FATIMA COLLEGE (AUTONOMOUS)

Re-Accredited with "A" Grade by NAAC (3rd Cycle)
74th Rank in India Ranking 2020 (NIRF) by MHRD
Maryland, Madurai- 625 018, Tamil Nadu, India

NAME OF THE DEPARTMENT : RESEARCH CENTRE OF PHYSICS

NAME OF THE PROGRAMME : M.SC

PROGRAMME CODE : PAPH

ACADEMIC YEAR : 2022-2023

Minutes of the Board of Studies Meeting

To be implemented from 2022-2023 onwards

Venue : A1

Convened on 23-03-2022 at 2pm

Members Present :

1. Dr. A. Sheela Vimala Rani — Head of the Dept
2. Dr. Basherrudin Mahmud Ahmed — University Nominee
   Asst. Prof. School of Physics
   Madurai Kamaraj University
   Madurai
3. Dr. K. Marimuthu — Subject Expert
   Asst. Prof
   Department of Physics
   Gandhigram Rural Institute – Deemed University
   Gandhigram
4. Dr. M. Umadevi — Subject Expert
   ~~Associate~~ Professor & Head
   Department of Physics
   Mother Teresa Women's University
   Kodaikanal
   23/03/22

5. Mr. Ramprakash
Industrial Electronics
Corporation No. 1,
Industrial Estate
Madurai

Industrialist

V. Ramprakash

6. Dr. R. Vishnu Priya
Asst. Prof.
Dept. of Physics
The Madura College
Madurai

Alumnae

Vishnu Priya

7. Dr. Malathi
Asst. Prof.
Dept. of Zoology
Fatima College

Dean of Academic Affairs

Malathi
23/3/2022

8. Dr. L. Caroline Sugitham
Associate Prof.

L. Caroline Sugitham

9. Mrs. R. Alphonsa Fernando
Associate Professor

R. A. Fernando

10. Dr. M. V. Leena Chandra
Asst. Prof.

M. V. Leena Chandra

11. I Jeyashealan
Asst. Prof.

I. Jeyashealan

12. Dr. Ancemma Joseph
Asst. Prof.

Ancemma Joseph

13. Dr. M. Ragam
Asst. Prof.

14. Dr. G. Jenita Rani
Asst. Prof.

15. Dr. R. Jothimani
Asst. Prof.

16. Ms. I. Janet Sherly
Asst. Prof.

17. Ms. J. R. Sofia
Asst. Prof.

18 Dr. R. Niranjana Devi
Asst. Prof.

AGENDA FOR BOARD OF STUDIES

1. Preparation of Action taken report
2. To carry out atleast 5-10% changes in a minimum - 20% or more in the courses offered (Approximately 8-10 courses minimum)
   (a) courses with revision less than 20% - same code
   (b) courses with revision more than 20% - New code - to be prefixed with 22...
3. New courses to be introduced
   • Course code to be prefixed with 22...

4. New Value-Added Courses can be introduced or the titles can be changed

5. Each department to offer atleast one Value-Added Courses per year

6. Frequency of the courses to be increased

7. Possibilities of the Credit transfer of SWAYAM MOOC Course to be explored

8. Both the Elective Courses have to be offered simultaneously.

MINUTES OF THE BOARD OF STUDIES

1. Presentation of Action taken report.

Action taken report for 2021-22
UG PHYSICS

SNo.	SUGGESTIONS IN THE PREVIOUS BOARD	ACTION TAKEN IN THE ACADEMIC YEAR 2021-22
1.	Self learning papers for all UG students namely "Amazing Universe and Indian Space Missions" (21P2SL1) offered by Physics dept.	These papers were introduced with the suggested syllabus

