts, principles, postulates and operators in atomic physics, quantum mechanics and relativity. [K1]
- CO2 : discuss various atom models, optical & X-ray spectra, Einstein's theory of photoelectric effect and derive the equations & theorems related to atomic physics, quantum mechanics and relativity. [K2]
- CO3 : apply learnt concepts to solve problems in atomic physics, wave mechanics, operators in quantum mechanics and relativity. [K3]
- CO4 : analyze the relativistic variations of physical quantities and solve Schrodinger equation for various potential functions. [K4]
- CO5 : Assess the impact of Compton effect, photoelectric effect, and pair production in Medical Physics. [K5]

| Course Code 20UPHC52 | PO1 | | PO2 | PO3 | | PO4 | | PO5 | PO6 | PO7 |
|-------------------------|--------|--------|-------|--------|--------|--------|--------|-------|-------|-------|
| | PSO 1a | PSO 1b | PSO 2 | PSO 3a | PSO 3b | PSO 4a | PSO 4b | PSO 5 | PSO 6 | PSO 7 |
| CO1 | H | - | H | - | - | - | - | - | - | M |
| CO2 | H | M | H | M | H | M | M | - | - | - |
| CO3 | H | - | H | - | H | H | - | - | - | - |
| CO4 | H | - | M | - | H | H | - | M | - | - |
| CO5 | H | - | M | - | H | H | - | H | - | - |



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| | | | |
|-------------------------|---------------------|----------------|----------------|
| Semester V | SOLID STATE PHYSICS | Hours/Week: 4 | |
| Core Course-9 | | Credits: 4 | |
| Course Code 20UPHC53 | | Internal 25 | External 75 |

COURSE OUTCOMES

On completion of the course, the students will be able to

- CO1 : explain the fundamentals in crystal structure, imperfections, types of bondings and superconductivity. [K1]
- CO2 : derive the relations related to crystal structure, electron theory of solids and discuss the theories related to bondings in solids, electron theory of solids and superconductivity. [K2]
- CO3 : apply the learned concepts to solve problems in solid state physics. [K3]
- CO4 : analyze the problems related to miller indices, reciprocal lattices, Fermi energy in electron theory, various parameters in superconductivity. [K4]
- CO5 : determine the crystalline structure of nonmetallic elements, colour centre in crystalline compounds and recent applications of superconductivity. [K5]

| Course Code 20UPHC53 | PO1 | | PO2 | PO3 | | PO4 | | PO5 | PO6 | PO7 |
|-------------------------|--------|--------|-------|--------|--------|--------|--------|-------|-------|-------|
| | PSO 1a | PSO 1b | PSO 2 | PSO 3a | PSO 3b | PSO 4a | PSO 4b | PSO 5 | PSO 6 | PSO 7 |
| CO1 | H | - | H | M | H | M | M | L | - | M |
| CO2 | H | L | M | M | M | M | M | M | - | M |
| CO3 | H | M | M | L | L | H | H | M | - | - |
| CO4 | H | M | H | M | M | H | H | H | - | - |
| CO5 | H | M | M | M | L | H | H | H | - | - |



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| | | | |
|----------------------------------|---------------------------|------------------------|------------------------|
| Semester V | ANALOG ELECTRONICS | Hours/Week: 5 | |
| Core Course – 11 | | Credits: 4 | |
| Course Code- 22UPHC53 | | Internal 25 | External 75 |

COURSE OUTCOMES

On completion of the course, the students will be able to

CO1: explain the basic concepts in electronic signal generators, ICs, modulators, regulated power supplies and operational amplifiers. [K1]

CO2: discuss the function of electronic signal generators, ICs, modulators, regulated power supplies and operational amplifiers. [K2]

CO3: illustrate the applications of active components and solve simple problems in analog electronic circuits. [K3]

CO4: analyze the effect of feedback in oscillators, operation of transistor and IC voltage regulators, modulators and operational amplifiers. [K4]

