

MAHENDRA ARTS & SCIENCE COLLEGE
(Autonomous)

Affiliated to Periyar University, Salem.

Accredited by NAAC with 'A' Grade & Recognized u/s 2(f) and 12(B) of the UGC Act 1956
Kalippatti – 637 501, Namakkal (Dt), Tamil Nadu.



DEPARTMENT OF PHYSICS

COURSE OUTCOMES (COs)

M.Sc. PHYSICS

PRINCIPAL

MAHENDRA ARTS & SCIENCE COLLEGE
(Autonomous)

Kalippatti (PO) - 637 501, Namakkal (DT)

For the students
admitted from the
Academic Year 2019-2020 onwards

CORE - 1	M.Sc- PHYSICS	2019 – 2020
M19PPH01	CLASSICAL MECHANICS	
CREDITS: 4		

Objectives

The present course titled “Classical Mechanics” completely deals about the Newtonian Mechanics in association with Lagrangian, Hamiltonian, etc., which will be helpful to understand the Physical laws.

Course outcomes

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

CO	Statement	Knowledge Level
CO1	Remember Newtonian laws	K1
CO2	Understand Lagrangian and Hamiltonian Principle	K2
CO3	Analyze Poisson's Brackets & Hamilton-Jacobi Theory	K3
CO4	Apply studied theories for various applications such as statics and dynamical systems	K4

