502	M.Com (CA)	Human Resources Management	21PCC415	2021
503	M. Sc. Physics	Thin Flim & Nano Science	21PPS3E5	2021
504	M.A Tamil	Ikkala illakiyam	21PTM101	2021
505	M.A Tamil	Bhakthi ilakkiam	21PTM205	2021
506	M.A Tamil	Ikkala mozhiyial	21PTM208	2021
507	M.A Tamil	Tamilar Panpadu/Pechukalai	21PTM2N1/ 21PTM2N2	2021
508	M.A Tamil	Kappiyangal	21PTM310	2021
509	M.A Tamil	HTML and collaborative communication tools	21PTM313	2021
510	M.A Tamil	Thonami Ilakkiyam	21PTM414	2021
511	M.Sc. Botany	Economic Botany	21PBY1E2	2021
512	M.Sc. Botany	Elective 1-Seed technology	21PBY1E3	2021
513	M.Sc. Botany	Non- Major Elective Commercial Horticulture	21PBY1N1	2021
514	M.Sc. Botany	Elective 2-Organic forming	21PBY2E6	2021
515	M.Sc. Botany	Laboratory Course III	21PBY312	2021
516	M.Sc. Botany	Pharmacognosy	21PBY3E9	2021
517	M.Sc. Botany	Economic Botany	21PBY3N3	2021
518	M.Sc. Botany	Field/Industry/ Institute Visit	21PBYFV1	2021
519	M.Sc Computer Science	Advanced Database Management System	21PCS104	2021
520	M.Sc Computer Science	Programming Lab II:Android Programming	21PCS210	2021
521	M.Sc Computer Science	Design and Analysis of Algorithms	21PCS101	2021
522	M.Sc Computer Science	Advanced Operating System	21PCS103	2021
523	M.Sc Computer Science	Advanced Database Management System	21PCS104	2021
524	M.Sc Computer Science	Programming Lab I:Design and analysis of Algorithm	21PCS105	2021
525	M.Sc Computer Science	Elective -1: Advanced Networks	21PCS1E1	2021
526	M.Sc Computer Science	Elective -1:Wireless Network	21PCS1E2	2021

BoS Minutes Highlighted

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Dr. R. MUTHUKUMARAN, M.A.,M.Phil.,B.Ed.,Ph.D., PRINCIPAL N.G.M. College, Pollachi - 642 001 Coimbatore District

DEPARTMENT OF PHYSICS

NALLAMUTHU GOUNDER MAHALINGAM COLLEGE

POLLACHI – 642 001

20th Board of Studies Meeting in the Department of Physics

Date: 22.5.2021

Time: 10.00 am

Agenda

BoS / PHY 20.1	:	Welcome address and Opening Remarks by Chairman, Board of studies in the Department of Physics
BoS / PHY 20.2	:	Confirmation of the Minutes of the 20th / Previous meeting of Board of studies in the Department of Physics held on 22.05.2021 and Action taken report of 19th meeting of Board of studies
BoS / PHY 20.3	:	20.3.1 Syllabus of I BSc PHYSICS under Regulation 2021
		20.3.2 Syllabus of II BSc PHYSICS under Regulation 2021
		20.3.3 Syllabus of III BSc PHYSICS under Regulation 2021
		Any other Discussions if any
BoS / PHY 20.4	:	Suggestion given by BOS Members
BoS / PHY 20.5	:	Any other items

NN – Number of BOS Meeting

DC – Short Form of Department (Eg: PHY – Physics / PHY 20.1)

NALLAMUTHU GOUNDER MAHALINGAM COLLEGE

POLLACHI

DEPARTMENT OF PHYSICS

MINUTES OF BOS MEETING

The 20th Meeting of the Board of studies of the Physics Department was held on 22.05.2021 at 10.00 a.m. in online mode.

