

FATIMA COLLEGE (AUTONOMOUS)



**Re-Accredited with “A” Grade by NAAC (3rd Cycle)
94th Rank in India Ranking 2019 (NIRF) by MHRD
Maryland, Madurai- 625 018, Tamil Nadu, India**

NAME OF THE DEPARTMENT : Research Centre of Physics
NAME OF THE PROGRAMME : UG
PROGRAMME CODE :UAPH
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
A. Sheela Vimala Rani
University
Nominee
2. Dr. Basherrudin Mahmud Ahmed
Asst. Prof. School of Physics
Madurai Kamaraj University
Madurai
ABent
3. Dr. K. Marimuthu
Asst. Prof
Department of Physics
Grandhigram Rural Institute
- Deemed University
Grandhigram
Subject Expert
K Marimuthu
4. Dr. M. Umadevi
Associate Professor & Head
Department of Physics
Mother Teresa Women's University
Attuvampatti, Kodaikanal
Subject Expert
Umadevi
23/03/22

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

Industrialist

Ramprakash

5. 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 Sugirtham
Associate Prof.

L. Caroline Sugirtham

9. Mrs. R. Alphonsa Fernando
Associate Professor

R. A. Fernando

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

Leena Chandra

11. I Jayashree
Asst. Prof.

I. Jayashree

12. Dr. Ancemnia Joseph
Asst. Prof.

Ancemnia Joseph

- | | |
|--|--------------------------|
| 13. Dr. M. Ragam
Asst. Prof. | <i>M. Ragam</i> |
| 14. Dr. G. Jenita Rani
Asst. Prof. | <i>G. Jenita Rani</i> |
| 15. Dr. R. Jothimani
Asst. Prof. | <i>R. Jothimani</i> |
| 16. Ms. I. Janet Sherly
Asst. Prof. | <i>I. Janet Sherly</i> |
| 17. Ms. J. R. Sofia
Asst. Prof. | <i>J. R. Sofia</i> |
| 18. Dr. R. Niranjana Devi
Asst. Prof. | <i>R. Niranjana Devi</i> |

AGENDA FOR BOARD OF STUDIES

1. Preparation of Action taken report
2. To carry out at least 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 at least 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

S. No.	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" (2IP2SL1) 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
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	Interdepartmental self learning papers "Microprocessor and Programming" (2IP4SLB2) offered by Physics and Computer Science, "Space Science" (2IP6SLM3) 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 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 are 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 Grafton (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.	19P1ACCV/ 19M3ACPI/ 19G3ACPI	Unit II - Bernoulli 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
5	19P5CC16	Non-electronics Practicals	15%.	Revised

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 Particle Physics

3. NEW COURSES INTRODUCED:

	PROGRAM	COURSE CODE	COURSE TITLE
1.	B.Sc.	22P4CC11	Mathematical Methods
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:

U.G.

- * 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" 21PR2P10 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 UA and PA programs.

The specifications of the sections would enable the students to learn more precisely. The detailed sections in all units would facilitate 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 match

- 1) Dr. A. Sheela Vimala Rani A. Sheela V. Rani
- 2) Dr. Bashiruddin Mahmud Ahmed A. Bashir.
- 3) Dr. K. Marimuthu K. Maruthu
- 4) Dr. M. Umadevi G. Umadevi 23/03/22
- 5) Mr. Ramprakash V. Ramprakash
- 6) Dr. R. Vishnu Priya R. Vishnu 23/03/22
- 7) Dr. Malathi Malathi 23/3/22
- 8) Dr. L. Caroline Sugirtham L. Caroline Sugirtham
- 9) Mrs. R. Alphonsa Fernando R. A. Lendo
- 10) Dr. M. V. Leena Chandra Shiva Chandra
- 11) Mrs. I. Jeyasheela I. Jeyasheela
- 12) Dr. Ancemna Joseph Ancemna Joseph
- 13) Dr. M. Ragam M. Ragam
- 14) Dr. Sr. G. Jenita Rani Sr. G. Jenita Rani
- 15) Dr. R. Jothamani R. Jothamani
- 16) Ms. I. Janet Sherly I. Janet Sherly

17) Ms. J. R. Sofia

J. R. Sofia

18) Dr. R. Niranjana Devi

R. Nj -

for 23/3/22

COLLEGE PROFILE

Fatima College (Autonomous), Mary Land, Madurai, is a Post Graduate and Research Institution for Women affiliated to Madurai Kamaraj University. It is a Catholic Minority institution established and run by St. Joseph's Society of Madurai (of the Congregation of the Sisters of St. Joseph of Lyons, France). This institution came into existence through the tireless efforts of the missionary sisters of St. Joseph of Lyons and the zeal and heroic sacrifice of Rev. Sr. Rose Benedicta, the Foundress of the College.