CO5: design analog electronic circuits such as phase shift oscillator, op amp Comparator voltage follower and dual tracking voltage regulators. [K5]

| Course Code 22UPHC53 | PO1 | | PO2 | PO3 | | PO4 | | PO5 | PO6 | PO7 |
|-------------------------|-----------|-----------|----------|-----------|-----------|-----------|-----------|----------|----------|----------|
| | PSO 1a | PSO 1b | PSO 2 | PSO 3a | PSO 3b | PSO 4a | PSO 4b | PSO 5 | PSO 6 | PSO 7 |
| CO 1 | H | - | M | - | M | L | - | H | - | M |
| CO 2 | H | H | H | H | L | M | M | - | - | H |
| CO 3 | H | - | M | M | H | H | L | - | - | - |
| CO 4 | H | M | M | H | H | H | H | H | - | L |
| CO 5 | H | L | M | M | M | H | M | H | M | L |



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| | | | |
|-------------------------|---|----------------|----------------|
| Semester V | Analytical Instrumentation and ChemDraw | Hours/Week: 4 | |
| DSEC-1 | | Credits: 4 | |
| Course Code 20UCHE51 | | Internal 25 | External 75 |

COURSE OUTCOMES

On completion of the course, the students will be able to

- CO1 : understand the basic principles in precipitation and analytical instrumentation. [K1]
CO2 : classify the thermo gravimetric and colorimetric methods. [K2]
CO3 : appraise the software tools and the chromatographic techniques. [K3]
CO4 : Compare the different analytical techniques used in precipitation, thermogravimetry, spectroscopy and software tools. [K4]
CO5 : Sketch the diagrams of analytical instruments and structures of chemical compounds. [K5]

| Course Code 20UCHE51 | PO1 | | PO2 | PO3 | | PO4 | | PO5 | PO6 | PO7 |
|-------------------------|-----|---|-----|-----|---|-----|---|-----|-----|-----|
| | H | H | H | H | H | H | M | H | M | - |
| CO1 | H | H | H | L | M | M | M | M | M | - |
| CO2 | H | H | H | L | H | H | H | H | H | - |
| CO3 | H | H | H | H | L | H | H | H | H | - |
| CO4 | H | H | H | H | H | H | H | H | H | - |
| CO5 | H | H | H | H | H | H | M | H | M | - |



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| | | | |
|-------------------------|--------------|----------------|----------------|
| Semester V | NANO SCIENCE | Hours/Week: 4 | |
| DSEC-1 | | Credits: 4 | |
| Course Code 20UPHE52 | | Internal 25 | External 75 |

COURSE OUTCOMES

On completion of the course, the students will be able to

- CO1 : explain the fundamentals of bulk materials, preparation and characterization of nanomaterials. [K1]
- CO2 : discuss the techniques involved in preparation and characterization and discuss the applications of nanomaterials. [K2]
- CO3 : apply the learned concepts to synthesize and characterize the nanomaterials. [K3]
- CO4 : analyze the nature and structures of nanomaterials. [K4]
- CO5 : assess the impact of nanomaterials in the field of medicine, sensors, energy storage devices and commercial products. [K5]

| Course Code 20UPHE52 | PO1 | | PO2 | PO3 | | PO4 | | PO5 | PO6 | PO7 |
|-------------------------|--------|--------|-------|--------|--------|--------|--------|-------|-------|-------|
| | PSO 1a | PSO 1b | PSO 2 | PSO 3a | PSO 3b | PSO 4a | PSO 4b | PSO 5 | PSO 6 | PSO 7 |
| CO1 | H | - | H | -H | - | M | H | H | - | M |
| CO2 | H | H | M | M | - | M | H | M | - | M |
| CO3 | H | H | M | L | L | H | H | M | - | - |
| CO4 | H | M | M | M | L | H | H | M | - | - |
| CO5 | H | H | M | M | L | H | H | M | M | M |



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| | | | |
|---------------------------------|---------------------|------------------------|------------------------|
| Semester V | SPECTROSCOPY | Hours/Week: 4 | |
| DSEC-1 | | Credits: 4 | |
| Course Code 20UPHE53 | | Internal 25 | External 75 |