S.No.	SUGGESTIONS IN THE PREVIOUS BOARD	ACTION TAKEN IN THE ACADEMIC YEAR 2021-22
	Interdepartmental self learning papers "Microprocessor and Programming" (21P4SLB2) offered by Physics and Computer Science, "Space Science" (21P6SLM3) offered by Physics and Maths department were passed and syllabus were suggested	from the academic year 2021-22 onwards
2.	Reference book for Self learning paper "Microprocessor and Programming" by Ramesh Gaonkar shall be appended	The suggested book is included
3.	Board suggested to introduce "Physics for Competitive Exams" as Self Learning paper in the forth coming year	It will be introduced in the next year
4	Reference book by S.O. Pillai suggested for "Solid State Physics" paper	Reference book is included

S.No.	SUGGESTIONS IN THE PREVIOUS BOARD	ACTION TAKEN IN THE ACADEMIC YEAR 2021-22
5	Board suggested to introduce Skill embedded Certificate courses on "Non conventional energy sources"	A Skill based course "Solar cell and its applications" introduced
6	Syllabus for allied papers of BCA department on "Digital Principles and Computer Organization" (19P4AC14) and IT department on "Digital Principles and Computer Architecture" (19P3AC13) are passed	It was implemented
7	Reference book Malvino and Gates also recommended as reference book in Digital Electronics and Communication (19P5CC13)	The book is included

PG PHYSICS

S.No.	SUGGESTIONS IN THE PREVIOUS BOARD	ACTION TAKEN IN THE ACADEMIC YEAR 2021-22
1.	The title "Principles in advanced Mathematical Physics" can be changed to Advanced Mathematical Physics as the term "Principles" is a misnomer in Mathematical Physics	Title is changed
2	The following reference books were suggested for Quantum Mechanics and Advanced Quantum Mechanics (i) Principles in Quantum Mechanics - A. Shankar (ii) Introduction to Quantum Mechanics - Powell and Craftsman (iii) Quantum Mechanics: Concepts and applications - Nouredine Zettili	The books are included
3.	Industrialistic suggested to replace the currently existing self learning paper	

S.No.	SUGGESTIONS IN THE PREVIOUS BOARD	ACTION TAKEN IN THE ACADEMIC YEAR 2021-22
	for advanced learners entitled on "Instrumentation and experimental methods" by paper entitled on "Digital Signal Processing"	This paper is to be passed in this board

2. REVISION OF COURSES:

S.No.	Course Code	Units revised	% of revision	Course Title
1.	19P1ACC1/ 19M3ACP1/ 19G3ACP1	Unit II - Bernoulli's theorem, Unit III entropy, Unit IV ohms laws	15%.	Allied Physics - I
2.	19P2ACC3/ 19M4ACP2/ 19G4ACP2	Unit II - Frank-Hertz expt	18%.	Allied Physics - II
3	19P5CC14	Unit II - Lasers removed Unit-V Spectroscopy included	15%.	OPTICS
4	19P6CC17	Unit I - Work done included	5%.	Thermodynamics & Statistical Mechanics Revised
5	19P5CC16	Non-electronics Practicals	15%.	

S.No.	Course Code	Units revised	% revision	Course Title
6	19PGME2	Medical Physics - Unit V - Imaging Techniques	10%	Medical Physics
7	19PG1P2	Unit V - Semiconductor memories included	10%	Applied Electronics
8	19PG3P13	Unit V - Quantum Electrodynamics, SU3 symmetry included	10%	Nuclear and Partic Physics

3 NEW COURSES INTRODUCED:

	PROGRAM	COURSE CODE	COURSE TITLE
1.	B.Sc.	22P4CC11	Mathematical Methe
2.	B.Sc.	22P4SB2	Solar Cell and its Applications
3	M.Sc.	22PGSL2	Batteries and its Applications
4	M.Sc.	22PGSLP1	Digital Signal Processing

4. NEW VALUE ADDED COURSE:

Course Code	Course Title
22PGVAPC1	PG Diploma in Instrumentation on Electrochemical Workstation

5. Approval of Ph.D. Course Work Syllabus:

Course Work paper and Core paper for the Research Scholar are as follows:

Ph.D. Scholar	Course work paper	Core paper
P. Mohanaa Muthuselvi	22PHDCWP01 Solid State Ionics	22PHDCPP02 Materials Science