CORE - 2	M.Sc.- PHYSICS	2019– 2020
M19PPH02	MATHEMATICAL PHYSICS-I	
CREDITS: 4		

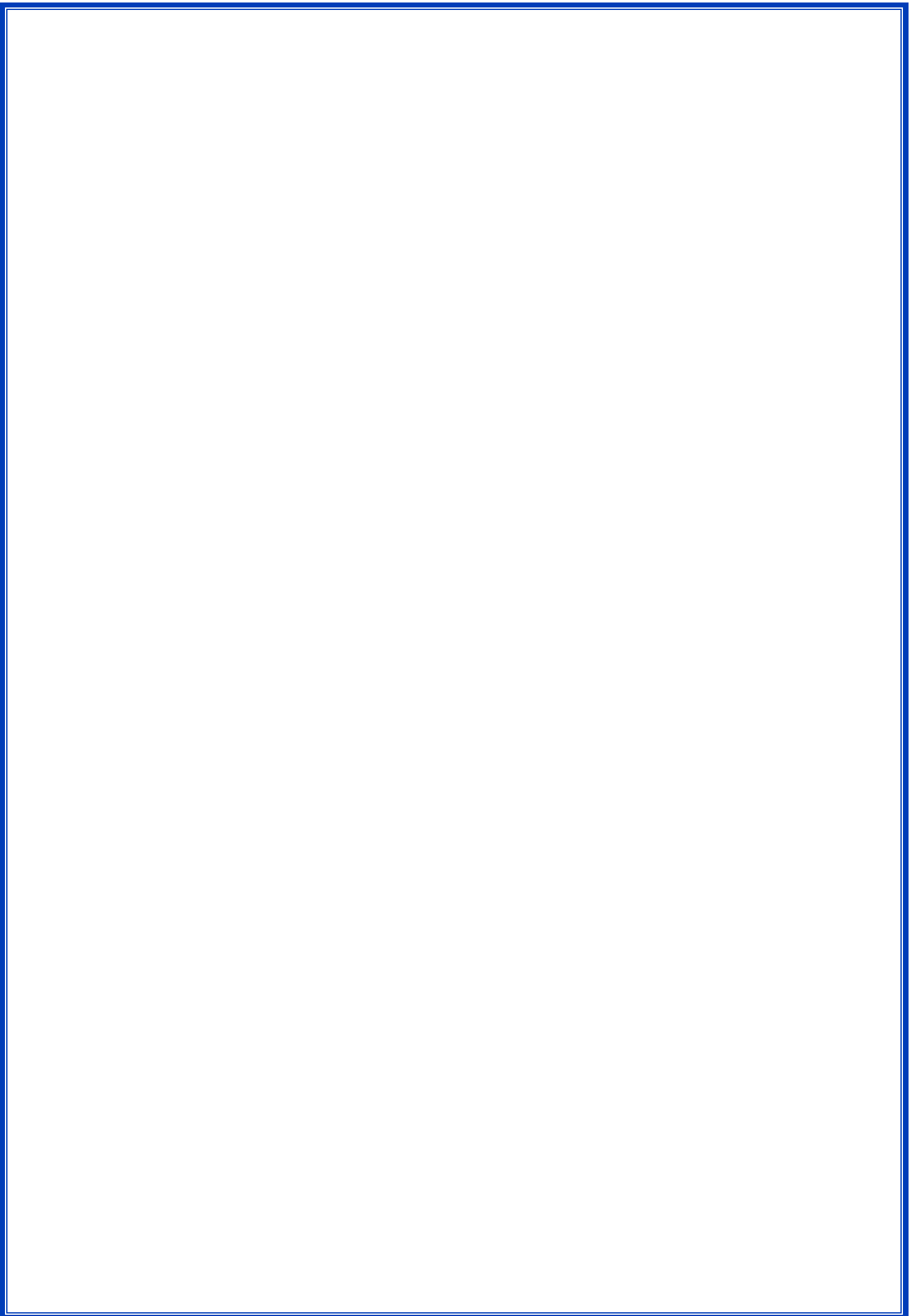
Objectives

The present title gives the detailed ideas about matrices and their respective determinants, Laplace, Differential and Fourier series etc. And the extension of the unit will be presented in semester III.

Course outcomes

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

CO	Statement	Knowledge Level
CO1	Remember basic matrix and the calculation determinants	K1
CO2	Summarize the salvation of differential equations	K2
CO3	Analyze special differential equations	K3
CO4	Apply Fourier series and Laplace transforms to various Physical problems	K4



CORE - 3	M.Sc- PHYSICS	2019– 2020
M19PPH03	ELECTRONICS	
CREDITS: 4		

Objectives

The present course explores the basic ideas about electronics and extends it towards the fabrication of integrated circuits. Also it covers special types of semi conducting materials. It deals about the basic concepts of converts and registers.

Course outcomes

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

CO	Statement	Knowledge Level
CO1	Remember basic concepts of ICs	K1
CO2	Summarize the principles of semi conducting devices	K2
CO3	Analyze the functions of registers and counters	K3
CO4	Apply Timers for various applications	K4

CORE - 4	M.Sc - PHYSICS	2019 – 2020
M19PPH04	OPTICS AND LASER PHYSICS	
CREDITS: 4		

Objectives

The present title will be helpful academically and industrially to make the students towards the development of optics and technology.

Course outcomes

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

CO	Statement	Knowledge Level
CO1	Remember optical laws such as reflection and refraction	K1
CO2	Discuss the production and applications of LASER	K2
CO3	Give the difference between linear and non linear optics	K3
CO4	Discuss the diffraction phenomenon and their applications	K4

Elective	M.Sc- PHYSICS	2019– 2020
M19PPHE01	X-RAY CRYSTALLOGRAPHY BIOPHYSICS	
CREDITS: 4		

Objectives

The present course titled “X-ray crystallography Bio Physics” completely deal about the concepts of X-ray crystals and diffraction methods in association with Phase problems and understand the Physical laws through data collection.

Course outcomes

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

CO	Statement	Knowledge Level
CO1	Remember Seven types of crystal systems	K1
CO2	Understand the techniques involved in Data Collection	K2
CO3	Analyze Phase Problem to solve the crystal structure	K3
CO4	Apply studied theories for various applications such as Bio Physics etc.,	K4

Elective	M.Sc- PHYSICS	2019– 2020
M19PPHE02	ELEMENTS OF NANO SCIENCE AND TECHNOLOGY	
CREDITS: 4		

Objectives

Bearing in mind the role of the applications of recent technologies The present course deals about the innovations of Nano science and Technology. Also it deals about the Physical and chemical properties of Materials in Nanoscale level.

Course outcomes

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

CO	Statement	Knowledge Level
CO1	Remember the differences between chemical and physical properties	K1
CO2	Understand the techniques involved in the synthesis of nanomaterials	K2
CO3	Analyze nanomaterials using various characterization techniques	K3
CO4	Apply studied theories for various applications which lying in Nanoscale level	K4

Elective - I	M.Sc - PHYSICS	2019 – 2020
M19PPHE03	CRYSTAL AND CHARACTERIZATION	
CREDITS: 4		

Objectives

The present elective title gives the elaborate ideas about crystals and their classifications. Also it deals the Physics governing the crystals and their growth techniques in detail along with applications.