COURSE OUTCOMES

On completion of the course, the students will be able to

- CO1 : explain basic aspects of electromagnetic radiation, rotational, vibrational, Raman, electronic and NMR spectra of molecules. [K1]
- CO2 : describe electromagnetic spectrum, energy level transitions in molecules due to different regions of EM spectrum and instrumentation techniques involved to obtain the spectrum. [K2]
- CO3 : apply relevant theories / principles to interpret spectra obtained due to energy level transitions in molecule. [K3]
- CO4 : analyze information from various spectroscopic techniques to understand properties of molecules. [K4]
- CO5 : assess the spectroscopic techniques involved in the study of celestial bodies. [K5]

| Course Code 20UPHE53 | PO1 | | PO2 | PO3 | | PO4 | | PO5 | PO6 | PO7 |
|-------------------------|--------|--------|-------|--------|--------|--------|--------|-------|-------|-------|
| | PSO 1a | PSO 1b | PSO 2 | PSO 3a | PSO 3b | PSO 4a | PSO 4b | PSO 5 | PSO 6 | PSO 7 |
| CO1 | M | - | H | - | - | L | - | L | - | - |
| CO2 | M | H | H | - | - | L | M | L | - | - |
| CO3 | H | L | H | M | H | M | M | M | - | - |
| CO4 | H | M | H | H | M | H | H | H | M | M |
| CO5 | H | M | H | H | M | H | H | M | M | M |



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|--------------------------|----------------|----------------|----------------|
| Semester V | MICROPROCESSOR | Hours/Week: 2 | |
| SEC -4 | | Credits: 2 | |
| Course Code- 20UPHS51 | | Internal 40 | External 60 |

COURSE OUTCOMES

On completion of the course, the students will be able to

- CO1 : explain the basic concepts involved in the architecture, instructions, counters, time delays, stack and subroutine. [K1]
- CO2 : Discuss the various features, blocks in architecture, counters, time delays, stack and subroutine of 8085 microprocessor. [K2]
- CO3 : describe the functions of various instructions and execution of simple programs. [K2]
- CO4 : apply the functions of various instructions in 8085 microprocessor to write programs. [K3]
- CO5 : illustrate the programs in counters, time delays, stack and subroutine. [K4]

| Course Code 20UPHS51 | PO1 | | PO2 | PO3 | | PO4 | | PO5 | PO6 | PO7 |
|-------------------------|--------|--------|-------|--------|--------|--------|--------|-------|-------|-------|
| | PSO 1a | PSO 1b | PSO 2 | PSO 3a | PSO 3b | PSO 4a | PSO 4b | PSO 5 | PSO 6 | PSO 7 |
| CO1 | H | - | M | - | M | M | - | H | - | M |
| CO2 | H | H | H | M | - | M | M | - | - | H |
| CO3 | H | - | M | L | M | H | L | - | - | - |
| CO4 | H | - | M | M | H | M | L | M | - | - |
| CO5 | H | M | M | H | H | M | H | H | - | L |



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|----------------------------------|-------------------|-------------------------|
| Semester V | BIOPHYSICS | Hours/Week: 0 |
| Extra Credit Course-2 | | Credits: 2 |
| Course Code 20UPHO51 | | Internal 100 |

COURSE OUTCOMES

On completion of the course, the students will be able to

- CO1 : explain the basic concepts of various physical mechanism of the living cells
- CO2 : describe the theories and methods involved in matter, biological systems, molecular physics
- CO3 : interpret the biological structures, techniques and methodologies that rely on biophysics
- CO4 : discuss the structural and functional aspects of biological entities
- CO5 : illustrate the biological and medical applications



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|--------------------------|------------------|----------------|----------------|
| Semester V | PROGRAMMING IN C | Hours/Week: 2 | |
| SEC – 5 Practical I | | Credits: 2 | |
| Course Code 20UPHS52P | | Internal 40 | External 60 |

COURSE OUTCOMES

On completion of the course, the students will be able to

- CO1 : apply the C language to solve the problems in physics using array, structures. [K3]
- CO2 : write C Program using C fundamentals, input output operations, control statements, arrays and structures. [K3]
- CO3 : Compile the C program and identify, correct the syntax and logical errors in C program. [K3]
- CO4 : execute and run the written program, completion of record work. [K3]
- CO5 : analyze the physical parameters obtained using C program with that of theoretical value. [K4]

| Course Code 20UPHS52P | PO1 | | PO2 | PO3 | | PO4 | | PO5 | PO6 | PO7 |
|--------------------------|--------|--------|-------|--------|--------|--------|--------|-------|-------|-------|
| | PSO 1a | PSO 1b | PSO 2 | PSO 3a | PSO 3b | PSO 4a | PSO 4b | PSO 5 | PSO 6 | PSO 7 |
| CO1 | H | M | L | H | - | - | L | - | - | M |
| CO2 | H | H | H | H | - | M | - | - | - | L |
| CO3 | H | H | H | H | - | M | - | L | H | - |
| CO4 | H | H | H | - | H | M | - | L | M | H |
| CO5 | M | H | M | H | H | H | M | M | M | H |



