## SRI RAMAKRISHNA MISSION VIDYALAYA COLLEGE OF ARTS AND SCIENCE, COIMBTORE-20

## **DEPARTMENT OF PHYSICS-PG**

## STAKEHOLDERS' CONSOLIDATED FEEDBACK REPORT ON POSTGRADUATE CURRICULUM-2021



## SRI RAMAKRISHNA MISSION VIDYALAYA COLLEGE OF ARTS AND SCIENCE, COIMBTORE-20

## **DEPARTMENT OF PHYSICS-PG**

#### STAKEHOLDERS' CONSOLIDATED FEEDBACK REPORT ON POSTGRADUATE CURRICULUM-2021

The overall development, assessment of quality, integration of innovations, the quest for excellence, sustainability, efficient performance, the cross-section of administration, and attainment of the vision of any organization are effectively retained through stakeholders' feedback. In parallel, a focused feedback system creates an effective core trajectory to integrate and enrich the respective courses in a programme. Besides, in continuation of the undergraduate feedback analysis in view of curriculum enrichment for the year 2020-2021, the consolidated feedback analysis and report are submitted at the postgraduate level, 2021-2022, for curriculum upgrading and integrating current trends in Physics.

## STUDENTS' FEEDBACK



The student's feedback was collected on different parameters like depth of the course, the extent of syllabus coverage, the applicability of syllabus in real-time, internships, overall rating on curriculum, and their suggestions, etc., to improve the course content. The majority of the students (70%) strongly agreed that the content provided in the programme is depth enough in the curriculum. Students appreciated theeffort made by the faculty members to covers the syllabi on average of 90%. The students agreed that the curriculum is in agreement with real-time situations. The inclination of project work paves the way for a research career. Finally, 90% of the students' positively responded to the overall rating of the curriculum as good.

### Suggessions:

- Compulsory summer internship program (15- 30 days)
- Linkages with advanced research laboratories may be a strengthened
- Intensive interactive approaches such as quiz and presentations may be strengthened
- More attention on problem-solving methodology
- Initiatives on the Kahoot and allied apps for classroom routines
- IoT course is required to defend the challenges in IT domains
- ICT tools may be strengthened

### **TEACHERS FEEDBACK**

The majority of the members, 100%, agreed that the POs, PSOs, and COs of the curriculum developed and implemented have relevance to the local, national, regional, and global developmental needs to a great extent. Around 66% of the members strongly approved that the courses having a focus on skill development. Further, it is observed that 58% of respondents agreed that 91-100% of the syllabus realized the stakeholders' expectations. The feedback revealed that 83% of them strongly agreed that the weightage provided to the students undertaking field projects/internships/projects/working models is relevant. Also, the majority of the members, 92%, approved that the Overall rating of the curriculum is excellent. In addition, curriculum refinement is listed in core topics to be added.

#### suggested content(s)

## MATHEMATICAL PHYSICS

Evaluation of improper real integrals, Evaluation of infinite integrals by Jordan's Lemma, Evaluation of infinite integrals when integrant has poles on real axis.

## ELECTRONICS

Flip-Flops - SR, JK, JK Master Slave - Counters - Scale of two to ten counter - Shift Registers -Serial and Parallel - Shift left and Shift right operations - Multiplexers and De-multiplexers D/A Conversion: Binary weighted resistor D/A converter - R-2R resistive adder D/A converter - A/D Conversion: Counter type A/D converter successive approximation A/D converter - Dual slope A/D converter- Sample and hold circuits.



#### ELECTROMAGNETIC THEORY AND ELECTRODYNAMICS

Boundary Conditions - Reflection and refraction of electromagnetic waves - Kinematic Properties & Dynamic Properties - Fresnel Formulae - Brewster's Law and Polarization of EM waves - total internal reflection and Critical angle - Reflection from a metallic surface - Propagation of Electromagnetic waves between parallel and perfectly conducting planes and Rectangular waveguide.

## QUANTUM MECHANICS

Stationary States- Hilbert Space- Problem: Calculation of potential and energy relation for an one dimensional wave function using Time independent Schrödinger equation.

Dirac's Notation- Momentum representation - Change of basis - Free particle: Plane wave solution and spherical wave solution. Clebsh-Gordan coefficients – Computation of Clebsh-Gordan coefficients – Components of arbitrary vectors A and B commute with those of  $\sigma$ .

First order correction to energy and wave function - Calculation of first order correction to the ground state energy of Anharmonic oscillator subjected to various potentials

#### MICROPROCESSOR AND MICROCONTROLLER

Introduction to microprocessor 80286 - Pins and signals of 80286 - 80286 Architecture - Real and protected virtual addressing mode of 80286 - Introduction to microprocessor 80386 - Pins and signals of 80386 - 80386 Architecture - Registers of 80386 - Operating modes of 80386 - Introduction to microprocessor 80486 - Pins and signals of 80486 - 80486 Architecture - Pins, Signals and Architecture of Pentium microprocessor

Comparison of Microprocessors and Microcontrollers - Architecture - Memory organization -I/O ports - Timers - Serial Communication - Interrupts - Programming tools and techniques -Addressing modes - Data transfer operations - Arithmetic operations - Logical operations -Rotate and sweep operations - Interfacing I/O Devices.

Applications: Timer Counter Programming - Displays - D/A and A/D conversions - Multiple interrupts.

#### SOLID STATE PHYSICS

Atomic scattering factor- Geometrical structure factor- fcc and bcc - Inelastic scattering of Photons by long wavelength Phonons -Elastic compliance and stiffness constants-waves in the (100) direction - waves in (110) direction - Molecular field theory of Antiferromagnetism - Dielectric breakdown - different types – characteristics.

CONDENSED MATTER PHYSICS AND NANOTECHNOLOGY

Cyclotron Resonance - De Hass-Vanalphen effect - Rectifier equation - Experimental survey-Effect of magnetic field : The Critical Field - Magnetic properties of Superconductors - Isotope effect - Theoritical survey - Photofragmentation - Coulombic explosion - Process of Self Assembly - Nanoelectromechanical systems (NEMS's) - fabrication-Nanomachines SPECTROSCOPY

Intensities of transition (selection rules & symmetry forbidden transition) - Phosphorescence and the nature of the triplet state - Population of the triplet state - Intersystem crossing - Phosphoresence Intesity - Excitation spectra.

## RELATIVITY AND WAVE MECHANICS

Variation of mass with velocity and its Experimental verification - Phase velocity and Group velocity - Velocity of De Broglie waves - Expansion theorem - Types of operators - Momentum operator - Commutator algebra- momentum and Hamiltonian - Time independent perturbation theory - First order and second order perturbation - The Variational principle - Rayleigh-Ritz method - Variation method for excited states.