1. The following members were present:

1	Dr. T. E. Manjulavalli Head, Department of Physics NGM College, Pollachi	Chairman
2	Mrs. N. Revathi	Internal Members
3	Dr. M. Karthika	
4	Dr. S. Shanmugapriya	
5	Dr. A. Sureshkumar	
6	Mrs. S. Yogeswari	
7	Mr. T. Ponraj	
8	Dr. A. G. Kannan	
9	Ms. M. Gayathri	
10	Mr. K. Raghulkumar	
11	Dr. P. Sivaraj	
12	Dr. L. Senthilkumar Professor, Department of Physics Bharthiar University, Coimbatore	University Nominee
13	Dr. C. Joseph Prabagar Assistant Professor of Physics Loyola College, Chennai.	UG Academic Auditor and Subject Expert
14	Dr. R. Jayaprakash Associate Professor of Physics Sri Ramakrishna Mission Vidyalaya College of Arts and Science, Coimbatore	PG Academic Auditor and Special Invitee
15	Mr. S. P. Senthil Subramaniam Mighty Electronics Equipments Corporation 16, First Street, Palaniappa Nagar Sowri Palayam, Coimbatore	Industrial Expert
16	Ms. C. Kokila Research Scholar, Department of Physics Bharathiar University, Coimbatore.	Alumnus nominated by Principal / HoD
17	S. Meenakshi III BSc Physics (2018-2021 Batch)	Student Member

HoD

BoS/PHY 20.3.2

II BSc Physics (III & IV SEMESTER)

The presented syllabus was accepted by the experts and a few suggestions were given as follows:

- **21UPS304 & Mathematical Physics**

Unit V - Group theory to be deleted and Fourier series to be incorporated

- **21UPS405 & Electricity & Magnetism**

The following papers from Second Year BSc Physics were accepted by the experts fully without further suggestions:

- **21UPS3N1 & Principles of Physics – I**
- **21UPS3N2 & Renewable Energy Sources Paper – I**
- **21UPS4N3 & Principles of Physics –II**
- **21UPS4N4 & Renewable Energy Sources Paper – II**
- **21UPS406 & Physics lab II**
- **21UMS4A5 / 21UCY4A5 & Physics Lab For Mathematics & Chemistry**
- **21UMS3A3 / 21UCY3A3 & Physics for Mathematics and Chemistry – I**
- **21UMS4A4 / 21UCY4A4 & Physics for Mathematics and Chemistry – II**

BoS/PHY 20.3.3

III BSc Physics (V & VI SEMESTER)

The presented syllabus was accepted by the experts and a few suggestions were given as follows:

- **21UPS507 & Mechanics**

Certain structural modifications to be carried out such as

Unit 3 can be moved to unit 1

Unit 1 can be moved to unit 2

Unit 2 can be moved to unit 3

Lagrangian and Hamiltonian Mechanics are not necessary for BSc students.

This paper can be strengthened further by including Newtonian mechanics.

- **21UPS509 & Relativity and Quantum Mechanics**

General relativity to be deleted.

To include discussion on failure of classical mechanics, Discussion on Black body radiation.

- **20UPS615** - The title of the paper **Condensed Matter Physics & Statistical**

BoS/PHY 20.1 WELCOME ADDRESS AND OPENING REMARKS BY CHAIRMAN, BOARD OF STUDIES IN THE DEPARTMENT OF PHYSICS. The Chairman, BoS of the Department of Physics welcomed and introduced the members of 20th Board of Studies and thanked each one of them for sparing their valuable time to attend the meeting.

BoS/PHY 20.2 TO CONFIRM THE MINUTES OF 19th BOS MEETING HELD ON 22.2.2020. The minutes of the 19th Board of Studies meeting held on 22.2.2020 were communicated to the members. The comments received have been incorporated and placed for confirmation. The same was approved by the Academic council which was held on 11.11.2020.

~ Action Taken Report (Enclosed in Annexure 1)

BoS/PHY 20.3

BoS/PHY 20.3.1

I BSc Physic (I & II SEMESTER)

- **21UPS101 & Properties of Matter**

The presented syllabus was accepted by the experts and a **few suggestions** were given as follows:

Potential and field intensity due to a spherical shell and solid sphere (Inside and outside) - Potential and intensity at a point due to circular disc – Intensity and potential of the gravitational field at a point due to an infinite plane **to be changed as** The Gravitational Field and Potential Spherical Shell – Solid sphere (inside and outside) – circular disc – infinite plane.