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|-----------------------------------|----------------|-----------------------------|
| Semester V | PROJECT | Hours: 0 |
| Core Course-10 | | Credits: 1 |
| Course Code- 20UPHC5PR | | Internal : 100 Marks |

COURSE OUTCOMES

On completion of the practical, the students will be able to

- CO1 : apply the learned concepts to select projects in Physics, Electronics and related interdisciplinary fields. [K3]
- CO2 : apply the theoretical knowledge to construct/arrange the circuit diagram /experimental set up to calculate the required physical/electrical parameters. [K3]
- CO3 : execute the technical skills in handling the equipment, observe the measurements and exhibit written communication skill acquired in related project. [K3]
- CO4 : analyze the accuracy of the results with the theoretical standards and communicate academic and technological knowledge orally. [K4]
- CO5 : assess the project to meet the challenges at higher education level /societal level. [K5]

| Course Code 20UPHC5PR | PO1 | | PO2 | PO3 | | PO4 | | PO5 | PO6 | PO7 |
|--------------------------|--------|--------|-------|--------|--------|--------|--------|-------|-------|-------|
| | PSO 1a | PSO 1b | PSO 2 | PSO 3a | PSO 3b | PSO 4a | PSO 4b | PSO 5 | PSO 6 | PSO 7 |
| CO1 | H | M | - | M | M | M | - | H | - | H |
| CO2 | H | H | M | H | H | M | H | H | H | H |
| CO3 | H | H | H | M | H | H | H | H | H | H |
| CO4 | H | - | H | M | H | M | H | H | - | - |
| CO5 | H | - | H | M | H | M | H | H | - | - |



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| | | | |
|---------------------------------|------------------------------|-------------------------|-----------------------|
| Semester V | ENVIRONMENTAL STUDIES | Hours/Week: 2 | |
| PART IV | | Credits: 1 | |
| Course Code 20UGES51 | | Internal 100 | External - |

COURSE OUTCOMES

On completion of the course, students will be able to

CO1 : State the social aspects of the environment, the present condition of the earth and the impact of human activities locally and globally. [K1]

CO2 : Explain the biodiversity conservation, environmental hazards and current possible disasters. [K2]

CO3 : Describe the need for sustainable development. [K2]

CO4 : Solve the environmental associated problems. [K3]

CO5 : Identify environmental legislations and management strategies. [K3]

| Course Code 20UGES51 | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 |
|---------------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| CO 1 | H | H | L | L | L | - | L |
| CO 2 | H | H | L | L | L | - | - |
| CO 3 | H | H | L | L | L | - | - |
| CO 4 | H | H | H | H | L | - | - |
| CO 5 | H | H | H | H | L | - | H |



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An Autonomous Institution Affiliated to Madurai Kamaraj University, Madurai

Re-accredited with 'A' Grade (3rd Cycle) by NAAC

VIRUDHUNAGAR - 626 001

| | | | |
|--------------------------|--------------------|----------------|----------------|
| Semester VI | ANALOG ELECTRONICS | Hours/Week: 5 | |
| Core Course – 11 | | Credits: 4 | |
| Course Code- 20UPHC61 | | Internal 25 | External 75 |

COURSE OUTCOMES

On completion of the course, the students will be able to

CO1: explain the basic concepts in electronic signal generators, ICs, modulators, regulated power supplies and operational amplifiers. [K1]

CO2: discuss the function of electronic signal generators, ICs, modulators, regulated power supplies and operational amplifiers. [K2]

CO3: apply the learned concepts to solve the related problems in analog electronic circuits. [K3]

CO4: analyze the effect of feedback in oscillators, operation of transistor and IC voltage regulators, modulators and operational amplifiers. [K4]