### CORE EXPERIMENTS

- Absorption Coefficient of Transparent Material using Laser
- Determination of Particle size using Laser source

#### ELECTRONICS EXPERIMENTS

- Ring Counter
- Simultaneous Addition and Subtraction using OP-AMP
- Clipping and Clamping circuits using OP-AMP
- OP-AMP Integrator, Differentiator and Time marker
- OP-AMP Sign and Scale changer, CMRR
- OP-AMP: Analog Computation First order differential equations

#### **EMPLOYER'S FEEDBACK-I**

The pioneering and sustained institution, SRI RAMAKRISHNA MISSION VIDYALAYA COLLEGE OF ARTS AND SCIENCE is offering vital programmes under the science, arts, and IT stream along with the B.Voc. programmes to knowledge acquisition and upgradation of skilled human competencies. In parallel, the Physics programme at the PG level offers valuable courses for local, regional, national, and global needs. Besides, experiential learning in core Physics, Electronics, and Programming-aided practical is a commendable task. In my belief, the following are the inborn topics for the higher achievers. Hence, core topics may be strengthened in the flowing courses for the betterment of the PG Physics students, and to expertise the higher-order innovations in Research and Development.

- MATHEMATICAL PHYSICS
- ELECTRONICS
- ELECTROMAGNETIC THEORY AND ELECTRODYNAMICS
- QUANTUM MECHANICS
- SOLID STATE PHYSICS
- CONDENSED MATTER PHYSICS AND NANOTECHNOLOGY
- SPECTROSCOPY

#### **EMPLOYER'S FEEDBACK-II**

The core topics may be strengthened in the following courses for the betterment of the PG Physics students and to expertise the higher-order innovations in Research and Development.

## RELATIVITY AND WAVE MECHANICS

## CORE EXPERIMENTS

- Absorption Coefficient of Transparent Material using Laser source
- Determination of Particle size using Laser source

## ELECTRONICS EXPERIMENTS

- Ring Counter
- Simultaneous Addition and Subtraction using OP-AMP
- Clipping and Clamping circuits using OP-AMP
- OP-AMP Integrator, Differentiator and Time marker
- OP-AMP Sign and Scale changer, CMRR
- OP-AMP: Analog Computation First order differential equations

## ALUMNI FEEDBACK



88.9%

11. Overall rating of the curriculum 9 responses



Excelent
 Very Good
 Good
 Average

100% of the members agreed that the offered experiential learning, Participative learning, and Problem-solving methodologies are excellent. 89% of the members support the great extent grading to which curriculum content is sufficient to pursue higher studies, competitive and entrance examinations. The majority of respondents agreed that the Strategies implemented in the Teaching-Learning and Evaluation process are good. 89% of the population supports that curriculum ensures the overall development of the youths to a great extent. 78% of respondents extended their support to excellent grading for the overall rating of the curriculum.

Suggessions:

- Hands on Training on Instruments like PL, TG-DTA, UV spectrophometer etc., for the PG students may be included as a part of curriculum
- Virtual laboratory exposure may be given to UG and PG students

Further, the Stakeholders' consolidated feedback report on postgraduate curriculum (2021-2022) is submitted to the principal, chairman of IQAC as the quality mandating and for competent authority approval.

Nasew. 22.07.2 Chairman, BoS

Dr. J. CHANDRASEKARAN Ph.D Associate Professor & Head of Physics SRMV College of Arts and Science Coimbatore - 641 020

Principal, Chairman-IQAC

DR. R. THANGAVEL, M.Sc., M.Tech., MBA., M.Phil., Ph.D. PRINCIPAL SRI, RAMAKRISHNA MISSION VIDYALAYA COLLEGE OF ARTS & SCIENCE COIMBATORE - 641 020.



**Department of Physics** 

Stakeholders' feedback and suggestions received for the year academic year 2018-19

## Students' feedback



#### Suggestions

• Bridge courses may be introduced.



## Sufficient books and relevant materials

All the faculty members felt that the sufficient books and relevant materials are available for curriculum design and development.

#### Methods applied to Curriculum transaction

Fifty five percent of the faculty members accepted that the teaching methods used for curriculum transaction are adequate. Others suggested to adopt new methods and strategies in teaching may be incorporated.

#### **Preparedness for career placement**

All the faculty members felt that the relevant skills required for industry readiness are reflected in the curriculum.

#### Development of Skills of creativity and critical thinking

All the faculty members felt that the skills of creativity and critical thinking are adequately embedded in the curriculum.

#### **Integration of Human and Ethical Values**

Most of the faculty members accepted that the integration of Human and Ethical values is exist in the curriculum.

#### **Theory and Practical**

Proportionate weightage has been given to both theory and practical.

#### Need for instilling flexibility in curriculum

Existing flexibility is sufficient to redefine the curriculum with current technology.

#### **Suggestions for Curriculum Enrichment**

- Self study topics in each course may be indexed in the existing curriculum.
- Value added course may be integrated.
- Bridge course may be introduced in first year.
- The courses "Allied Physics-I and II" may be enriched.

## Alumni Feedback



#### Suggestions

• Self study topics may be included.

#### **Action Taken Report**

	Suggestions from the feedback	Action taken	
•	Self study topics in each course may be indexed in the existing		
	curriculum.	XX7'11 1	
	Value added course may be integrated.	Will be	
	Bridge course may be introduced in first year.	implemented.	
	<ul> <li>The courses "Allied Physics-I and II" may be enriched.</li> </ul>		

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**HoD of Physics** 



## SRI RAMAKRISHNA MISSION VIDYALAYA COLLEGE OF ARTS AND SCIENCE, COIMBATORE - 20 DEPARTMENT OF PHYSICS

### **BOARD OF STUDIES MEETING**

#### **MINUTES OF THE MEETING**

A meeting of Board of Studies in Physics was held on 22-02-2019 at 10.30 A.M to 03.30 P.M in our Department smart classroom.

## The Board approves the

- 1. Programme/Course outcomes (POs/COs) for Second year UG students from the academic year 2018-2019 onwards.
- 2. Programme specific outcomes for UG students from the academic year 2018-19 onwards.

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CHAIRMAN

Signature Members Name Dr. P. BALRAJU t, Dr. B. Jarov thurs 2. P. AMARNATH 3.

SRA S. RAMANA TIM 4. 5. .NT. RAMAMURTHY 6. R. JAYAPRARASH R.C 7. pr. R. Bharathikanna PC .1 8. M. Retrin Reman M. Rehm Reman 9. Dr.C. MAHENDRAN 10. Dr. D. Srielher Dh 11. Dr. K. SATIFISIA KUMAR K tholy E 12. Dr. R. SURESH , ~? Dr. R. GIOPALA CRUHNAN Pla 13 D. V. Ponm & Bmy V. 14.



Stakeholders' feedback and suggestions received for the academic year 2017-18

## Students' feedback



## Suggestions

- Problem solving practice is suggested to challenge competitive examination.
- The course "Advanced Materials and Characterisation" may be introduced.



## Sufficient books and relevant materials

Most of the faculty members of the department felt that sufficient books and relevant materials are available for curriculum design and development.

## Methods applied to Curriculum transaction

Most of the faculty members accepted that the teaching methods used for curriculum transaction are adequate.

#### Preparedness for career placement

Fifty eight percent of the faculty members felt that the relevant skills required for industry readiness are partially reflected in the curriculum. Others suggested to strengthen the curriculum to meet the industrial requirements.

#### Development of Skills of creativity and critical thinking

Most of the faculty members revealed that the skills of creativity and critical thinking are adequately present in the curriculum.

#### **Integration of Human and Ethical Values**

Integration of Human and Ethical values is exists in the curriculum.

#### **Theory and Practical**

Proportionate weightage has been given to both theory and practical.