6. SUGGESTIONS GIVEN BY THE BOARD MEMBERS:

UG

* The new course Mathematical Methods can be offered as elective / skill based paper
* The nomenclature for the above paper can be changed into Numerical Methods
* A paper on Mathematical Physics can be included as core paper which will form a basis to studying papers like Mechanics, Quantum theory, Solid State Physics etc.
* "Interference" can be shifted from Allied Physics - II to Allied Physics - I to be on-par with the practicals

* The Board suggested to include "Principles of Electronics" by Mehta as one of the reference books.
* In the elective paper (19P6ME1), instead of Timer and Counter Assemblers and Compilers can be included.

PG

* The nomenclature for the New Value added course was discussed in detail.
* The above course can be offered as "certificate course".
* So the title of the New Value added course is

Certificate Course on Instrumentation on Electrochemical techniques.

* In the Nuclear and Particle Physics course, the Board

suggested to include "Nuclear Physics - Theory and Experiments" by Roy and Nigam as reference book.

* In the Applied Electronics paper, the Industrialist suggested that Pulse width Modulation and Switching regulators can be introduced instead of registers and counters.

* Mr. Ramprakash also recommended to include Assemblers and Simulators in the course "Instrumentation and Microcontroller" 21PG2P10 and to reduce the content of programming in 8051.

* The subject experts strongly recommended to specify the details of sections in the books for study in all the units of the syllabus for both UG and PG programs.

The specifications of the sections would enable the students to learn more precisely. The detailed sections in all units would feciliate the examiner also.

* CREDIT TRANSFER OF SWAYAM MOOC COURSE:

The board members suggested the credit transfer of Swayam-MOOC course is possible:

1) Both the syllabus should be same

2) Number of hours should mat

1) Dr. A. Sheela Vimala Rani

2) Dr. Basheeruddin Mahmud Ahmed

3) Dr. K. Marimuthu

4) Dr. M. Umadevi 23/03/22

5) Mr. Ramprakash

6) Dr. R. Vishnu Priya 23/03/22

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23/3/22

VISION OF THE DEPARTMENT

Educating and Empowering the youth and make them excel in all fields of Physics.

MISSION OF THE DEPARTMENT

- To ignite the young minds and impart quality education in basic Physics
- To promote enthusiasm in the study of physics through innovative and dedicated teaching methodologies
- To discover the budding talents in theoretical and experimental physics and ensure their global competency
- To provide a stimulating environment and strengthen basic and application oriented research aptitude among the students.

PROGRAMME EDUCATIONAL OBJECTIVES (PEO)

A graduate of M.Sc. Physics programme after two years will be

PEO 1	Our graduates will be academic, digital and information literates, creative, inquisitive, innovative and committed researchers who would be desirous for the "more" in all aspects
PEO 2	They will be efficient individual and team performers who would deliver excellent professional service exhibiting progress, flexibility, transparency, accountability and in taking up initiatives in their professional work
PEO 3	The graduates will be effective managers of all sorts of real life and professional circumstances, making ethical decisions, pursuing excellence within the time framework and demonstrating apt leadership skills
PEO 4	They will engage locally and globally evincing social and environmental stewardship demonstrating civic responsibilities and employing right skills at the right moment.

GRADUATE ATTRIBUTES (GA)

Fatima College empowers her women graduates holistically. A Fatimite achieves all-round empowerment by acquiring Social, Professional and Ethical competencies. A graduate would sustain and nurture the following attributes:

I. SOCIAL COMPETENCE	
GA 1	Deep disciplinary expertise with a wide range of academic and digital literacy
GA 2	Hone creativity, passion for innovation and aspire excellence
GA 3	Enthusiasm towards emancipation and empowerment of humanity
GA 4	Potentials of being independent
GA 5	Intellectual competence and inquisitiveness with problem solving abilities befitting the field of research
GA 6	Effectiveness in different forms of communications to be employed in personal and professional environments through varied platforms
GA 7	Communicative competence with civic, professional and cyber dignity and decorum
GA 8	Integrity respecting the diversity and pluralism in societies, cultures and religions
GA 9	All inclusive skill sets to interpret, analyse and solve social and environmental issues in diverse environments
GA 10	Self awareness that would enable them to recognise their uniqueness through continuous self-assessment in order to face and make changes building on their strengths and improving their weaknesses