CO5: design analog electronic circuits such as phase shift oscillator, op amp comparator, voltage follower and dual tracking voltage regulators. [K5]

| Course Code 20UPHC61 | PO1 | | PO2 | PO3 | | PO4 | | PO5 | PO6 | PO7 |
|-------------------------|--------|--------|-------|--------|--------|--------|--------|-------|-------|-------|
| | PSO 1a | PSO 1b | PSO 2 | PSO 3a | PSO 3b | PSO 4a | PSO 4b | PSO 5 | PSO 6 | PSO 7 |
| CO1 | H | - | M | - | M | L | - | H | - | M |
| CO2 | H | H | H | H | L | M | M | - | - | H |
| CO3 | H | - | M | M | H | H | L | - | - | - |
| CO4 | H | M | M | H | H | H | H | H | - | L |
| CO5 | H | L | M | M | M | H | M | H | M | L |



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|----------------------|----------------------------|----------------------|-----------------|
| Semester VI | SOLID STATE PHYSICS | Hours/Week: 4 | |
| Core Course-9 | | Credits: 4 | |
| Course Code | | Internal | External |
| 22UPHC61 | | 25 | 75 |

COURSE OUTCOMES

On completion of the course, the students will be able to

- CO1 : explain the fundamentals in crystal structure, imperfections, types of bondings and superconductivity. [K1]
- CO2 : derive the relations related to crystal structure, electron theory of solids and discuss the theories related to bondings in solids, electron theory of solids and superconductivity. [K2]
- CO3 : apply the learned concepts to find lattice constants, Fermi Energy and determine properties of crystals. [K3]
- CO4 : analyze density of states and infer properties of solids. [K4]
- CO5 : determine the crystalline structure of nonmetallic elements, colour centre in crystalline compounds and recent applications of superconductivity. [K5]

| Course Code 22UPHC61 | PO1 | | PO2 | PO3 | | PO4 | | PO5 | PO6 | PO7 |
|-------------------------|-----------|-----------|----------|-----------|-----------|-----------|-----------|----------|----------|----------|
| | PSO 1a | PSO 1b | PSO 2 | PSO 3a | PSO 3b | PSO 4a | PSO 4b | PSO 5 | PSO 6 | PSO 7 |
| CO 1 | H | - | H | M | H | M | M | L | - | M |
| CO 2 | H | L | M | M | M | M | M | M | - | M |
| CO 3 | H | M | M | L | L | H | H | M | - | - |
| CO 4 | H | M | H | M | M | H | H | H | - | - |
| CO 5 | H | M | M | M | L | H | H | H | - | - |



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| | | | |
|--------------------------|---------------------------------|----------------|----------------|
| Semester VI | NUCLEAR AND PARTICLE PHYSICS | Hours/Week: 5 | |
| Core Course -12 | | Credits: 4 | |
| Course Code- 20UPHC62 | | Internal 25 | External 75 |

COURSE OUTCOMES

On completion of the course, the students will be able to

CO1: explain the principles and concepts related to nuclear physics and elementary particles.

[K1]

CO2: describe the experimental methods to explain nuclear structure, nuclear reactors, radio activity, detectors & accelerators and discuss radiation effects and properties of elementary particles. [K2]

CO3: apply the learnt concepts to solve problems in nuclear structure, radio activity, nuclear reactions and accelerators. [K3]

CO4: analyze the issues related to various nuclear models, radio activity, nuclear reactions, and chemical & biological effects of radiation. [K4]

CO 5: assess the environmental impact on nuclear waste disposal, radiation hazards, global warming and water pollution. [K5]

| Course Code 20UPHC62 | PO1 | | PO2 | PO3 | | PO4 | | PO5 | PO6 | PO7 |
|-------------------------|--------|--------|-------|--------|--------|--------|--------|-------|-------|-------|
| | PSO 1a | PSO 1b | PSO 2 | PSO 3a | PSO 3b | PSO 4a | PSO 4b | PSO 5 | PSO 6 | PSO 7 |
| CO1 | H | - | H | - | M | L | - | L | - | M |
| CO2 | H | L | M | M | - | M | M | - | L | H |
| CO3 | H | - | M | L | H | H | M | - | - | - |
| CO4 | H | - | M | L | H | H | L | L | - | - |
| CO5 | H | - | H | M | H | H | H | H | - | H |