Course outcomes

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

CO	Statement	Knowledge Level
CO1	Remember fundamentals of crystal growth and their importance	K1
CO2	Understand the theories of crystal growth phenomenon	K2
CO3	Give the experimental ideas about crystal growth	K3
CO4	Discuss the various crystal growth techniques with advantages and disadvantages	K4

CORE - V	M.Sc- PHYSICS	2019– 2020
M19PPH05	MATHEMATICAL PHYSICS-II	
CREDITS: 4		

Objectives

The present title gives the detailed ideas about Probability, Complex variables and group theory and their respective applications, Linear vector variables and tensor analyses. And the extension of the unit will be presented in previous semester I.

Course outcomes

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

CO	Statement	Knowledge Level
CO1	Remember basic Probability and the calculation in distributions	K1
CO2	Summarize the salvation of complex variables	K2
CO3	Analyze special features of group theory	K3
CO4	Apply Laplace and Tensor analyses for various Physics problems	K4

CORE - VI	M.Sc- PHYSICS	2019– 2020
M19PPH06	QUANTUM MECHANICS- I	
CREDITS: 4		

Objectives

The failures of classical mechanics unleash the behaviors of matters at the microscopic level. The modern physics with the title quantum mechanics will open the puzzles of various physical properties at the microscopic level.

Course outcomes

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

CO	Statement	Knowledge Level
CO1	Distinguish classical and quantum mechanics	K1
CO2	Discuss the hypothesis of quantum mechanics	K2
CO3	Give the time dependent and independent ideas	K3
CO4	Discuss the applications of quantum mechanics	K4

CORE - VII	M.Sc- PHYSICS	2019– 2020
M19PPH07	MICROPROCESSOR AND MICROCONTROLLER	
CREDITS: 4		

Objectives

The present title gives Architecture and Programming of 8085, 8086 and applications of Microprocessor and microcontroller respectively in detail.

Course outcomes

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

CO	Statement	Knowledge Level
CO1	Familiar with architecture and programming of 8085	K1
CO2	Brief about the architecture of 8086	K2
CO3	Analyze the applications of microprocessor and microcontrollers	K3
CO4	Apply Programming languages for various applications	K4

Elective - II	M.Sc - PHYSICS	2019 – 2020
M19PPHE04	THIN FILM PHYSICS	
CREDITS: 4		

Objectives

The elective course will be basic platforms for researchers and students in thin film science and technology. It deals preparation and coating techniques and also gives the idea about the measurement of the thickness of thin films. Also it provides characterization of thin films.

Course outcomes

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

CO	Statement	Knowledge Level
CO1	Proceed the application of Physics in thin film science and technology	K1
CO2	Understand the difference between thin film with other existing technologies	K2
CO3	Analyze the measurement techniques involved in thin films	K3
CO4	Apply the techniques to know the Physical properties of thin films by suitable methods	K4

Elective - II	M.Sc- PHYSICS	2019– 2020
M19PPHE05	ULTRASONICS AND ITS APPLICATIONS	
CREDITS: 4		

Objectives

In recent years Ultrasonic play a major role in the fields of scanner technologies and biological studies. With this connection the present title enhance the students towards the development of knowledge about Ultrasonic and their respective applications.

Course outcomes

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

CO	Statement	Knowledge Level
CO1	Recall the fundamentals of sound	K1
CO2	Understand the Propagation of ultrasonic through different medium	K2
CO3	Give the experimental ideas about Ultrasonic during generation	K3
CO4	Discuss the various applications of ultrasonic	K4

Elective - II	M.Sc- PHYSICS	2019 – 2020
M19PPHE06	NONLINEAR DYNAMICS	
CREDITS: 4		

Objectives

The development of dynamics plays a major role in the field of classical mechanics. By bearing in mind the applications of dynamics, the present course deals about dynamics in non linear conditions. After the completion of the course, the students are able to understand the concepts of non linear dynamics using theoretical knowledge.

Course outcomes

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

CO	Statement	Knowledge Level
CO1	Recall the classifications of motions	K1
CO2	Understand Newtonian laws of motion	K2
CO3	Give the theoretical ideas about Chaos	K3
CO4	Discuss the various applications of Non linear equations through suitable tools	K4

CORE - VIII	M.Sc - PHYSICS	2019 – 2020
M19PPH08	QUANTUM MECHANICS – II	
CREDITS: 4		

Objectives

The failures of classical mechanics unleash the behaviors of matters at the microscopic level. The modern physics with the title quantum mechanics will open the puzzles of various physical properties at the microscopic level.