## Need for instilling flexibility in curriculum

Most of the faculty members acknowledged the flexibility in the curriculum is adequate.

## **Suggestions for Curriculum Enrichment**

- The course "Advanced Materials and Characterisation" may be introduced.
- The course "Energy Auditing" may be introduced as NME.
- OBE system may be introduced.
- The courses "Simulation in Physics C++ Programming and MATLAB Programming" may be merged as a single course.

## Alumni Feedback



## Suggestions

• Problem solving practice is suggested to challenge competitive examination.

#### **Action Taken Report**

Suggestions from the feedback	Action taken	
<ul> <li>Problem solving practice is suggested to challenge competitive examination.</li> <li>The courses "Simulation in Physics - C++ Programming and</li> </ul>	Implemented.	
MATLAB Programming" may be merged as a single course. The course "Advanced Materials and Characterization" may be introduced.	Implemented.	
The course "Energy Auditing" may be introduced as NME. OBE system may be introduced.	Implemented.	

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HoD of Physics

Dr. J. CHANDRASEKARAN Ph.D Associate Professor & Head of Physics SRMV College of Arts and Science Coimbatore - 641 020

SRI RAMAKRISHNA MISSION VIDYALAYA COLLEGE OF ARTS AND SCIENCE COIMBATORE-641829.

## Sri Ramakrishna Mission Vidyalaya College of arts and science, Coimbatore - 20

#### **Department of Physics**

The board of studies meeting for Physics was held on 28.10.2017 between 10.30 am and 3.30 pm. The minutes of the meeting are following:

- The committee suggested to include the foreign author books in the reference category for all the courses and also suggested that core - 9 Solid State Physics (3CT09) and core - 10 Condensed Matter Physics (4CT10) courses are enriched for M. Sc Physics.
- 2. A resolution was made by the committee members to replace the Instrumental Methods of Chemical Analysis II course by the new course titled "Energy Auditing" in the UG syllabi. The newly included course will be under open CBCS for all the students of SRKVCAS. This will be in regulation from the academic year 2018 19 onwards.
- 3. It is resolved to extend the Advanced Research Instrumentation Centre (ARIC) facilities by the way of Knowledge Sharing, Sample Characterization and Conducting Certificate Course on "Instrumentation Techniques" at subsidized rates to the students of the colleges which executed MOUs with our college.
- 4. The committee suggested to include a question with compulsory problem worth of 5 marks out of 75 marks in both UG and PG question papers. It was decided that one question in EITHER or OR of Section –B must be problem from any one unit.
- 5. Committee recommended to mention the Course Outcome for each course in the syllabi of all the UG and PG programs.

- 6. Committee suggested to combine the two courses, namely Simulation in Physics -C++ Programming and MATLAB Programming as a single course, which consists of three units from C++ and two units from MATLAB. The newly combined course will be titled as "Programming in C++ and MATLAB".
- The new course is suggested instead of Simulation in Physics MATLAB Programming as "Advance Physics" in the PG syllabi from the academic year 2018 – 19.

17. G. MURACIDHARAN 9443928510 11 Dr. J. CHANDEASEKARAN 944 640 2212 SNAMANA Dr.C 111 AWNAMAL 28/10/17 SETIN RAMAN 9865596962 BOI mr. ATHISIAKUMAR Dr.C. MAHENDRAN RAMAMURTHY Dr.NT Dr. R. BHARATHKANNAN er1 Jayapak TAYAPRAKASH D. forlow DO. R. SURESH. NTT. R. GOPALAKRISHNIAN S.Y. JOTHI MANIKANDAN. (III BSC PLYSICS CHANDRASEKAR. IIM 0

## SRI RAMAKRISHNA MISSION VIDYALAYA COLLEGE OF ARTS AND SCIENCE, COIMBATORE - 20 DEPARTMENT OF PHYSICS

#### **BOARD OF STUDIES MEETING**

#### MINUTES OF THE MEETING

A meeting of board of studies in Physics was held on 09-03-2018 at 10.30 A.M to 03.30 P.M in our Department smart classroom.

### The following are the minutes of the meeting :-

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- The committee has approved the Programme/Course outcomes (POs/COs) for First year UG students from the academic year 2018-2019 onwards.
- The committee has approved the course PROGRAMMING IN C++ AND MATLAB as one of the Elective -I for First year PG programme from the academic year 2018-2019 onwards.
- 3. The committee has suggested to change the title of the paper ADVANCE PHYSICS as ADVANCE MATERIALS AND CHARACTERISATION.
- 4. The committee has approved the new syllabus for the course ADVANCE MATERIALS AND CHARACTERISATION as one the Elective -II from the academic year 2018-2019 onwards.
- 5. The committee has strongly recommended to include a question with compulsory problem worth of 5 marks out of 75 marks in both UG and PG question papers. It was decided that one question in EITHER or OR of section -B must be problem from any one unit.

¥ • Name and Designation ·Signature 1- ANNAMALA Profesor of Physics Tirupur -2. Dr. P BALRATU Registant Rotefros, Diept. 03 Nytics, CIJ, coimbatorerly

## **M.Sc Physics**

- 6. The committee has advised to add IG FET in unit No. 1of Electronics paper to I M.Sc., Physics Students.
- 7. Nuclear Physics paper for II M.Sc., Physics has been revised and the committee has approved the revised syllabus.
- 8. The Paper Spectroscopy for II M.Sc., Physics has been revised as per the suggestion given by the committee.

All the above changes are applicable for the students who have admitted during the academic year 2015-16 and onwards.

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1. Dr.K. SRINIVASAN,	K. 52 06/03/1
2. J.V. Ponnu Barry	VP TS
3. Dr. V. Veeravazhuthi	AR CI
4. Dr. D. VENUGOPAL	Q. my
5. Dr. R. JAYA-PRAKASH	R. Jayapahabh
6. Dr. R. Bharalli Kennan	. AC
J.DL. M. SETHU RAMAN	M. Lemin Raam
8. Dr. C. MAHENDRAN	Chilin
G. K. SATHISHKUMAR	L. Andham
10. S. RAMARATION	Ster
U. C.R. SREEKANTH	C.R. Sueccel
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4 J. Chadvasely,	Bandhaset .
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## For candidates admitted from academic year 2018-19 onwards Under New CBCS

Programme : B. Sc ChemistryCourse Code:18UCH3NM1Course Title : NME-INSTRUMENTAL METHODS OF CHEMICAL ANALYSIS-IYear : II2 Hours/Week2 Credits

### **Objectives:**

- To enable the students, know about basic principles of instrumentation methods
- To understand the characteristic properties of IR, UV, Raman and Fluorescence spectroscopy

## UNIT - I

Ultraviolet and Visible Spectrophotometry: Radiation sources - Monochromators -

Detectors – Double beam spectrophotometer. **Infrared Spectrophotometer**: The range of IR radiation – Instrumentation - Radiation sources –Monochromators – Single beam and Double beam Spectrophotometer.

## UNIT - II

**Raman Spectroscopy:** Characteristics and properties of Raman lines – Difference between Raman spectra & IR spectra – Instrumentation – Source of light – Filters – Sample holders – Spectrograph.