The College was started in St. Joseph's Campus Madurai as a Second Grade College with 63 students in 1953. It was upgraded into a Post Graduate College in 1964; Autonomous in 1990 and a Research Institute in 2004. The College now offers 21 Undergraduate Programmes, 13 Postgraduate Programmes, 2 Professional Programme, 5 M.Phil. Programmes and 6 Departments have become Research Centres. It has strength of 4134 Students, 206 Teaching Staff and 100 Non-Teaching Staff.

The comprehensive assessment by NAAC in 1999 placed Fatima College in Five Star Status of merit. The college strives to sustain excellence, quality and relevance while equipping the students to meet the demands of higher education in India. In 2004 UGC conferred on Fatima College the status of College with Potential for Excellence. In 2006 and 2013 NAAC Re-Accredited the College with 'A' Grade. The College was ranked 94th in the All India NIRF Ranking in 2019 by MHRD.

VISION**WOMEN'S EMPOWERMENT THROUGH EDUCATION**

The vision of the college is to empower women by developing human capabilities through quality education based on Christian values, making them responsible citizens who can work for the advancement of the society and promote communal harmony in the multi-religious and multi-cultural reality of India eventually evolving into women of communion.

MISSION

- To enhance quality of life through the development of individuals.
- To enable women to become contributors in the economic, social and political development of India.
- To equip the students with 21st century skill-sets with a focus on problem-solving abilities
- To motivate them to work for social justice
- To give preference to the rural economically backward and first-generation learners
- To enable students to be employed in the technology oriented competitive market

VISION OF THE DEPARTMENT

Educate , Empower and Excel

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 B.Sc. Physics programme after three years will be

PEO 1	Our graduates will be academic, digital and information literates, creative, inquisitive, innovative and desirous for the “more” in all aspects
PEO 2	They will be efficient individual and team performers, exhibiting progress, flexibility, transparency and accountability 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 entrepreneurs 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)

On completion (after three years) of B.Sc.Physics programme, the graduates would be able to

PO 1	Acquire knowledge on the concepts of general laws of physics governing the universe
PO 2	Relate the principles behind the fundamental theory of Physics including microscopic and macroscopic levels
PO 3	Develop technologies to meet the requirements of the society

PROGRAMME SPECIFIC OUTCOMES (PSO)

On completion (after three years) of B.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 Mechanics, Properties of matter, Electromagnetism, Electronics, Thermodynamics, Modern Physics, optics, Medical Physics and Opto electronics.
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***PROGRAMME CODE :UAPH****PART – I – TAMIL / FRENCH / HINDI- 12 CREDITS****PART – I – TAMIL****Offered by The Research Centre of Tamil**

S. NO	SEM.	COURSE CODE	COURSE TITLE	HRS	CRE DIT	CIA Mks	ESE Mks	TOT . MKs
1.	I	19TLC1	Language-Modern Literature nghJj;jkpo; - ,f;fhy ,yf;fpak;	5	3	40	60	100
2.	II	19TLC2	Language - Bakthi Literature nghJj;jkpo; - gf;jp ,yf;fpak;	5	3	40	60	100
3.	III	19TLC3	Language- Epic Literature nghJj;jkpo; - fhg;gpa ,yf;fpak;	5	3	40	60	100
4.	IV	19TLC4	Language-Sangam Literature nghJj;jkpo; - rq;f ,yf;fpak;	5	3	40	60	100
			Total	20	12			

PART – I – FRENCH**Offered by The Department of French**

S. NO	SEM.	COURSE CODE	COURSE TITLE	HRS	CRE DIT	CIA Mks	ESE Mks	TOT. MKs
1.	I	19RLC1	PART 1 LANGUAGE FRENCH	5	3	40	60	100
2.	II	19RLC2	PART 1 LANGUAGE FRENCH	5	3	40	60	100
3.	III	19RLC3	PART 1 LANGUAGE FRENCH	5	3	40	60	100
4.	IV	19RLC4	PART 1 LANGUAGE FRENCH	5	3	40	60	100
			Total	20	12			