Course outcomes

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

CO	Statement	Knowledge Level
CO1	Distinguish classical and quantum mechanics	K1
CO2	Discuss the hypothesis of quantum mechanics	K2
CO3	Give the ideas about identical particles	K3
CO4	Discuss the applications of quantum mechanics	K4

CORE - IX	M.Sc - PHYSICS	2019 – 2020
M19PPH09	STATISTICAL MECHANICS	
CREDITS: 4		

Objectives

The present course completely deals about the distributions of the particles in n number of ways through mid way Physics so called as Statistical Mechanics.

Course outcomes

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

CO	Statement	Knowledge Level
CO1	Distinguish classical and statistical mechanics	K1
CO2	Discuss the hypothesis of Statistical mechanics	K2
CO3	Give the various distributions present in statistical mechanics	K3
CO4	Discuss the applications of Statistical Mechanics	K4

CORE - X	M.Sc- PHYSICS	2019– 2020
M19PPH10	COMPUTATIONAL METHODS AND PROGRAMMING	
CREDITS: 4		

Objectives

The present title gives applications of programs for the development of Physics and for theoretical applications. It covers C++ programming, curve fitting and Linear and non linear equations etc.,

Course outcomes

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

CO	Statement	Knowledge Level
CO1	Familiar with computer programmings	K1
CO2	Summarize Curve fittings and interpolations	K2
CO3	Analyze Linear and Non linear solutions	K3
CO4	Apply solutions to various types of differential equations	K4

CORE - XI	M.Sc - PHYSICS	2019 – 2020
M19PPH11	ELECTROMAGNETIC THEORY	
CREDITS: 4		

Objectives

It provides the detailed idea about Electromagnetic waves with Maxwell's equations. It also deals electrostatics along with magneto statics in detail with applications. In addition with the above it introduces Plasma Physics to the students.

Course outcomes

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

CO	Statement	Knowledge Level
CO1	Know about electrostatics and magnetostatics with basic principles	K1
CO2	Understand the connection between electricity and magnetism with equations	K2
CO3	Discuss about the role of electromagnetic waves to unleash the puzzles of Physics	K3
CO4	Elaborate the concepts EMT for Plasma Physics	K4

Elective - III	M.Sc- PHYSICS	2019– 2020
M19PPHE07	NANO PHYSICS	
CREDITS: 4		

Objectives

Bearing in mind the role of the applications of recent technologies The present course deals about the innovations of Nano science and Technology. Also it deals about the Physical and chemical properties of Materials in Nanoscale level.

Course outcomes

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

CO	Statement	Knowledge Level
CO1	Remember the differences between chemical and physical properties	K1
CO2	Understand the techniques involved in the synthesis of nanomaterials	K2
CO3	Analyze nanomaterials using various characterization techniques	K3
CO4	Apply studied theories for various applications which lying in Nanoscale level	K4

Elective - III	M.Sc - PHYSICS	2019 – 2020
M19PPHE08	MEDICAL PHYSICS	
CREDITS: 4		

Objectives

The elective course will be the basic platforms for researchers and students towards the applications of Physics in Medical Sciences.

Course outcomes

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

CO	Statement	Knowledge Level
CO1	Remember Bio electric signals	K1
CO2	Understand the mechanism of transducers	K2
CO3	Analyze measurements in human through electro neurography	K3
CO4	Apply Physics Laws with the endoscopes, X-ray etc.,	K4

Elective -III	M.Sc- PHYSICS	2019– 2020
M19PPHE09	OPTO ELECTRONICS	
CREDITS: 4		

Objectives

The present core course is considered as one of the most unique research course in Physics and will be basic platforms for researchers and scientists.

Course outcomes

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

CO	Statement	Knowledge Level
CO1	Familiar with Optical concepts and their forms based on electron propagation	K1
CO2	Understand the concepts of active and passive devices	K2
CO3	Discuss the function of fibre optical communication	K3
CO4	Extend optoelectronics for optical and sensor applications	K4

CORE - XII	M.Sc - PHYSICS	2019 – 2020
M19PPH12	CONDENSED MATTER PHYSICS	
CREDITS: 4		

Objectives

The present core course is considered as one of the most unique research course in Physics and will be basic platforms for researchers and scientists.