- **21UPS202 & Thermal Physics**

The title of the paper **Heat and Thermodynamics (20UPS202)** to be **changed as Thermal Physics.**

The following papers from First Year BSc Physics were accepted by the experts fully without further suggestions:

- **21UPS203 & Physics lab I**

Mechanics to be changed as **21UPS615 & Solid State Physics & Statistical Mechanics**

Strengthen the solid state Physics portion (Unit I to IV) and delete one unit in statistical mechanics

The following papers from Third Year BSc Physics were accepted by the experts fully without further suggestions:

- **21UPS508 & Optics & Spectroscopy**
- **21UPS5E10 & Basic Electronics & Circuit Systems**
- **21UPS5S1 & Mechanical measurements**
- **21UPS5S2 & Fundamentals of Bio-Physics**
- **21UPS614 & Atomic & Nuclear Physics**
- **21UPS6E19 & Microprocessor & Programming in C**
- **21UPS622 & Electronics Lab**
- **21UPS623 & Digital & Microprocessor Lab**
- **21UPS624 & Computer lab in C**
- **21VAD603 & PCB and Circuit Designing**
- **21UPS6E16 & Digital Principles and application**
- **21UPS6S4 & Fundamentals of Astrophysics**

New Courses Added:

The following papers from Third Year BSc Physics were accepted by the experts fully without further suggestions

- **21UPS5E11 & Communication Electronics**
- **21UPS5E12 & Material Science**
- **21UPS5AL1 & Problem Solving – I**
- **21UPS6E17& Biomedical Instrumentation**
- **21UPS6E18 & Nanomaterials and applications**
- **21UPS6E20 & Industrial Instrumentation**
- **21UPS6E21 & Python Programming**
- **21UPS6AL2 & Problem Solving - II**

These changes have been made effect for the students admitted in 2021 with (Sem I to VI) semesters accordingly.

BoS/PHY 20.4 SUGGESTIONS GIVEN BY THE BoS MEMBERS

20.4.1: Few papers such as Mathematical Physics (21UPS304), Solid State Physics & Statistical Mechanics (21UPS615), Mechanics (21UPS507) to be modified.

20.4.2: Advanced learner course – Problem solving skills in Physics to be included to enhance their ability in solving various problems related to Physics so as to help students to succeed in the competitive exams like JAM, JEST, etc.

The members had a brainstorming discussion and interaction among themselves. After discussion, fruitful suggestions were incorporated appropriately in the Curriculum and Syllabi.

Based on the suggestions given by the members, BOS resolved to recommend the following to the Academic Council for further approval.

a) The syllabus of First Year BSc Physics under Regulation 2021.

b) The syllabus of Second Year BSc Physics under Regulation 2021.

c) The syllabus of Third Year BSc Physics under Regulation 2021.

BoS/PHY 20.3

BoS/PHY 20.3.1

I M.Sc. Physics (I & II Sem)

The following papers from M.Sc. Physics were accepted by the experts fully without further suggestions:

- **21 PPS 101 - Core I: Mathematical Physics**
- **21 PPS 102 - Core II: Classical Mechanics**
- **21 PPS 103 - Core III: Statistical Mechanics**
- **21 PPS 1E1 - Core Elective I: Applied Electronics**
- **21 PPS 205 - Core V: Electromagnetic theory & Electrodynamics**
- **21 PPS 2E2 - Core Elective II: Electronic Communications and Cyber security**
- **21 PPS 207 - Core VII: General Physics lab I**
- **21 PPS 208 - Core VIII: Electronics lab I**
- **21 PPS 2N1 - Non Major Elective: Non-Conventional Energy sources**
- **21 PPS 2N2 - Biomedical Instrumentation**

The following courses were revised with minor modifications

- **21 PPS 204 - Core IV: Quantum Mechanics I**

The presented syllabus was accepted by the experts and a few suggestions were given as follows:

In Unit I, total number of contact hours to be increased and suggested a book for study (Quantum Mechanics by Nouredine Zettili)

BoS/PHY 20.3.2

I M.Sc. Physics (III & IV Sem)

The following papers from M.Sc. Physics were accepted by the experts fully without further suggestions:

- **21 PPS 309 - Core IX: Molecular Spectroscopy**
- **21 PPS 411 - Core XI: Lasers & Non-linear optics**
- **21 PPS 412 - Core XII: Nuclear & Particle Physics**
- **21 PPS 4E4 - Core Elective IV: Microprocessor & Object Oriented Programming with C++**
- **21 PPS 413 - Core XIII: General Physics lab II**
- **21 PPS 414 - Core XIV: Electronics lab II**
- **21 PPS 415 - Core XV: Computer lab in C++**
- **21 PPS 416 - Core XVI: Project**

The following courses were revised with minor modifications

- **21 PPS 310 - Core X: Quantum Mechanics II**

The presented syllabus was accepted by the experts and a few suggestions were given as follows:

Unit II – Indistinguishable particle and spin to be deleted and to introduce semi-classical theory of radiation.