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| | | | |
|---------------------------------|----------------------------|------------------------|------------------------|
| Semester VI | DIGITAL ELECTRONICS | Hours/Week: 5 | |
| Core Course -13 | | Credits: 4 | |
| Course Code 20UPHC63 | | Internal 25 | External 75 |

COURSE OUTCOMES

On completion of the course, the students will be able to

CO1: explain concepts of number system, Boolean algebra combinational circuits, sequential circuits and converters. [K1]

CO2: describe number system, Boolean algebra and explain the working of arithmetic, combinational and sequential circuits and converters. [K2]

CO3: apply the learned concepts to solve problems in digital circuits. [K3]

CO4: analyze various digital circuits using laws & theorems and to solve related problems. [K4]

CO5: design the modulus counters (mod5 & mod12), universal shift register and flash ADC. [K5]

| Course Code 20UPHC63 | PO1 | | PO2 | PO3 | | PO4 | | PO5 | PO6 | PO7 |
|-------------------------|--------|--------|-------|--------|--------|--------|--------|-------|-------|-------|
| | PSO 1a | PSO 1b | PSO 2 | PSO 3a | PSO 3b | PSO 4a | PSO 4b | PSO 5 | PSO 6 | PSO 7 |
| CO1 | H | - | M | - | M | L | - | - | - | M |
| CO2 | H | H | H | M | - | M | L | - | - | - |
| CO3 | H | - | M | M | H | M | M | - | - | - |
| CO4 | H | L | M | M | H | H | M | M | - | - |
| CO5 | H | H | M | H | H | H | M | H | M | L |



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| | | | |
|---------------------------------------|-------------------------|------------------------------|------------------------------|
| Semester VI | MATERIAL SCIENCE | Hours/Week: 5 | |
| DSEC-2 | | Credits: 4 | |
| Course Code 20UPHE61 | | Internal 25 | External 75 |

COURSE OUTCOMES

On completion of the course, the students will be able to

CO1: explain the basic concepts involved in properties of materials. [K1]

CO2: derive the expressions and discuss the theory of conducting, dielectric and magnetic materials. [K2]

CO3: apply the learned concepts to solve problems in materials. [K3]

CO4: examine the concepts concerning to dielectric, conductive, superconducting, optical, magnetic and new materials. [K4]

CO5: assess the impact of materials in applied physics. [K5]

| Course Code 20UPHE61 | PO1 | | PO2 | PO3 | | PO4 | | PO5 | PO6 | PO7 |
|-------------------------|--------|--------|-------|--------|--------|--------|--------|-------|-------|-------|
| | PSO 1a | PSO 1b | PSO 2 | PSO 3a | PSO 3b | PSO 4a | PSO 4b | PSO 5 | PSO 6 | PSO 7 |
| CO1 | H | - | M | - | M | M | - | H | - | M |
| CO2 | H | H | H | M | - | M | M | - | - | H |
| CO3 | H | - | M | L | M | H | L | - | - | - |
| CO4 | H | - | M | M | H | M | L | M | - | - |
| CO5 | H | M | M | H | H | H | H | H | - | L |



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| | | | |
|-------------------------|-----------------|----------------|----------------|
| Semester VI | MEDICAL PHYSICS | Hours/Week: 5 | |
| DSEC-2 | | Credits: 4 | |
| Course Code 20UPHE62 | | Internal 25 | External 75 |

COURSE OUTCOMES

On completion of the course, the students will be able to

- CO1 : explain bio potential, transducers, biomedical recorders, radio therapy, medical and safety instrumentation. [K1]
- CO2 : describe the principle of bio electrodes, active & passive transducers, biomedical recorders, X-ray, Laser and safety instrumentation. [K2]
- CO3 : apply the theories to calculate the relevant physical parameters for medical devices/instrumentation. [K3]
- CO4 : examine the structure and mechanism of cells, transducers, biomedical recorders, medical and safety instrumentation. [K4]
- CO5 : justify the Medical Instrumentation techniques based on their safety level. [K5]

| Course Code 20UPHE62 | PO1 | | PO2 | PO3 | | PO4 | | PO5 | PO6 | PO7 |
|-------------------------|---------|---------|-------|---------|---------|---------|---------|-------|-------|-------|
| | PSO 1.a | PSO 1.b | PSO 2 | PSO 3.a | PSO 3.b | PSO 4.a | PSO 4.b | PSO 5 | PSO 6 | PSO 7 |
| CO1 | H | - | M | - | - | L | - | M | - | H |
| CO2 | H | L | M | L | - | L | - | M | - | M |
| CO3 | H | - | - | - | M | L | L | H | - | - |
| CO4 | H | L | L | - | - | M | L | H | - | L |
| CO5 | H | - | L | - | - | M | M | H | L | L |