Course outcomes

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

CO	Statement	Knowledge Level
CO1	Familiar with crystallographic concepts and their bondings	K1
CO2	Understand the lattice vibrations and thermal properties in crystal systems	K2
CO3	Discuss in detail about various theories involving to understand matters in detail	K3
CO4	Elaborate magnetic, dielectric and superconducting behaviors in detail	K4

CORE - XIII	M.Sc- PHYSICS	2019– 2020
M19PPH13	NUCLEAR AND PARTICLE PHYSICS	
CREDITS: 4		

Objectives

Nuclear and particle Physics course deals in detail about the structure and properties of the nucleus through various models and theories. It also gives the basic ideas about nuclear interactions, reactions, decays and about elementary particles.

Course outcomes

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

CO	Statement	Knowledge Level
CO1	Remember the models of nucleus and elementary particles	K1
CO2	Understand the reactions and interactions between the nucleus	K2
CO3	Familiar in nuclear decays and elementary particles and their classifications	K3
CO4	Apply various models and theories to understand nuclear structure	K4

CORE - XIV	M.Sc- PHYSICS	2019– 2020
M19PPH14	SPECTROSCOPY	
CREDITS: 4		

Objectives

The present title gives brief ideas about molecular, rotational and vibration spectroscopy. It also offers the principle and instrumentations of each spectroscopic technique in brief.

Course outcomes

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

CO	Statement	Knowledge Level
CO1	Know about vibrational, rotational and molecular spectroscopic techniques	K1
CO2	Understand the mechanisms of rotational and molecular spectroscopic techniques	K2
CO3	Identify the suitability of each spectroscopic techniques	K3
CO4	Apply these spectroscopic techniques for qualitative and quantitative analyses of the molecules	K4

Elective - IV	M.Sc- PHYSICS	2019– 2020
M19PPHE10	CHARACTERIZATION OF MATERIALS	
CREDITS: 4		

Objectives

The present elective course focuses on characterization of materials in order to know the suitability of the materials for specific applications. It describes in detail completely about crystal growth, thin film technology, XRD, UV etc., and their applications.

Course outcomes

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

CO	Statement	Knowledge Level
CO1	Remember crystals and their growth technologies	K1
CO2	Familiarize with thin film technology	K2
CO3	Analyze suitable characterization techniques based on the choice of the materials and applications	K3
CO4	Apply these technologies in MEMS and R&D	K4

Elective -IV	M.Sc- PHYSICS	2019 – 2020
M19PPHE11	ENERGY PHYSICS	
CREDITS: 4		

Objectives

It gives a brief idea about various types of renewable and non renewable energy sources. At the end of this course the students are able to understand the concepts of energy sources and the storage technologies.

Course outcomes

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

CO	Statement	Knowledge Level
CO1	Receive the concepts of renewable and non renewable energy sources	K1
CO2	Familiarize with different types of solar cells	K2
CO3	Discuss about the applications of solar cells	K3
CO4	Apply these technologies in wind and bio mass technologies	K4

Elective -IV	M.Sc- PHYSICS	2019– 2020
M19PPHE12	COMMUNICATION ELECTRONICS	
CREDITS: 4		


Objectives


It gives a brief idea about various communication technologies being used by the people in various sectors.


Course outcomes

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

CO	Statement	Knowledge Level
CO1	Receive the concepts of transmission and reception in communication technology	K1
CO2	Familiarize with codes and digital signals	K2
CO3	Discuss about microwaves for communication purpose	K3
CO4	Apply these technologies in RADAR & TV	K4


Head of the Department
 Dr. V. HARIHARAN, M.Sc., M.Phil., Ph.D.,
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DEPARTMENT OF PHYSICS

PROGRAMME OUTCOMES (POs) OF M.Sc. PHYSICS

Academic year 2020-2021

PO1: Knowledge: has substantial knowledge in physics and basic knowledge in mathematics along with advanced knowledge in some areas in physics.

PO2: Skill: can combine and use knowledge from several disciplines and independently assess and evaluate research methods and results.

PO3: General competence: has the ability to successfully carry out advanced tasks and projects, both independently and in collaboration with others, and also across disciplines.

Head of the Department
Dr. V. HARIHARAN, M.Sc., M.Phil., Ph.D.,
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DEPARTMENT OF PHYSICS


PROGRAMME SPECIFIC OUTCOMES (PSOs) OF M.Sc. PHYSICS

Academic year 2020-2021

- PSO1:** Technical Proficiency: Obtaining successful employment to their respective interests, education and to become socially responsible physicist.
- PSO2:** Professional growth: Developing life long learning, higher education and research in their respective areas of specialization.
- PSO3:** Management growth: Improving leadership quality through innovative manner.


Head of the Department
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