PART – I – HINDI**Offered by The Department of Hindi**

S. NO	SEM.	COURSE CODE	COURSE TITLE	HRS	CRE DIT	CIA Mks	ESE Mks	TOT. MKs
1.	I	19DLC1	PART 1 LANGUAGE HINDI	5	3	40	60	100
2.	II	19DLC2	PART 1 LANGUAGE HINDI	5	3	40	60	100
3.	III	19DLC3	PART 1 LANGUAGE HINDI	5	3	40	60	100
4.	IV	19DLC4	PART 1 LANGUAGE	5	3	40	60	100

S. NO	SEM.	COURSE CODE	COURSE TITLE	HRS	CRE DIT	CIA Mks	ESE Mks	TOT. MKs
			HINDI					
			Total	20	12			

PART – II -ENGLISH – 12 CREDITS

Offered by The Research Centre of English

S. NO	SEM.	COURSE CODE	COURSE TITLE	HRS	CRE DIT	CIA Mks	ESE Mks	TOT. MKs
1.	I	19E1LB1	BASIC COMMUNICATIVE ENGLISH	5	3	40	60	100
2.		19E1LI1	INTERMEDIATE COMMUNICATIVE ENGLISH	5	3	40	60	100
3.		19E1LA1	ADVANCED COMMUNICATIVE ENGLISH	5	3	40	60	100
4.	II	19E2LB2	ENGLISH COMMUNICATION SKILLS (BASIC)	5	3	40	60	100
5.		19E2LI2	ENGLISH FOR EMPOWERMENT (INTERMEDIATE)	5	3	40	60	100
6.		19E2LA2	ENGLISH FOR CREATIVE WRITING (ADVANCED)	5	3	40	60	100
7.	III	19ELC3	ENGLISH FOR DIGITAL ERA	5	3	40	60	100
8.	IV	19ELC4	ENGLISH FOR INTEGRATED DEVELOPMENT	5	3	40	60	100

S. NO	SEM.	COURSE CODE	COURSE TITLE	HRS	CREDIT	CIA Mks	ESE Mks	TOT. MKs
			Total	20	12			

PART – III -MAJOR, ALLIED & ELECTIVES – 95 CREDITS

MAJOR CORE COURSES INCLUDING PRACTICALS : 60 CREDITS

S.N O	SEM .	COURSE CODE	COURSE TITLE	HR S	CREDI T	CIA Mk s	ES E Mk s	TOT . Mk s
1.	I	19P1CC1	Mechanics and Properties of Matter	5	4	40	60	100
2.		19P1CC2	Thermal Physics	4	3	40	60	100
3.		19P1CC3	Major practicals-I	3	2	40	60	100
4.	II	19P2CC4	Oscillations and Waves	5	4	40	60	100
5.		19P2CC5	Applied Mechanics	4	3	40	60	100
6.		19P2CC6	Major Practicals - II	3	2	40	60	100
7.	III	19P3CC7	Electromagnetism	5	4	40	60	100
8.		19P3CC8	Solid State Physics	4	3	40	60	100
9.		19P3CC9	Major Practicals - III	3	2	40	60	100
10.	IV	19P4CC10	Analog Electronics	5	4	40	60	100
11.		22P4CC11	Mathematical Physics	4	3	40	60	100
12.		19P4CC12	Major Practicals – IV	3	2	40	60	100

S.NO	SEM.	COURSE CODE	COURSE TITLE	HRS	CREDIT	CIA Mks	ESE Mks	TOT. Mks
13.	V	19P5CC13	Digital Electronics and Communication	6	4	40	60	100
14.		19P5CC14	Optics	6	4	40	60	100
15.		19P5CC15	Major Practicals – V (Electronics)	4	2	40	60	100
16.		19P5CC16	Major Practicals – VI (Non Electronics)	4	2	40	60	100
17.	VI	19P6CC17	Thermodynamics & Statistical Mechanics	5	4	40	60	100
18.		19P6CC18	Modern Physics	5	4	40	60	100
19.		19P6CC19	Major Practicals – VII (Electronics)	3	2	40	60	100
20.		19P6CC20	Major Practicals – VIII (Non Elec)	3	2	40	60	100

ALLIED COURSES- 20 CREDITS

S.NO	SEM.	COURSE CODE	COURSE TITLE	HRS	CREDIT	CIA Mks	ESE Mks	TOT. MKs
1.	I	22P1ACC1	Allied Physics – I	3	3	40	60	100
2.		21P1ACC2	Allied Physics Practicals-I	2	2	40	60	100
3.	II	22P1ACC3	Allied Physics – II	3	3	40	60	100
4.		21P1ACC4	Allied Physics Practicals-II	2	2	40	60	100