### UNIT – III

#### Fluorescence and Phosphoresence Spectrophotometry: Fluorescence and

Phosphorescence – Theory – Singlet and Triplet states – Instrumentation - Single beam and Double beam Fluorimeters - Spectrofluorimeters – Instruments for Phosphorimetric analysis – Comparison of Fluorimetry and Phosphorimetry.

## **TEXT BOOK**

1. Gurdeep Chatwal and Anand, Instrumental Methods and Analysis, Himalaya Publishing House, Mumbai, 1979, Edition: 1.

## **REFERENCE BOOK**

**1.** B.K.Sharma, Instrumental Methods of Chemical analysis, Goel Publishing House, Meerut, Edition: 3<sup>rd</sup>.

## **LEARNING OUTCOMES**

Students will be able to

- understand the concepts and basic principles of instrumentation methods.
- know the characteristic properties of IR, UV, Raman and Fluorescence spectroscopy

#### For candidates admitted from academic year 2018-19 onwards Under New CBCS

Programme:Course Title: NME - Energy AuditingNME: IIYear: IISemester : IV

2 Hours/Week

#### **Course Objectives:**

- > To understand and appreciate the energy crisis and environmental concerns associated with the energy management, and the importance of energy conservation
- > To understand the energy auditing tools & systems and their essential elements
- > To acquire the knowledge and the basic skills for energy monitoring and energy auditing

#### UNIT - I Energy

Energy resources - Different forms of energy - New and renewable energy - Primary and secondary energy - Conventional and non-conventional energy - Energy conservation and its importance - Energy and environmental concerns - Energy scneario and energy crisis.

#### UNIT - II Energy Audit & Management

General philosophy - Need of energy audit and management - Definition and objective of energy audit - Types of energy audits - Preliminary & Detailed energy audit methodology Industrial, commercial and residential audit planning - General principles of energy management - Energy management strategy - Energy audit instruments

#### UNIT - III Energy conservation

Energy conservation in domestic and industrial sectors

Energy conservation in

- ✓ Thermal system
- ✓ Electrical system
- ✓ Lighting system

#### **Learning Outcomes:**

At the end of this course student will acquire skills such as

- > An understanding of the energy management, auditing and optimization processes
- > Hands on experience and skills to conduct an audit
- > Demonstrate skills required for energy audit and management.

#### **TEXT BOOK**

Author :Albert Thumann and Willaim J. Younger Book Name: Hand book of energy audits Publication: The Fairmont Press Inc., Year: 2007Edition: 7<sup>th</sup>UNIT:I-III

Author :W.C. Turner Book Name: Energy management hand book Publication: The Fairmont Press Inc., Year: 2001 Edition: 4<sup>th</sup>UNIT:I-III

#### **REFERENCE BOOK**

Author :G.D. Rai Book Name: Non-conventional energy sources Publication: Khanna Publishers Year: 2011 Edition: 4<sup>th</sup>

Subject Code:18UPH4NM2

2 Credits

Author :C.B. Smith Book Name: Energy management principles Publication: Pergamon Press

### SRI RAMAKRISHNA MISSION VIDYALAYA COLLEGE OF ARTS AND SCIENCE (AUTONOMOUS) COIMBATORE - 641 020 For candidates admitted from academic year 2018 - 19 onwards Under New CBCS

Programme	: M.Sc Physics	Course Code: 18PPH1EL1	
Course Title	: PROGRAMMING	IN C++ AND MATLAB	
Elective	: 1	Year	: I
Semester	: I	Hours/Week	: 5
		4	

Credits

**Objectives:** To enable the students, to know about the Introduction of Mat lab functions, branching statements,

Program design, user defined functions, Input/output functions and Advanced Features of Mat lab Programs and how they may applied for our day to day life.

## UNIT - I :BEGINNING WITH C ++

Basic Concepts of OOP - Structure of C++ Programme - Tokens, Expressions and Control structures - Basic data types - Symbolic Constants - Operators in C++ - Manipulators - Type Casting - Expressions and their Types - Control structure: if, else, nested if, switch case, while, do while, for, nested for- break - continue and goto statement – Types Functions - Function Prototyping - Call by reference - Return by Reference - Inline Functions - Default Arguments.

## UNIT - II :CLASSES AND OBJECTS

Specifying a Class - Defining Member Functions - Static Data Members - Static Member Functions - Arrays of Objects - Objects as Function Arguments - Friend Functions -Returning Objects - Constant Member Functions - Pointers to Members. **Constructors and Destructors:** Constructors - Parameterized Constructors - Copy Constructor - Dynamic Constructor - Constant Objects - Destructors.

## UNIT - III : POLYMORPHISM AND FILES

Operator Overloading - Function Overloading - Single Inheritance - Multiple Inheritance - Hierarchical Inheritance - Multi Level Inheritance - Hybrid Inheritance.Classes for File Stream Operations - Opening and Closing a File - Text File Operations - Binary File Operations - Function Templates - Class Templates - Member Function Templates.

## UNIT- III : INTRODUCTION TO MATLAB:

Basics of MATLAB - MATLAB windows - On-line help - Input - Output - File types – Interactive Computation: Matrices and vectors - Input - Indexing - Matrix manipulation -Creating vectors - Matrix array operations - Arithmetic operations - Relational operations -Logical operations - Elementary math function - Matrix function - Character strings -Manipulating character strings - Eval function - Array operations - Command line functions -Inline function - Anonymous function - Plotting simple graphs.

## **UNIT - V : PROGRAMMING ON MATLAB**

Scripts and functions - Script files - Function files - Executing a function - Sub functions -Nested functions - Language specific features - Use on comments to create online help -Continuation - Global variables - Loops branches and control flow - Interactive input-Application: Linear algebra - Solving a linear system - Gaussian elimination - Eigen values and Eigen vectors - Matrix factorization

## **TEXT BOOK**

1. Author : E. Balagurusamy Book Name: Object - Oriented Programming with C++ Publication: Tata Mc- Graw Hill Publishing Ltd, Year: 2001 : Edition:2<sup>nd</sup> UNIT:I- III

## **REFERENCE BOOK:**

1. Author : Herbert Schildt Book Name: C++:The Complete Reference

Publication: McGraw- Hill Year: 1998 : Edition: Third

 Author : Stephen J. Chapman , Thomson, Book Name: MATLAB Programming For Engineers, Publication : Learning publishing company,

Year: 2004. Edition:3<sup>rd</sup>

- Author : Rudra Pratap Book Name: Getting started with MATLAB - A quick introduction for Scientists and Engineers Publication: Oxford University Press Year:2005 UNIT:IV- V
- Author : Bjarne Stroutstrup Book Name: The C++ Programming Language Publications, Addison Wesley Edition: 2<sup>nd</sup>

## Sri Ramakrishna Mission Vidyalaya College of Arts and Science (Autonomous), Coimbatore -20

## For the students admitted from academic year 2018-19 onwards Under new CBCS

Programme: **M. Sc Physics** Course Title: **Advanced Materials and Characterization** Year: **II** Hours/Week: **5** 

Course Code:18PPH3EL2 Semester: III Credits: 4

## **Course Objectives:**

- To cater the PG students about nature and formation of different materials like thin films, polymers and solar cells.
- ✤ To impart the basic knowledge on various techniques available for the processing and characterization of different materials.