GA 11	Finesse to co-operate exhibiting team-spirit while working in groups to achieve goals
GA 12	Dexterity in self-management to control their selves in attaining the kind of life that they dream for
GA 13	Resilience to rise up instantly from their intimidating setbacks
GA 14	Virtuosity to use their personal and intellectual autonomy in being life-long learners
GA 15	Digital learning and research attributes
GA 16	Cyber security competence reflecting compassion, care and concern towards the marginalised
GA 17	Rectitude to use digital technology reflecting civic and social responsibilities in local, national and global scenario
II. PROFESSIONAL COMPETENCE	
GA 18	Optimism, flexibility and diligence that would make them professionally competent
GA 19	Prowess to be successful entrepreuners and become employees of trans-national societies
GA 20	Excellence in Local and Global Job Markets
GA 21	Effectiveness in Time Management
GA 22	Efficiency in taking up Initiatives
GA 23	Eagerness to deliver excellent service
GA 24	Managerial Skills to Identify, Commend and tap Potentials

III. ETHICAL COMPETENCE	
GA 25	Integrity and be disciplined in bringing stability leading a systematic life promoting good human behaviour to build better society
GA 26	Honesty in words and deeds
GA 27	Transparency revealing one's own character as well as self-esteem to lead a genuine and authentic life
GA 28	Social and Environmental Stewardship
GA 29	Readiness to make ethical decisions consistently from the galore of conflicting choices paying heed to their conscience
GA 30	Right life skills at the right moment

PROGRAMME OUTCOMES (PO)

The learners will be able to

PO 1	Apply acquired scientific knowledge to solve major and complex issues in the society/industry.
PO 2	Attain research skills to solve complex cultural, societal and environmental issues.
PO 3	Employ latest and updated tools and technologies to solve complex issues.
PO 4	Demonstrate Professional Ethics that foster Community, Nation and Environment Building Initiatives.

PROGRAMME SPECIFIC OUTCOMES (PSO)

On completion of **M.Sc. Physics** programme, the graduates would be able to

PSO 1	Acquire thorough knowledge of the basic concepts of the frontier areas of Physics comprising Mathematical Physics, Electromagnetic theory, Classical Mechanics, Quantum Mechanics, Condensed Matter Physics, Nuclear Physics, Numerical Methods, Communication systems, Molecular Spectroscopy, Material Science and Advanced Quantum Mechanics.
PSO 2	Understand and solve the physics problems in everyday life using the acquired basic knowledge.
PSO 3	Develop skills to perform experiments based on the theoretical understanding
PSO 4	Apply the knowledge acquired to analyse and design models in the versatile realm of physics.
PSO 5	Equip with the essential foundations for higher education and research in physics.

FATIMA COLLEGE (AUTONOMOUS), MADURAI-18

DEPARTMENT OF PHYSICS

For those who joined in June 2019 onwards

MAJOR CORE 70 CREDITS

PROGRAMME CODE: PAPH

COURSE CODE	COURSE TITLE	HRS / WK	CREDIT	CIA Mks	ESE Mks	TOT. MKs
SEMESTER – I						
19PG1P1	Introduction to Mathematical Physics	5	3	40	60	100
19PG1P2	Applied Electronics	5	3	40	60	100
19PG1P3	Classical Mechanics	5	3	40	60	100
21PG1P4	Applied Optics	4	3	40	60	100
19PG1P5	Practicals-I Non Electronics	4	2	40	60	100
19PG1P6	Practicals-II Electronics	4	2	40	60	100
Total		**27**	**16**			
SEMESTER – II						
19PG2P7	Advanced Mathematical Physics	5	3	40	60	100
19PG2P8	Quantum Mechanics	5	3	40	60	100
19PG2P9	Electromagnetic Theory	5	3	40	60	100
21PG2P10	Instrumentation and Microcontroller	4	3	40	60	100
19PG2P11	Practicals-III Non Electronics	4	2	40	60	100