S.NO	SEM.	COURSECODE	COURSE TITLE	HRS	CREDIT	CIA Mks	ESE Mks	TOT. MKs
5.	III	21P3ACM1	Allied Physics – I	3	3	40	60	100
6.		21P3ACM2	Allied Physics Practicals -I	2	2	40	60	100
7.	IV	21P3ACM3	Allied Physics – II	3	3	40	60	100
8.		21P3ACM4	Allied Physics Practicals -II	2	2	40	60	100

ELECTIVES-15 CREDITS

S.No	SEM	COURSECODE	COURSE TITLE	HRS	CREDIT	CIA Mks	ES E Mks	TOT. Mks
1.	V	19P5ME1/ 19P5ME2	Programming with C	5	5	40	60	100
2.	VI	19P6ME1 / 19P6ME2	Microprocessor / Medical Physics	5	5	40	60	100
3.		19P6ME3/ 19P6ME4	Optoelectronics / Energy Physics	5	5	40	60	100

PART – IV – 20 CREDITS

- **VALUE EDUCATION**
- **ENVIRONMENTAL AWARENESS**
- **NON MAJOR ELECTIVE**
- **SKILL BASED COURSES**

S. No	SEM.	COURSE CODE	COURSE TITLE	HR S	CRE DIT	CIA Mks	ESE Mks	TOT. Mks
1.	I	19G1VE	Value Education (Including Meditation in Action Movement)	1	1	40	60	100
2.		19P1NME	Non Major Elective (Offered to other major Students)	2	2	40	60	100
3.	II	19G2VE	Value Education	1	1	40	60	100
4.		19P2NME	Non Major Elective (Offered to other major Students)	2	2	40	60	100
5.	III	19G3EE	Environmental Education	1	1	40	60	100
6.		19P3SB1	Skill based –Bio mechanics	2	2	40	60	100
7.	IV	19G4EE	Environmental Education	1	1	40	60	100
8.		22P4SB2	Skill based – Solar Cell and its applications	2	2	40	60	100
9.		19P5SB3	Skill based –Physics of measuring instruments	2	2	40	60	100
10.		19P5SB4	Skill based –Physics of medical instruments	2	2	40	60	100
11.		19P6SB5	Skill based - Physics of instruments for Astronomical Measurements and Material Characterisation	2	2	40	60	100
12.		19P6SB6	Skill based - Physics of advanced Medical Instruments	2	2	40	60	100

PART – IV – 20 CREDITS

- **VALUE EDUCATION**
- **ENVIRONMENTAL AWARENESS**
- **NON MAJOR ELECTIVE**
- **SKILL BASED COURSES**

S. No	SEM.	COURSE CODE	COURSE TITLE	H RS	CRE DIT	CIA Mks	ESE Mks	TOT. Mks
1.	I	21G1VE1	Personal Values	1	1	40	60	100
2.	I	19P1NME	Non-Major Elective-"Physics in Everyday Life" (Offered to other major students)	2	2	40	60	100
3.	II	21G2VE2	Values for Life	1	1	40	60	100
4.		19P2NME	Non Major Elective -- "Physics in Everyday Life"(Offered to other major Students)	2	2	40	60	100
5.	III	21G3EE1	Environmental Education	1	1	40	60	100
6.		19P3SB1	Skill based – Biomechanics	2	2	40	60	100
7.	IV	21G4EE2	Gender Studies	1	1	40	60	100
8.		19P4SB2	Skill based – Physics of Stars	2	2	40	60	100
9.	V	19P5SB3	Skill based –Physics of measuring instruments	2	2	40	60	100
10.		19P5SB4	Skill based –Physics of medical instruments	2	2	40	60	100

11.	VI	19P6SB5	Skill based - Physics of instruments for Astronomical Measurements and Material Characterisation	2	2	40	60	100
12.		19P6SB6	Skill based -Physics ofadvanced Medical Instruments	2	2	40	60	100

OFF-CLASS PROGRAMMES - ALL PART-V

SHIFT - I

S. No	SEM.	COURSE CODE	COURSE TITLE	HRS	CRE DIT	TOT. Mks
1.	I - IV	21A4PED	Physical Education	30/	1	100
2.		21A4NSS	NSS	SEM		
3.		21A4NCC	NCC			
4.		21A4WEC	Women Empowerment Cell			
5.		21A4ACUF	AICUF			