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| | | | |
|-------------------------|---------------------|----------------|----------------|
| Semester VI | MEDICINAL CHEMISTRY | Hours/Week: 5 | |
| DSEC-2 | | Credits: 4 | |
| Course Code 20UCHE63 | | Internal 25 | External 75 |

COURSE OUTCOMES

On completion of the course, the students will be able to

- CO1 : recall common diseases, poisons and sources of drugs. [K1]
CO2 : classify important pharmacy terminologies, drugs and their actions. [K2]
CO3 : use first aid box , paracetamol, aspirin and inorganic compounds for sufferings. [K3]
CO4 : explain routes of administration and biological responses of drugs for major diseases. [K4]
CO5 : summarize the treatment, mechanism, assay and side effects of drugs for diseases. [K5]

| Course Code 20UCHE63 | PO1 | | PO2 | PO3 | | PO4 | | PO5 | | PO6 | PO7 |
|-------------------------|-------------|-------------|----------|-------------|-------------|-------------|-------------|-----------|------------|----------|----------|
| | PSO 1. a | PSO 1. b | PSO 2 | PSO 3. a | PSO 3. b | PSO 4 .a | PSO 4. b | SO 5.a | PSO 5.b | PSO 6 | PSO 7 |
| CO1 | H | H | M | M | H | H | M | H | M | - | M |
| CO2 | H | H | M | M | H | H | M | H | M | - | M |
| CO3 | H | H | H | H | H | H | H | H | H | - | H |
| CO4 | H | H | H | H | M | H | M | M | M | - | H |
| CO5 | H | H | H | M | M | M | M | H | M | - | H |



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|---------------------------|--|------------------------|------------------------|
| Semester V/ VI | PRACTICAL – 3 GENERAL PHYSICS - III | Hours/Week: 3 | |
| Core Course Practical III | | Credits: 3 | |
| Course Code- 20UPHC61P | | Internal 40 | External 60 |

COURSE OUTCOMES

On completion of the practical, the students will be able to

CO1: apply the theoretical concepts in Electromagnetism, Heat and Optics related experiments. [K3]

CO2: draw/ arrangement for the circuit diagram /experimental set up with tabular column/model graph and write the appropriate formula to calculate the required physical parameters. [K3]

CO3: execute the technical skills in handling the equipment and observe the required measurements related to the experiment. [K3]

CO4: calculate the necessary parameters using the formula/graph and complete the record work. [K3]

CO5: analyze the accuracy of the results obtained and compare it with the theoretical value. [K4]

| Course Code 20UPHC61P | PO1 | | PO2 | PO3 | | PO4 | | PO5 | PO6 | PO7 |
|--------------------------|--------|--------|-------|--------|--------|--------|--------|-------|-------|-------|
| | PSO 1a | PSO 1b | PSO 2 | PSO 3a | PSO 3b | PSO 4a | PSO 4b | PSO 5 | PSO 6 | PSO 7 |
| CO1 | H | H | L | H | - | - | M | - | - | M |
| CO2 | H | H | H | H | - | M | - | - | - | L |
| CO3 | H | H | H | H | - | M | - | L | H | - |
| CO4 | H | H | H | - | H | M | - | L | M | H |
| CO5 | M | H | M | H | H | H | M | M | M | H |



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|-----------------------------|--------------------------------------|------------------------|------------------------|
| Semester V/ VI | PRACTICAL – 4 ELECTRONICS | Hours/Week: 3 | |
| Core Course Practical IV | | Credits: 3 | |
| Course Code- 20UPHC62P | | Internal 40 | External 60 |

COURSE OUTCOMES

On completion of the practical, the students will be able to

CO1: apply the theoretical concepts in regulated power supply, electronic signal generators, op-amp application, verification of gates, theorems and related experiments. [K3]