COURSE CODE	COURSE TITLE	HRS / WK	CREDIT	CIA Mks	ESE Mks	TOT. MKs
19PG2P12	Practicals-IV Electronics	4	2	40	60	100
Total		**27**	**16**			
SEMESTER _ III						
19PG3P11	Condensed Matter Physics	6	5	40	50	100
19PG3P12	Statistical Mechanics	6	5	40	60	100
19PG3P13	Nuclear and Particle Physics	6	5	40	60	100
19PG3P14	Practicals _ V Advanced Non Electronics	4	2	40	60	100
19PG4P15	Practicals _ V1 Computational Programming	4	2	40	60	100
Total		**26**	**19**			
SEMESTER _ IV						
19PG4P16	Advanced Condensed Matter Physics	6	5	40	60	100
19PG4P17	Molecular Spectroscopy	6	5	40	60	100
19PG4P18	Advanced Quantum Mechanics	6	5	40	60	100
19PG4P19	Practicals VII Advanced Electronics	4	2	40	60	100
19PG4P20	Practicals VIII PROGRAMMING IN C++	4	2	40	60	100
Total		**26**	**19**			
	Total	**106**	**70**			

MAJOR ELECTIVE / EXTRA DEPARTMENTAL COURSE / INTERNSHIP/ PROJECT -20 CREDITS

S. No	SEM.	COURSE CODE	COURSE TITLE	HRS	CREDITS	CIA Mks	ESE Mks	TOT. Mks
1.	I	19P1EDC	Modern Photography	3	3	40	60	100
2.	II	19P2EDC	Modern Photography	3	3	40	60	100
3.	III	19PG3PE1A/ 19PG3PE1B	Communication system/ Numerical methods and Programming in C++	4	4	40	60	100
4.		19PG3PSI	Summer Internship	-	3	40	60	100
5.	IV	19PG4PE2A/ 19PG4PE2B	Material Science / Astro Physics	4	4	40	60	100
6.		19PG4PPR	Project		3	40	60	100
			TOTAL	14	20			

OFF-CLASS PROGRAMME

ADD-ON COURSES

Course Code	Courses	Hrs.	Credits	Semester in which the course is offered	CIA Mks	ESE Mks	Total Marks
19PAD2SS	SOFT SKILLS	40	4	I	40	60	100
19PAD2CA	COMPUTER APPLICATIONS LATEX (Dept. Specific Course)	40	4	II	40	60	100

	MOOC COURSES (Department Specific Courses) * Students can opt other than the listed course from UGC-SWAYAM /UGC /CEC	-	Minimum2 Credits	-	-	-	
19PAD 4CV	**COMPREHENSIVE VIVA** (Question bank to be prepared for all the papers by the respective course teachers)	-	2	IV	-	-	100
19PAD 4RC	**READING CULTURE**	15/ Semester	1	I-IV	-	-	-
	TOTAL		13 +				

EXTRA CREDIT COURSE

Course Code	Courses	Hrs.	Credits	Semester in which the course is offered	CIA Mks	ESE Mks	Total Marks
19PGSLP1	**SELF LEARNING COURSE for ADVANCE LEARNERS (Offered for II PG)**	-	3	III & IV	40	60	100

	Instrumentation& Experimental Methods						
21PG2PSL1	**NANOTECHNOLOGY FOR ALL**	-	3	II	40	60	100
22PGSL2	**Batteries and its applications**	-	3	III & IV	40	60	100
22PGSLP1	**Digital Signal Processing**	-	3	III & IV	40	60	100