## UNIT - I: THIN FILMS:

Thin Film and growth process - Distribution of deposits - Deposition Techniques: Thermal evaporation - Cathodic sputtering – Glow discharge sputtering - RF sputtering – Chemical and Physical vapor deposition – Spray pyrolysis – Spin coating.

**THICKNESS MEASUREMENTS:** Mass methods – Optical method - photometry, ellipsometry, interferometry - Microbalance technique.

## **UNIT - II POLYMERIC MATERIALS:**

Introduction and types - Photoconductive polymers - Composition and structure of polymers - Polymerization techniques - Chemical oxidative and Electrochemical polymerization -Applications.

**SOLAR CELLS:** Introduction - History and types of solar cell - Thin film and Dye sensitized solar cell - Minority carrier diffusion - IV characteristics - Solar cell output parameters.

## UNIT - III X-RAY ANALYSIS:

Powder X-ray diffraction - Debye-Scherrer technique - Indexing the powder pattern - Calculation of particle size using Scherer method - Lattice constant calculations.

**MICROSCOPY ANALYSIS:** Scanning Electron Microscope (SEM) - EDAX analysis -Principle and working of Atomic Force Microscopy (AFM) and - Principle of Transmission Electron Microscopy (TEM)

## **UNIT - IV OPTICAL ANALYSIS:**

UV-Vis spectroscopy studies - Band gap calculation - Determination of refractive index and optical conductivity - Fluorescence and Photoluminescence studies - Determination of direct band gap energy - Electroluminescence - FTIR spectroscopy - determination of different vibrational modes.

## UNIT – V ELECTRICAL AND THERMAL ANALYSIS:

Two probe and four probe methods - Hall effect setup measurement - Thermal Analysis: Introduction - Thermogravimetric analysis (TGA) - instrumentation - Determination of weight loss and decomposition products - Differential thermal analysis (DTA) - Cooling curves - Differential scanning calorimetry (DSC) - Instrumentation - Specific heat capacity measurements.

## **Text Books:**

- Book Name: Thin film fundamentals Author: A.Goswami Pubblisher: New age international (P) Ltd New Delhi (1986)
- Book Name: Introduction to Nano technology Author: C.P. Poole, F.J. Ownes. Pubblisher: Wiley, India (2007)
- Book Name: Solar Cells and their applications Author: L.D. Partain Pubblisher: John Wiley and Sons, New York (1995)
   Book Name: Electron and Ion microscopy and Microanalysis principles and Applications
- Author: Lawrence E. Murr Publisher: Marcel Dekker Inc., New York (1991)

## **Reference Books:**

- 1. K.L. Chopra, Thin film phenomena, McGraw-Hill Book companies, New york (1969).
- 2. G.Timp, Nanotechnology, A.P. Press, Springer (1999)
- 3. R.H. Bube, Photovoltaic Materials, Imperial (1998).
- 4. Nanoscale characterization of surfaces & interfaces, N John Dinardo, Weinheim Cambridge: Wiley-VCH, 2nd ed., 2000.



## Sri Ramakrishna Mission Vidyalaya College of Arts and Science Coimbatore - 641 020 Department of Physics

Stakeholders' feedback and suggestions received for the academic year 2016-17

## Students' Feedback



## Suggestions

- Power Supply experiment is required in the course "Core Practical-II" in UG programme.
- The course "Electricity and Magnetism" may be enriched.
- The course "Electronics" may be revised in UG programme.



## Sufficient books and relevant materials

All the faculty members of the department felt that the sufficient books and relevant materials are available for curriculum design and development.

#### Methods applied to Curriculum transaction

Fifty percent of the faculty members accepted that the teaching methods used for curriculum transaction are adequate. Other faculty members recommended to inculcate new methods and strategies of teaching for curriculum transaction.

#### **Preparedness for career placement**

Fifty eight percent of the faculty members felt that the relevant skills required for industry readiness are partially reflected in the curriculum. Others suggested to strengthen the curriculum to meet the industrial requirements.

#### Development of Skills of creativity and critical thinking

All the faculty members felt that the skills of creativity and critical thinking are adequately present in the curriculum.

## **Integration of Human and Ethical Values**

Most of the faculty members accepted that the integration of Human and Ethical values are present in the existing curriculum.

## **Theory and Practical**

Most of the faculty members felt that the impartial weightage has been given to both theory and practical courses.

## Need for instilling flexibility in curriculum

Most of the faculty members acknowledged that the flexibility into the existing curriculum is adequate.

## **Suggestions for Curriculum Enrichment**

- The course "Electricity and magnetism" may be enriched.
- The course "Electronics" may be revised and also include latest text books.
- Construction of IC regulated power supply may be included in "Core practical II".
- Value added course may be included in PG level.
- The course "Energy auditing" may be introduced as NME.
- The course "Advanced Physics" may be introduced.
- The courses "Mathematical Physics" and "Electromagnetic Theory and Electrodynamics" may be interchanged.
- The courses "Solid State Physics" and "Condensed Matter Physics and Nanoscience" may be strengthened.

#### **Alumni Feedback**



#### Suggestions

Offer value added course for PG students.

#### **Action Taken Report**

Suggestions from the feedback	Action taken
<ul> <li>The course "Electricity and magnetism" may be enriched.</li> <li>The course "Electronics" may be revised and also include latest text books.</li> <li>Construction of IC regulated power supply may be included in "Core practical - II".</li> </ul>	Implemented.
<ul> <li>Course rearrangement</li> <li>The course "Mathematical Physics" may be shifted from semester II to semester I.</li> <li>The course "Electromagnetic Theory and Electrodynamics" may be shifted from semester I to semester II.</li> </ul>	Implemented.
<ul> <li>Value added course may be included in PG level.</li> <li>The course "Energy auditing" may be introduced as NME.</li> <li>The course "Advanced Physics" may be introduced.</li> <li>The courses "Solid State Physics" and "Condensed Matter Physics and Nanoscience" may be strengthened.</li> </ul>	Will be implemented.

HoD of Physics

Dept. of Physics - 2016-17

Page 4

Principal

## SRI RAMAKRISHNA MISSION VIDYALAYA COLLEGE OF ARTS AND SCIENCE COIMBATORE-20 DEPARTMENT OF PHYSICS <u>MINUTES OF BOARD OF STUDIES MEETING</u>

27.02.2017

The Board of Studies meeting in Physics was held on 27.02.2017 between 10.30 am and 3.30 pm. The following are the minutes of the meeting.

#### **B.Sc Physics**

- 1 The core paper 2 (13UPH2C02) Electricity and Magnetism was revised with topics RL, RC, RLC (AC and DC Analysis). Lorentz law and Biot-Savart's law as per the recommandation given by the committee.
- 2' In core paper -3 (13UPH3C03) Electronics, the topics Sign Changer, Scale Changer and Phase Shifter of Unit IV were deleted and the topics Inverting, Non-Inverting amplifiers and Comparator were included. Besides, two text books Authored by V.Vijendran, (Digital Electronics) and Albert Malvino leech (Digital Principles and Applications) were included as reference books in the paper Electronics as per the committee's recommandation.
- 3 The book Non-conventional energy Resources writen by G.D. Rai in the Elective-I (14UPH5EL1) paper Alternative energy resources was included as reference book.
- 4 In Core Practical II (14UPH2CP2), the experiments 3 and 4 were merged together and included as experiment No. 3 and the construction of IC Regulated power supply (5V) was included as experiment No. 4.
- 5 The committee suggested the revision of Unit-V of Allied I Mathematics-I (13UPHAL1) course in line with B.Sc Physics programme.
- 6 The committee suggested the inclusion of either Environmental Chemistry or Biochemistry as Non-Major Elective paper for Solid state Chemistry with the concurrence of the Department of Chemistry.