ADD-ON COURSES

COURSE CODE	Courses	Hrs.	Credits	Semester in which the course is offered	CIA Mks	ES E M ks	Total Marks
21UAD1CA	COMPUTER APPLICATIONS (offered by The department of PGDCA for Shift I)	40	2	I & II	40	60	100
21UADFCA	ONLINE SELF LEARNING COURSE- Foundation Course for Arts	40	3	I	50	-	50
21UADFCS	ONLINE SELF LEARNING COURSE- Foundation Course for Science	40	3	II	50	-	50

21UAD3ES & 21UAD4ES	ETHICAL STUDIES- Professional Ethics	15	2	III&IV	50 each Semester	-	100
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21UAD5ES & 21UAD6ES	ETHICAL STUDIES	15	2	V&VI	50 each Semester	-	100
21UAD5HR	HUMAN RIGHTS	15	2	V	-	-	100
21UAD6RS	OUTREACH PROGRAMM E- Reach Out to Society through Action ROSA	100	3	V & VI	-	-	100
21UAD6PR	PROJECT	30	4	VI	40	60	100
21UAD6RC	READING CULTURE	10/Semester	1	II-VI	-	-	-
	MOOC COURSES (Department Specific Courses) * Students can opt other than the listed course from UGC- SWAYAM UGC / CEC	-	Minimum 2 Credits	-	-	-	
	TOTAL		20 +				

EXTRA CREDIT COURSE

Course Code	Courses	Hr s.	Credi ts	Semester in which the course is offered	CIA Mk s	ES E Mk s	Total Mark s
19UGSLP1	SELF LEARNING COURSE for ADVANCE LEARNERS Nanoscience and Nanotechnology (offered for III UG)	-	2	V	40	60	100
21UGSLP2	AMAZING UNIVERSE AND INDIAN SPACE MISSIONS	-	2	II	40	60	100
21UGIDPB1	FUNDAMENTALS & PROGRAMMING OF MICROPROCESSOR 8085	-	2	IV	40	60	100
21UGIDPM1	SPACE SCIENCE	-	2	VI	40	60	100

VALUE ADDED COURSES

19UGVA P1 - Crash Course on 'Digital Photography'

19UGVA CP1 - Certificate Course on 'Mobile Servicing'



II B.Sc.**SEMESTER –IV***For those who joined in 2022 onwards*

PROGRAMME CODE	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
UAPH	22P4CC11	Mathematical Physics	Theory	4	3

COURSE DESCRIPTION

The course provides an introduction to fundamentals of Mathematical Physics required in scientific and technological applications. This paper includes modeling, solving and interpretation of scientific problem based on basic principles of Physics. This course has also tremendous applications in solving problems in diverse fields of sciences.

COURSE OBJECTIVES

The main objective of this course is to provide students with an introduction of Mathematics to interpret Physics Phenomena. The course aims to emphasize the need for applying mathematical methods to Physics problems and to realize that Mathematics is a systematic science built on relatively few basic concepts involving unifying principles for the interrelation between theory and experiment.

UNIT –I Linear Algebra: Matrices, Vectors, Determinants (12 HRS.)

Matrix Multiplication: Multiplication of a matrix by a matrix- Differences of Multiplication of Numbers-Special **Matrices**-Transpose of a Product-Inner Product of **vectors**-Product in terms of row and column vectors-Matrix multiplication by Linear Transformation-Applications of Matrix multiplication

Determinants: Second order, third order, General Properties -Cramer's Rule

Unit- II Vector Differential Calculus 12 HRS.)

Vector Algebra in 2-space and 3-space-Dot Product-Application of Inner Product-Vector Product-Applications of vector product-Gradient of a scalar field -Divergence of a vector field-Curl of a vector field

UNIT –III Fourier Analysis**(12 HRS.)**

Periodic functions: Trigonometric series- Fourier Series: Euler's formulas for the Fourier Coefficients -Orthogonality of trigonometric system-Examples of Fourier Series: Rectangular Wave-Periodic square wave-Half wave rectifier. Even and odd functions: Fourier cosine series, Fourier sine series, Rectangular wave, Saw-tooth wave.