- **Lab Courses:**
  - A range of 10-15 experiments per semester

- **Summer Internship:**
  - Duration-1 month (2nd Week of May to 2nd week of June-before college reopens)

- **Project:**
  - Off class
  - Evaluation components-Report writing + Viva Voce (Internal marks-50) + External marks 50

- **EDC:**

  Syllabus should be offered for two different batches of students from other than the parent department in Sem-I& Sem-II

Employability,
Skill Development -100%

II M Sc.
Semester - III & IV

(For those who joined in June- 2022 onwards)

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
PAPH	22PGSL2	Batteries and its applications	Self Learning	-	2

Objective: This course gives a detailed study of electrochemistry and Batteries

Unit I

Galvanic cells and EMF – electrode reactions – electrode potentials and cell reactions – representations of electrodes – sign conventions.

Unit II

Electrochemical series– measurements of EMF- Construction of electrochemical cells – Applications.

Unit III

Types of Batteries (Primary and secondary Batteries)

Unit IV

Lithium Ion Batteries , Advantages and disadvantages- How Li-Ion Battery Works?

Unit V

Clean Energy Institute - Super capacitor battery, Charging and Working.

Text Book:

1.The principles of Physical chemistry by Puri, Sharma and Pathania.

Reference Book:

1. Introduction to Electrochemistry By Samuel Glasstone

Course Designer
1.Dr. I. Jeyasheela

Forwarded

Dr. A. Sheela Vimala Rani

HoD's Signature & Name

EMPLOYABILITY,
SKILL DEVELOPEMENT:100%

II M.Sc.

SEMESTER –III & IV

For those who joined in 2022 onwards

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
PAPH	22PGSLP1	Digital Signal Processing	Self Learning Course for Advanced Learners	-	3

COURSE DESCRIPTION

This course is an informative and comprehensive course which covers the concepts and techniques of modern digital signal processing which are fundamental to all the signal/speech/image processing, applications

COURSE OBJECTIVES

The objective of this course is to provide background and fundamental material for the analysis and processing of digital signals and to familiarize the relationships between continuous-time and discrete-time signals and systems. This course also gives the fundamentals of time, frequency and z-plane analysis and introduces real world signal processing applications.

UNITS

UNIT –I SIGNALS, SYSTEMS AND SIGNAL PROCESSING (15 HRS.)

Signals, Systems and Signal Processing - Basic elements of Digital Signal Processing System – Advantages of Digital over Analog Signal processing – Classification of signals – Concept of Frequency in continuous -time and discrete time signals.

UNIT –II Analog to Digital and Digital to Analog Conversion

(15HRS.)

Analog to Digital and Digital to Analog conversion – Sampling – Sampling theorem – Quantization and coding – Digital to Analog Conversion – Analysis of Digital Signals and Systems versus Discrete Time signals and systems

UNIT –III Discrete Time signals and systems (15 HRS.)

Discrete Time Signals – some Elementary Discrete – Time Signals – classification of Discrete Time signals – Block Diagram Representation of Discrete Time Systems – Classification of Discrete time systems

UNIT –IV Z Transform and its application (15 HRS.)

Z Trasform, Rational Z Transforms, Inversion of Z- transforms, stability and causality.

UNIT –V Discrete Fourier transform (15HRS.)

Interpretations of DFT –- Relationship of DFT to z transform – Properties of DFT – FFT Algorithms

UNIT –VI DYNAMISM (Evaluation Pattern-CIA only) (HRS.)

Real world signal processing applications

Text Book:

John G. Proakis, Dimitris G. Manolakis (2007), Digital Signal Processing, Principles, Algorithms, and Applications,Pearson Education / PHI, India..

REFERENCES:

1. A.V. Oppenheim, R. W. Schaffer (2009), Discrete Time Signal Processing, Prentice Hall of India, New Delhi.
2. Andreas Antoniou (2006), Digital Signal Processing, Tata McGraw Hill, NewDelhi

COURSE DESIGNER:

Dr.Ancemma Joseph

Forwarded By

HOD'S Signature & Name