CO2: draw the circuit diagram /experimental set up with tabular column/model graph and write the formula to calculate the required electrical parameters. [K3]

CO3: execute the technical skills in handling the equipment & components and observe the required measurements related to the experiment. [K3]

CO4: calculate the necessary parameters using the formula/graph and complete the record work [K3]

CO5: analyze the accuracy of the results obtained and compare it with the theoretical value. [K4]

| Course Code 20UPHC62P | PO1 | | PO2 | PO3 | | PO4 | | PO5 | PO6 | PO7 |
|--------------------------|--------|--------|-------|--------|--------|--------|--------|-------|-------|-------|
| | PSO 1a | PSO 1b | PSO 2 | PSO 3a | PSO 3b | PSO 4a | PSO 4b | PSO 5 | PSO 6 | PSO 7 |
| CO1 | H | H | L | H | - | - | M | - | - | M |
| CO2 | H | H | H | H | - | M | - | - | - | L |
| CO3 | H | H | H | H | - | M | - | L | H | - |
| CO4 | H | H | H | - | H | M | - | L | M | H |
| CO5 | M | H | M | H | H | H | M | M | M | H |



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|------------------------------------|--|------------------------|------------------------|
| Semester V/VI | PRACTICAL – 5 DIGITAL ELECTRONICS | Hours/Week: 2 | |
| Core Course Practical V | | Credits: 2 | |
| Course Code 20UPHC63P | | Internal 40 | External 60 |

COURSE OUTCOMES

On completion of the practical, the students will be able to

CO1: apply the theoretical concepts in digital electronics. [K3]

CO2: draw the circuit diagram /experimental set up with tabular column/model graph and write the formula to calculate the required physical parameters. [K3]

CO3: develop the technical skills in handling the equipment and components and observe the required measurements related to the experiment. [K3]

CO4: verify the truth tables of the digital circuits and complete the record work. [K3]

CO5: analyze the accuracy of the results obtained and compare it with the theoretical value. [K4]

| Course Code 20UPHC63P | PO1 | | PO2 | PO3 | | PO4 | | PO5 | PO6 | PO7 |
|--------------------------|-----------|-----------|----------|-----------|-----------|-----------|-----------|----------|----------|----------|
| | PSO 1a | PSO 1b | PSO 2 | PSO 3a | PSO 3b | PSO 4a | PSO 4b | PSO 5 | PSO 6 | PSO 7 |
| CO1 | H | H | L | H | - | - | M | - | - | M |
| CO2 | H | H | H | H | - | M | - | - | - | L |
| CO3 | H | H | H | H | - | M | - | L | H | - |
| CO4 | H | H | H | - | H | M | - | L | M | H |
| CO5 | M | H | M | H | H | H | M | M | M | H |



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|--|--|------------------------|------------------------|
| Semester V/VI | SEC Practical II MICROPROCESSOR | Hours/Week: 2 | |
| Skill Enhancement Course Practical II | | Credits: 2 | |
| Course Code 20UPHS61P | | Internal 40 | External 60 |

COURSE OUTCOMES

On completion of the practical, the students will be able to

CO1: apply the functions of various instructions used in 8085 microprocessor and write the programs. [K3]

CO2: write the programs related to the problems and calculate the necessary parameters. [K3]

CO3: develop the logical skills in writing the program and observe the required outputs related to the problem. [K3]

CO4: verify the output of the program and complete the record work [K3]

CO5: analyze the accuracy of the results obtained and compare it with the theoretical value. [K4]

| Course Code 20UPHS61P | PO1 | | PO2 | PO3 | | PO4 | | PO5 | PO6 | PO7 |
|--------------------------|--------|--------|-------|--------|--------|--------|--------|-------|-------|-------|
| | PSO 1a | PSO 1b | PSO 2 | PSO 3a | PSO 3b | PSO 4a | PSO 4b | PSO 5 | PSO 6 | PSO 7 |
| CO1 | H | H | L | H | - | - | M | - | - | M |
| CO2 | H | H | H | H | - | M | - | - | - | L |
| CO3 | H | H | H | H | - | M | - | L | H | - |
| CO4 | H | H | H | - | H | M | - | L | M | H |
| CO5 | M | H | M | H | H | H | M | M | M | H |