Unit-IV Partial Differential Equations**(12 HRS.)**

Basic concepts -Modelling: Vibrating string, Wave Equation-Solution by separating variables-D'Alembert's solution of wave equation-Modelling: Heat flow from a body in a space-Heat Equation -Solution by Fourier series

Unit -V Complex numbers and functions**(12 HRS)**

Complex numbers - Complex plane-Polar form of complex numbers-Powers and roots- Complex function-Limit, Continuity-Analytic functions - Exponential function-Trigonometric and Hyperbolic functions

REFERENCES:

1. Advanced Engineering Mathematics by Erwin Kreyszig, Tenth Edition, Wiley Plus publications.
2. Introductory Methods of Mathematical Physics, Charlie Harper, Prentice Hall of India PVT Ltd.
3. Mathematical Physics by P K Chattopadhyay, New Age International Publications. **COURSE CONTENTS AND LECTURE:**

Module No.	Topic	No.of Lectures	Teaching Pedagogy	Teaching Aids
UNIT-I Linear Algebra: Matrices, Vectors, Determinants				
1.1	Matrix Multiplication Multiplication of a matrix by a matrix	3	Chalk&Talk	Black Board
1.2	Differences of Multiplication of Numbers	2	Chalk&Talk	PPT

1.3	Special Matrices	2	Demonstration	PPT
1.4	Transpose of a Product	2	Lecture	PPT
1.5	Inner Product of vectors- Product in terms of row and column vectors	2	Lecture	PPT
1.6	Matrix multiplication by Linear Transformation- Applications of Matrix multiplication	2	Lecture	PPT
1.7	Determinants: Second order, third order, General Properties -Cramer's Rule	2	Lecture	PPT
UNIT-II Vector Differential Calculus				
2.1	Vector Algebra in 2-space and 3space	3	Lecture	Black Board
2.2	Dot Product-Application of Inner Product	3	Chalk&Talk	PPT& Black Board
2.3	Vector Product- Applications of vector product	3	Discussion	Black Board
2.4	Gradient of a scalar field	3	Discussion	Black Board
2.5	Divergence of a vector field-Curl of a vector field	3	Chalk&Talk	PPT& Black Board
UNIT-III Fourier Analysis				

3.1	Periodic functions Trigonometric series	3	Lecture	Black Board
3.2	Fourier Series: Euler's formulas for the Fourier Coefficients	3	Lecture	Black Board
3.3	Orthogonality of trigonometric system Examples of Fourier Series Rectangular Wave-Periodic square wave-Half wave rectifier. Even and odd functions: Fourier cosine series, Fourier sine series, Rectangular wave, Saw-tooth wave	2	Discussion	PPT

UNIT-IV Fourier Analysis

4.1	Basic concepts, Modelling: Vibrating string	3	Lecture	Black Board
4.2	Wave Equation-Solution by separating variables-	3	Chalk&Talk	PPT& Black Board
4.3	D'Alembert's solution of wave equation	3	Discussion	Black Board
4.4	-Modelling: Heat flow from a body in a space	3	Discussion	Black Board
4.5	-Heat Equation -Solution by Fourier series	3	Chalk&Talk	PPT& Black Board

UNIT V COMPLEX NUMBERS AND FUNCTIONS

5.1	Complex numbers -	3	Lecture	Black Board
5.2	Complex plane-Polar form of complex numbers-	3	Chalk&Talk	PPT& Black Board
5.3	Powers and roots-Complex function-Limit, Continuity-	3	Discussion	Black Board
5.4	Analytic functions	3	Discussion	Black Board
5.5	Exponential function-Trigonometric and Hyperbolic functions	3	Chalk&Talk	PPT& Black Board

EVALUATIONPATTERN

Levels	C1	C2	C3	C4	C5	TotalSch holic Marks	NonSch holic Marks C6	CIA Total	% ofAsses ment
	T1	T2	Qui z	Assignm ent	OBT/P PT				
	10 Mk s.	10 Mk s.	5 Mk s.	5Mks	5Mks	35Mks.	5Mks.	40Mk s.	
K1	2	2	-	-	-	4	-	4	10%
K2	2	2	5	-	-	9	-	9	22.5%
K3	3	3	-	-	5	11	-	11	27.5%
K4	3	3	-	5	-	11	-	11	27.5%
NonSc holic	-	-	-	-	-		5	5	12.5%
Total	10	10	5	5	5	35	5	40	100%

CIA	
Scholastic	35

NonScholastic	5
	40

SCHOLASTIC					NON-SCHOLASTIC	MARKS		
C1	C2	C3	C4	C5	C6	CIA	ESE	Total
10	10	5	5	5	5	40	60	100

UGCIA Components

Nos

C1	-	Test(CIA1)	1	-	10Mks
C2	-	Test(CIA2)	1	-	10Mks
C3	-	Assignment	1	-	5Mks
C4	-	Open Book Test/PPT	2*	-	5Mks
C5	-	Quiz	2*	-	5Mk
sC6	-	Attendance			-5Mks