## M.Sc Physics

- 7 The core paper-2 Electro Magnetic Theory and the core paper-4 Mathematical Physics were inter changed as per the recommendation given by the committee.
- 8 The committee has suggested the inclution of control related programs in Elective practical -II (ELP2) Simulation In Physics - MatLab practicals.
- 9 The committee advised to enrich the core-9 (3CT09) paper Solid State Physics and core -10
  (4CT10) paper Condensed Matter and Nano Science with required revision.
- 10 Two Value Added Extra Credit courses on Physics for Compattive Examinations-I and Physics for Compattive Examinations-II were introduced for I & II year PG students. The present I year PG students (2016-17 batch) will have these courses as certificate courses.

The changes made in the syllabai will be implimented from the academic year 2017-18 onwards. The suggestion given by the board will be taken for future revision.

NAME	SIGNATURE
1) Dr. G. MUROLIDHORAN	6. Mar 25/02/17
2) Dr. P. BALBAJU	Pr 127/02/17
3) Dr.V.ANWAMALAI	V. An
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#### For candidates admitted from academic year 2017-18onwards Under New CBCS

Programme	: B. Sc Physics	Subject Code: 13UPH2C02
Course Title	: ELECTRICITY AND MAGNETISM	
Core	: 2	
Year	: I	Semester : II
5 Hours/Week		5 Credits

#### **UNIT-I: CURRENT ELECTRICITY**

Electrical measurements: Potential difference – Electric current – Ohm's law – Resistance – Resistances in series and parallel – Kirchhoff's laws - Ammeters and voltmeters. R. C. L. RC, RL and RLC Circuits in AC and DC

#### **UNIT-II: ELECTROSTATICS**

Gauss's theorem and its applications- Coulomb's law – Mechanical force experienced by unit area of a charged sphere – Electrified soap bubble – Electrical images (Basics Only).

Capacitors: Capacity of a conductor- Energy of a charged conductor- Sharing of energy between two capacitors - Principle of a capacitor- capacity of a spherical and cylindrical capacitors- Capacitors in series and in parallel.

#### **UNIT- III: MAGNETIC INDUCTION**

Biot-Savart law – Ampere's circuital law – Lorentz force - Electromagnetic Induction: Faraday's laws – Lenz's law - Fleming's right hand thumb rule – Self inductance – Self inductance of a long solenoid – Determination of self inductance by Rayleigh's method – Mutual inductance – mutual inductance between two solenoids – Determination of mutual inductance.

#### **UNIT- IV: MAGNETISM**

Magnetic potential – potential and intensity at a point due to a bar magnet- magnetic intensity at any point due to bar magnet - magnetic potential at a point due to a magnetized sphere – magnetic shell – potential at a point due to a magnetic shell – potential at a point due to a magnetic shell – potential at a point due to a magnetic shell – potential at a point due to a magnetism - applications.

#### UNIT -V: MAGNETIC PROPERTIES OF MATERIAL

Magnetic induction – Magnetization M – Properties of dia, para and ferro magnetic materials –Anti ferro magnetism and ferri magnetism - Electron theory of magnetism – Langevin's theory of para magnetism - Weiss's theory of ferro magnetism – determination of draw M-H curve (horizontal model) – Energy loss due to hysteresis.

#### **TEXT BOOK:**

 Author : Brijlal and Subramaniam
 Book Name: Electricity and Magnetism
 Publication: Ratan Prakashan Educational & University Publishers,
 Year: 1992,Edition: 19<sup>th</sup>
 **REFERENCE BOOK** Author : Sehgal, Chopra and Sehgal
 Book Name: Electricity and Magnetism
 Publication: Sultan Chand & Sons, Delhi,
 Year: 1980.Edition:3<sup>rd</sup> 2. Author : R. MurugesanBook Name: Electricity and MagnetismPublication: Sultan Chand & Sons,Year: 1998Edition:2

For candidates admitted from academic year 2017-18onwards Under New CBCS

Subject Code: 17UPH3C03

Programme	: B. Sc Physics	
Course Title	: ELECTRONI	CS
Core	: 3	
Year	: II	Semester : III
5 Hours/Week		5 Credits

#### **UNIT – I: SEMICONDUCTOR FUNDAMENTALS**

Energy band in solids – types of semiconductor – majority and minority carriers – Mobile charge carriers and immobile ions – drift current in intrinsic semiconductor – PN junction – Depletion layer – barrier voltage – Effect of temperature – forward biased and reverse biased pn junction – Zener breakdown – Avalanche breakdown – H parameters in CE and CB configuration.

#### **UNIT-II: AMPLIFIERS**

Single stage Transistor amplifiers – CB,CE and CC – comparison of amplifier configuration – Amplifier classification based on the biasing condition – Class B push-pull amplifier – Complementary Symmetry push-pull class B amplifier – Distortion in amplifiers – RC and Transformer coupled two stage amplifiers – Direct-couple amplifier using complementary and symmetry of two transistors – Darlington pair

#### UNIT-III: SINUSOIDAL AND NON SINUSOIDAL OSCILLATORS

Comparison between an amplifier and oscillator – Damped and undamped Oscillations – Tuned base oscillator – Tuned collector oscillator - Hartley and Colpitt's oscillator Phase shift oscillator and Crystal controlled oscillator – Astable and Bistable multivibrator.

#### UNIT - IV: POWER SUPPLY AND OPERATIONAL AMPLIFIER

Rectifiers – Half wave - full wave rectifiers – voltage regulation using Zener diode and transistor-Characteristics of ideal and practical operational amplifiers – Inverting and Non-inverting amplifier – Adder – Subtractor - Integrator – Differentiator - Comparator,

#### UNIT-V: DIGITAL FUNDAMENTAL AND DEVICES

Basic logic gates – Demorgan's theorem – NAND and NOR as a universal gates – Half adder – Full adder - Half subtractor – Full subtractor – 4 Bit binary adder – RS flip flop- J-K flip flop – Digital to Analog Converter (R-2R ladder D/A converter) – Analog to Digital converter (Counter type A/D converter).

#### **TEXT BOOK:**

1.Author: B L Theraja Book Name: Basic Electronics Publication: S.Chand and company Ltd Year: 2001, Edition: 11<sup>th</sup> UNIT : I-IV

2. Author : V. Vijayendran
 Book Name: Introduction to Integrated Electronics
 Digital and Analog
 Year:2007 : Edition: 1<sup>st</sup>, Reprint 2007

3. Author : Malvino and Leech Book Name: Digital Principles & Application Publication: McGraw Hill Company, Unit – V

#### **REFERENCE BOOK:**

1. Author: V .K. Metha Book Name: Principles of Electronics Publication: S.Chand and company Ltd Year: 1983 Edition: 3<sup>rd</sup>

2. Author : R.S. Sedha Book Name: Applied Electronics Publication: S.Chand and company Ltd Reprint Year: 2010

For candidates admitted from academic year 2017-18onwards Under New CBCS

Programme: B. Sc PhysicsSubject Code:16UPH6EL1Course Title: ALTERNATE ENERGY RESOURCESElective: IYear: IIISemester: VI2 Hours/Week4 Credits

#### **Objectives:**

Impart the knowledge of energy crisis, conventional and non-conventional energy sources.