****The best out of two will be taken into account***

COURSEOUTCOMES

Onthesuccessfulcompletionofthecourse,studentswillbeableto:

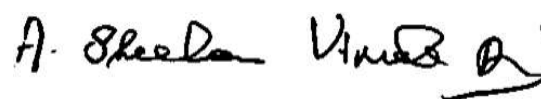
NO.	COURSEOUTCOMES	KNOWLEDG ELEVEL(AC CORDINGTO REVISED TAXONOMY)	PSOs ADDRESS ED
CO 1	Analyze properties and of determinants of matrix to solve problems	K1,K2	PSO1&PSO 2
CO 2	Apply vector calculus to solve Physics Phenomena	K1,K3	PSO3&PSO 4
CO 3	UtilizeFourier series to represent waves of different shapes	K3,K3	PSO1, PSO2 &PSO 3
CO 4	Comprehend idea of modeling physics phenomena	K2,K4	PSO1&PSO 2
CO 5	Analyse analytic function and to express trigonometric and hyperbolic functions	K2,K3	PSO1,PSO 2PSO4&P SO5

Mapping of COs with PSOs

CO/ PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	3	3	2	1	1
CO2	2	2	3	3	1
CO3	3	3	3	2	1
CO4	3	3	2	2	1
CO5	3	3	1	3	3

Mapping of COs with POs

CO/ PSO	PO1	PO2	PO3	PO4
CO1	2	1	3	2
CO2	2	2	3	1
CO3	2	2	3	2
CO4	3	3	3	3
CO5	2	2	2	2

COURSE DESIGNER: Dr. M. Ragam**Forwarded By**

Dr. A. Sheela Vimala Rani**HoD's Signature & Name**

**II B.Sc.
SEMESTER –IV**

For those who joined in 2022 onwards

PROGRAM ME CODE	COURSE CODE	COURSE TITLE	CATEGOR Y	HRS/WEE K	CREDIT S
UAPH	22P4SB2	Solar Cell and its Applications	Lecture	2	2

COURSE DESCRIPTION

The course provides concept based exposure to solar cell technologies.

COURSE OBJECTIVES

This course deals with the elemental concepts, applications of solar cells and insights in design of PV based appliances.

Unit -1: Solar Cell Technologies (6 HRS)

Introduction – solar cell technologies : Crystalline silicon solar cell- mono silicon solar cell- poly silicon solar cell

Unit -2: Thin film solar cells (6 HRS)

Cadmium telluride solar cells (CdTe)- Copper indium gallium selenide (CIGS) solar cells- polymer solar cells- organic solar cells-Dye sensitised solar cells

Unit -3: Applications of Solar PV (6 HRS)

Solar Domestic Appliances : Solar Water heater, Solar Cooker, Solar Refrigerator, Solar Fans, Solar Mobile Charger

Unit-4: Applications of solar in power plants (6 HRS)

Introduction- Development- Engineering, procurement and construction- economics of power plants-safety issues

Unit -5: PV Solar Design (6 HRS)

Solar Panel Power Calculation – DC load – AC load – Battery Capacity – Design of PV based appliances

Reference Book

1. Photovoltaic solar Energy conversion Technologies, Application and Academic Council 28.3.2019

- Environmental impacts, 2020, Shiva Gorjian, Ashish shukla.
2. Hand book of Photovoltaic Science and Engineering - Antonio Luque, Steven Hegedus, Second Edition, 2011.

Web References

1. <https://www.havells.com/en/consumer/water-heater/solar.html#:~:text=Solar%20water%20heaters%20use%20natural,an d%20is%20also%20environment%20friendly.>
2. https://www.leonics.com/support/article2_12j/articles2_12j_en.php

COURSE CONTENTS & LECTURE SCHEDULE:

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
UNIT -1 Solar Cell Technologies				
1.1	Introduction	2	Lecture	PPT
1.2	solar cell technologies	1	Lecture	PPT
1.3	Crystalline silicon solar cell-	1	Lecture	PPT
1.4	mono silicon solar cell	1	Lecture	PPT
1.5	poly silicon solar cell	1	Lecture	PPT
UNIT -2 Thin film solar cells				
2.1	Cadmium telluride solar cells (CdTe)	1	Lecture	PPT
2.2	Copper indium gallium selenide (CIGS) solar cells	1	Lecture	Black Board
2.3	polymer solar cells	2	Lecture	Smart Board
2.4	organic solar cells	1	Chalk & Talk	LCD
2.5	Dye sensitised solar cells	1	Chalk &	LCD