### UNIT – I: INTRODUCTION

Introduction – Consumption pattern – Oil shock – Types based on usage –Usage pattern of primary energy sources – Necessity of harnessing alternate energy resources – Energy chain –Energy and its major classifications.

#### **UNIT – II: ENERGY CRISIS**

Salient features and drawbacks of energy sources in practice- Alternate energy sources and their significances- Energy and its influence on environment -Heating values of various fuels – Energy status – Global context –Indian context

#### UNIT – III: THERMAL CONVERSION

Principles of Solar thermal conversion - Solar collectors - Solar water heater- Solar passive space heating and cooling systems - Solar industrial heating systems - Solar cookers – Solar furnaces- Solar green house - Solar desalination - Solar pumping – Satellite solar power stations

#### **UNIT – IV: BIOMASS ENERGY**

Introduction - Photosynthesis - Bio-gas generation - Digesters and their design - Some materials for biogas and biomass - Advantages and disadvantages of biological conversion of solar energy applications of biogas.

#### UNIT – V: FUEL CELL

Introduction to fuel cell – Potential applications – Classifications – Phosphoric acid fuel cell (PAFC) – Alkane fuel cell (AFC) – Fuel cell power plot- Magneto hydro dynamic (MHD) power conversion – Principle MZHD generator – Advantages – Limitations.

#### **TEXT BOOK:1**

1. B.H. KHAN – Non-conventional Energy Resources, Tata Mc Graw-Hill Publishing Company Ltd, 2006.

2. G.D. RAI – Solar Energy Utilization, Khanna Publishers, 1995.

- 3. G.D. RAI Non-conventional Energy Resources, Khanna Publishers, 2004.
- 4. S.P. SUKHATME solar energy Principles of thermal collection and storage- 2nd edition./ Tata Mc-Hill –coy 2006

## For candidates admitted from academic year 2017-18onwards Under New CBCS

Subject

Programme: B. Sc PhysicsCode :17UPH2CP2Course Title:ELECTRONICS EXPERIMENTSCore Practical : IIYear: ISemester : II2 Hours/Week2 Credits

## Any Fifteen of the Following Experiments

- 1. Junction diode characteristics.
- 2. Zener diode characteristics.
- 3. Construction of Half and Full wave rectifier.
- 4. Construction of 5V regulated power supply using IC.
- 5. Bridge Rectifier.

#### 6. 12 - 0 - (-12) Dual IC regulated power supply

- 7. Zener Regulated Power supply.
- 8. Study of CRO- Lissajous figures.
- 9. Verification of truth tables of AND, OR and NOT gates.
- 10. Verification of truth tables of NAND, NOR and EX-OR gates.
- 11. NAND as universal gate.
- 12. NOR as universal gate.
- 13. Voltage Doubler.
- 14. Construction of Half adder and half subtractor.
- 15. Verify ohms law.
- 16. Transistor characteristics CE mode.
- 17. Construction of Astable Multivibrator.
- 18. Single stage RC-coupled amplifier.



Stakeholders' feedback and suggestions received for the academic year 2015-16

## Students' feedback



## Suggestions

- The course "Mathematical Physics and Classical Mechanics" may be enriched.
- The course "Core Practical-III Advanced Experiments" may be strengthened.
- The course "Alternate Energy Recourses" may be enriched with the inclusion of Solar Cell Characteristics.



## Sufficient books and relevant materials

Most of the faculty members of the department felt that the sufficient books and relevant materials are available for curriculum design and development.

#### Methods applied to Curriculum transaction

Fifty eight of the faculty members accepted that the teaching methods used for curriculum transactions are adequate. Other faculty members suggested toadopt new methods and strategies.

#### **Preparedness for career placement**

58% of the faculty members felt that the relevant skills required for industry readiness are partially reflected in the curriculum. Others recommended to incorporate more skill oriented contents relevant to industrial requirements.

#### Development of Skills of creativity and critical thinking

Most of the faculty members perceived that the skills of creativity and critical thinking are adequately embedded in the curriculum.

## **Integration of Human and Ethical Values**

Most of the faculty members accepted that the integration of Human and Ethical values in the existing curriculum is sufficient.

## **Theory and Practical**

Proportionate weight age has been given to both theory and practical.

## Need for instilling flexibility in curriculum

Most of the faculty members acknowledged the flexibility into the existing curriculum is sufficient.

## **Suggestions for Curriculum Enrichment**

- The course "Mathematical Physics and Classical Mechanics" may be revised with the inclusion of Coordinate Systems.
- The course "Core Practical-III Advanced Experiments" may be strengthened with the following experiments.
  - Determination of thickness of a wire using the LASER Source.
  - Determination of absorptivity of COBALT OXIDE selective coating.
    - Dielectric constant-Non-polar molecules.
  - Solar Cells-Voltage-Current characteristics



## Alumni Feedback

### Suggestions

- The Courses, Mathematical Physics and Classical Mechanics may be revised.
- Advanced Experiments may be enriched.

### **Action Taken Report**

Suggestions from the feedback	Action taken
<ul> <li>The course "Mathematical Physics and Classical Mechanics" may be revised with the inclusion of Coordinate Systems.</li> <li>The course "Core Practical-III" Advanced Experiments may be strengthened.</li> </ul>	Implemented
<ul> <li>The course "Alternate Energy Recourses" may be enriched.</li> </ul>	Will be implemented

V.C HoD of Physics

OEPARTMENT OF PHYSICS SRI RAMAKRISHNA MISSION VIDYALAYA COLLEGE OF ARTS AND SCIENCE, COIMBATORE - 641 020.

Principal

SRI RAMAKRISHNA MISSION VIDYALAYA College of Arts and Science Combatore-641020.

## SRI RAMAKRISHNA MISSION VIDYALAYA COLLEGE OF ARTS AND SCIENCE, COIMBATORE - 20 DEPARTMENT OF PHYSICS BOARD OF STUDIES MEETING

# MINUTES OF THE MEETING

The board of studies in Physics was held on 14-03-2016 between 10.30 am to 12.30 pm. The following are the minutes of the meeting

## **B.Sc Physics**

- The Committee has approved the inclusion of special functions in Unit III of the paper Mathematical Physics in III year – V<sup>th</sup> semester.
- 2. The Committee also suggested to remove Hamiltonian formulation in Unit V and to include coordinate systems in the same paper.
- 3. The Committee has suggested to add a topic on population inversion in Unit V of the paper Optics for III year.
- 4. The Committee recommended to a topic on Solar cells and their characteristics in Unit V of the paper Alternate Energy Resources for III year.

## M.Sc Physics

1. The Committee approved to include the following experiments in Core practical - III for

II Year.