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
			Talk	
UNIT -3 Applications of Solar PV				
3.1	Solar Domestic Appliances	1	Chalk & Talk	Black Board
3.2	Solar Water heater	1	Lecture	Smart Board
3.3	Solar Cooker	1	Lecture	Black Board
3.4	Solar Refrigerator	1	Discussion	Google classroom
3.5	Solar Fans	1	Chalk & Talk	LCD
3.6	Solar Mobile Charger	1	Discussion	Black Board
UNIT – 4 Applications of solar in power plants				
4.1	Introduction	1	Chalk & Talk	Black Board
4.2	Development	1	Lecture	Smart Board
4.3	Engineering	1	Lecture	Black Board
4.4	procurement and construction	1	Discussion	Google classroom
4.5	economics of power plants-	1	Chalk & Talk	LCD
4.6	safety issues	1	Discussion	Black Board
UNIT- 5 PV Solar Design				
5.1	Solar Panel Power Calculation	1	Lecture	Black

Module No.	Topic	No. of Lectures	Teaching Pedagogy	Teaching Aids
				Board
5.2	DC load	1	Chalk & Talk	Black Board
5.3	AC load	2	Chalk & Talk	Black Board
5.4	Battery Capacity	1	Chalk & Talk	Black Board
5.5	Design of PV based appliances	1	Discussion	Google classroom

Levels	C1	C2	C3	C4	Total Scholastic Marks	Non Scholastic Marks C5	CIA Total	% of Assessment
	Session-wise Average 5 Mks.	Better of W1, W2 5 Mks	M1+M2 5+5=10 Mks.	MID-SEM TEST 15 Mks	35 Mks.	5 Mks.	40Mks.	
K1	5	-	-	2 ½	7.5	-	7.5	18.75 %
K2	-	5	4	2 ½	11.5	-	11.5	28.75 %
K3	-	-	3	5	8	-	8	20 %
K4	-	-	3	5	8	-	8	20 %
Non	-	-	-	-		5	5	

Scholastic								12.5 %
Total	5	5	10	15	35	5	40	100 %

CIA	
Scholastic	35
Non Scholastic	5
	40

- ✓ **All the course outcomes are to be assessed in the various CIA components.**
- ✓ **The levels of CIA Assessment based on Revised Bloom's Taxonomy for I UG are :**

K1- Remember, **K2-**Understand, **K3-**Apply, **K4-**Analyse

- ✓ **The I UG course teachers are requested to start conducting S1, W1, M1, in due intervals of time.**

EVALUATION PATTERN

SCHOLASTIC				NON - SCHOLASTIC	MARKS		
C1	C2	C3	C4	C5	CIA	ESE	Total
5	10	15	5	5	40	60	100

C1 – Average of Two Session Wise Tests

C2 – Average of Two Monthly Tests

C3 - Mid Sem Test

C4 – Best of Two Weekly Tests

C5 – Non - Scholastic

COURSE OUTCOMES

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

NO.	COURSE OUTCOMES	KNOWLEDGE LEVEL (ACCORDING TO REVISED BLOOM'S TAXONOMY)	PSOs ADDRESSED
CO 1	Acquire a skill on various technologies of solar cell	K1,K2	PSO1
CO 2	Acquire a knowledge on thin film technologies	K1, K3,	PSO2
CO 3	Gain knowledge about the Applications of PV cells	K1,K2	PSO1
CO 4	Explain how to use solar in power plants	K2, K3	PSO3
CO 5	Discuss about PV Solar Design	K1, K3	PSO1,PSO2

Mapping of COs with PSOs

CO/ PSO	PSO 1	PSO 2	PSO 3
CO1	3	2	1
CO2	1	3	1
CO3	3	2	1
CO4	2	2	3
CO5	3	3	1

Mapping of COs with Pos

CO/ PSO	PO1	PO2	PO3	PO4
CO1	3	1	1	1

CO2	1	1	3	3
CO3	3	2	1	2
CO4	2	1	3	1
CO5	3	3	1	2

Note: ♦ Strongly Correlated – 3

♦ Moderately Correlated – 2

♦ Weakly Correlated -1

COURSE DESIGNER:

1. Dr.R.Jothi Mani

Forwarded By

A. Shreedha Vardh

HOD'S Signature

& Name