-

- 1. Determination of thickness of wire using laser
- 2. Determination of Absorptivity of CoO selective coating.
- 3. Determination of dielectric constant : Non Polar liquids
- 4. Solar cells : I-V Characteristics
- 5. Solar cells : Variable temperature characteristics

All the above changes are applicable for the students who are admitted during the academic year 2016-2017 and onwards.

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For candidates admitted from academic year 2016-17 onwards Under New CBCS					
Programme	: B. Sc Physics			Subject Code	: 16UPH5C05
Course Title	: MATHEMA	TICAL PHY	SICS AND CLASS	SICAL MEC	HANICS
Core : 5					
Year	: III	Semester :	V: 5 Hours/Week	5	Credits

## **Objectives:**

To understand the basics of vector calculus, matrices and complex variables. With these background, students are made to gain the knowledge of concept of classical mechanics and its applications.

## UNIT – I: VECTOR CALCULUS

Gradient of a scalar field – line, surface and volume integral – Divergence of a vector function – examples – Curl of a vector function – Important vector identities – Gauss divergence theorem – Stoke's theorem – Green's theorem – examples.

## UNIT – II: COORDINATE SYSTEMS

Curvilinear coordinates – transformation of coordinates – orthogonal curvilinear coordinates – unit vectors in curvilinear systems – cylindrical coordinates – spherical polar coordinates – curl, divergence and gradient in curvilinear, cylindrical and spherical polar coordinates.

#### UNIT – III: MATRICES

Special types of matrices -Properties of unitary and orthogonal matrices -Eigen values and Eigen functions- Cayley - Hamilton theorem- Diagonalisation of matrix -Solution of quadratic equations by matrix method.

## **UNIT – IV: COMPLEX VARIABLES AND SPECIAL FUNCTIONS**

Complex analysis- Analytic functions – Cauchy - Riemann equations- Cauchy's Integral theorem -Integral formula-Residues -Residue theorem (Definite integrals of trigonometry functions of  $\cos \theta$  and  $\sin \theta$ ).

**Special Functions :** Definition – Beta function – Gamma function – Evaluation of Beta function – Evaluation of Gamma function – Relation between Beta and Gamma functions.

## **UNIT – V: LAGRANGE'S FORMULATION**

Conservation theorem – linear and angular momentum - energy – Degress of freedom – constraints – Generalized co-ordinates – transformation equations – Generalized displacement, velocity, acceleration, momentum and force – Principle of virtual work – D'

Alembert's principle – Lagrange's equation of motion – linear Harmonic Oscillator, Simple Pendulum and Compound Pendulum.

TEXT BOOK	<b>REFERENCE BOOK</b>
1. Author : Satya Prakash	1. Author : B.D.Gupta
Book Name: Mathematical Physics with Classical	Book Name: Mathematical Physics
Publication: Sultan Chand & sons	Publication: Vikas Publishing house Year: Reprint, 1997
Year: Reprint 2007	Edition: Reprint, 1997
Edition: Reprint 2007 (UNIT:I – V)	2. Author: R. Murugeshan
	Book Name: Mechanics and Mathematical
	Physics,
	Publication: S.Chand, Edition 2008

### For candidates admitted from academic year 2016-17 onwards Under New CBCS

Programme	: B. Sc Physics			Subject Code: 16UPH6EL2		
Course Title	: ALTERNATE ENERGY RESOURCES					
Elective	: I					
Year	: III	Semester:	VI	2 Hours/Week	-	4 Credits

#### **Objectives:**

Impart the knowledge of energy crisis, conventional and non-conventional energy sources.

#### UNIT – I: INTRODUCTION

Introduction – Consumption pattern – Oil shock – Types based on usage –Usage pattern of primary energy sources – Necessity of harnessing alternate energy resources – Energy chain –Energy and its major classifications.

#### UNIT – II: ENERGY CRISIS

Salient features and drawbacks of energy sources in practice- Alternate energy sources and their significances- Energy and its influence on environment -Heating values of various fuels – Energy status – Global context –Indian context.

#### **UNIT – III: THERMAL CONVERSION**

Principles of Solar thermal conversion - Solar collectors - Solar water heater- Solar passive space heating and cooling systems - Solar industrial heating systems - Solar cookers - Solar furnaces- Solar green house - Solar desalination - Solar pumping - Satellite solar power stations.

## **UNIT – IV: BIOMASS ENERGY**

Introduction - Photosynthesis - Bio-gas generation - Digesters and their design - Some materials for biogas and biomass - Advantages and disadvantages of biological conversion of solar energy applications of biogas.

## **UNIT – V: FUEL CELL AND PHOTOVOLTAICS**

Introduction to fuel cell – Potential applications – Classifications – Phosphoric acid fuel cell (PAFC) – Alkane fuel cell (AFC) – Fuel cell power plot- Magneto hydro dynamic (MHD) power conversion – Principle MZHD generator – Advantages – Limitations.

**Photovoltaics :** Introduction to photovoltaics – Photovoltaic effect – Photovoltaic cell – Photovoltaic system for power generation – Applications of photovoltaic system.

- 1. B.H. KHAN Non-conventional Energy Resources, Tata Mc Graw-Hill Publishing Company Ltd, 2006.
- 2. G.D. RAI Solar Energy Utilization, Khanna Publishers, 1995.
- 3. S.P. SUKHATME solar energy Principles of thermal collection and storage- 2 nd edition./ Tata Mc-Hill –coy 2006

### SRI RAMAKRISHNA MISSION VIDYALAYA COLLEGE OF ARTS AND SCIENCE

## (AUTONOMOUS) COIMBATORE - 641 020

### For candidates admitted from academic year 2016 - 17 onwards Under New CBCS

Programme : M.Sc Physics	Subject Code: 16PPH4CP3
Course Title : ADVANCED EXPERIMENTS	Core Practical : III
Year : II Semester : IV	Hours/Week : 3 Credits : 3

### Any Fifteen of the following Experiments:

- 1. Determination of Dipole moment of liquids and solids.
- 2. Susceptibility of liquids Quincke's method.
- 3. Susceptibility of liquids Gouy's method.

4. Geiger Muller counter - Characteristics of GM tube and absorption coefficient of Aluminium- Beta & Gamma rays.

- 5. Determination of Band gap energy Michelson interferometer.
- 6. Study of Hall Effect in semiconductors.
- 7. Synthesis and study of conductivity of electro- deposited conducting polymers.
- 8. X ray powder photograph Debye Scherrer formula.

9. Deposition and Study of conductivity and activation energy of spray pyrolysis coated  $SnO_2$  films.

- 10. Study of transmission of light through optic fiber Numerical Aperture and Bending loss.
- 11. Elastic constants in solids ultrasonic method.
- 12. Ferroelectric materials Curie Temperature.
- 13. Study of Zeeman Effect.
- 14. Laser- Determination of refractive index of given liquids.
- 15. Determination of thickness of wire using laser
- 16. Determination of absorbitivity of CoO selective coating.
- 17. Determination of dielectric constant : Non Polar liquids

18. Deposition of Black Cobalt selective surface by spray pyrolysis method and deposition of Carbon

by Direct method-Temperature measurements.

19. Solar cells- I-V characteristics.

20. Solar cells- variable temperature characteristics.