- **21 PPS 3E3 - Core Elective III: Thin films & Nano science**

The presented syllabus was accepted by the experts and a few suggestions were given as follows:

Unit II, III, IV, V to be modified

New Course Added:

The following paper from M.Sc. Physics were accepted by the experts fully without further suggestions

- **21 VAD 301 - Value Added Course: Python Programming**

BoS/PHY 20.4 SUGGESTIONS GIVEN BY THE BoS MEMBERS

1: NPTEL lecture series by Prof. V.Balakrishnan, Dept. of Physics, IIT Madras to be followed

2: Python Programming may be introduced as value added course for M.Sc. Physics students.

3: Any two MOOC courses are compulsory and to be completed at the end of 2nd semester

4: Value added Programme - 21 VAD 301 Python Programming to be completed at the 3rd semester

The members had a brainstorming discussion and interaction among themselves. After discussion, fruitful suggestions were incorporated appropriately in the Curriculum and Syllabi.

Based on the suggestions given by the members, BOS resolved to recommend the following to the Academic Council for further approval.

(a) The syllabus of First Year M.Sc. Physics under Regulation 2021

(b) The syllabus of Second Year M.Sc. Physics under Regulation 2021

Members Present:

Chairman	
Dr. T. E. Manjulavalli Head, Department of Physics NGM College, Pollachi	
Internal Members	
Mrs. N. Revathi, Assistant Professor	
Dr. M. Karthika, Assistant Professor	
Dr. S. Shanmugapriya, Assistant Professor	
Dr. A. Sureshkumar, Assistant Professor	
Mrs. S. Yogeswari, Assistant Professor	
Mr. T. Ponraj, Assistant Professor	
Dr. A. G. Kannan, Assistant Professor	
Ms. M. Gayathri, Assistant Professor	
Mr. K. Raghulkumar, Assistant Professor	
Dr. P. Sivaraj, Assistant Professor	
University Nominee	
Dr. L. Senthilkumar Professor, Department of Physics Bharthiar University, Coimbatore	
Academic Expert	
Dr. C. Joseph Prabagar Assistant Professor of Physics Loyola College, Chennai.	
Special Invitee	
Dr. R. Jayaprakash Associate Professor of Physics Sri Ramakrishna Mission Vidyalaya College of Arts and Science, Coimbatore	
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Alumnus nominated by Principal / HoD	
Ms. C. Kokila Research Scholar, Department of Physics Bharathiar University, Coimbatore.	
Student Member	
S. Meenakshi III BSc Physics (2018-2021 Batch)	

HOD of Physics

M.Sc. Physics

Curriculum and Scheme of Examination under CBCS & OBES (2021 - 2024)

Subject Code	Subjects	Ins. Hrs Per Week	Examinations				Credits
			Dur. Hrs	CIA	ESE	Total	
SEMESTER III							
21 PPS 309	Core IX: Quantum Mechanics II	5	3	50	50	100	4
21 PPS 310	Core X: Molecular Spectroscopy	5	3	50	50	100	4
21 PPS 3E5/ 21 PPS 3E6	Core Elective III: Thinfilms & Nanoscience/ Matrials Physics & Processing Techniques	5	3	50	50	100	5
21 VAD 301	Value Added Course: Python Programming	-	-	-	-	-	Grade
	General Physics lab II	4					
	Electronics lab II	4					
	Project	3					
						300	**13**

Dr. T.E. Manjulavalli, M.Sc.,M.Phil.,Ph.D.,
Assistant Professor and Head
PG & Research Department of Physics
NGM College (Autonomous)
Pollachi - 642 001, Tamil Nadu.

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Programme Code:	M.Sc. PHY			**Programme Title:**	Master of Science	
Course Code:	21PPS3E5			**Title**	**Batch:**	2021 – 2023
				Core Elective III: Thin film & Nano science	**Semester:**	III
Lecture Hrs./Week	5	**Tutorial Hrs./Sem.**	-		**Credits:**	5

Course Objective

To develop the knowledge about fundamentals of Thin Film and Nano science

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Understand the concepts of Growth process of Thin film materials and familiarize with the basics of Nanotechnology and Quantum structure	K1/K2
CO2	Apply the various methodologies to fabricate materials	K3
CO3	Categorize the materials according to their size	K4
CO4	Summarize the various properties of thin materials and nanomaterials using several characterization techniques	K5
CO5	Synthesis thin-film materials and nano-materials for several applications	K6

Dr. T.E. Manjulavalli, M.Sc.,M.Phil.,Ph.D.,
Assistant Professor and Head
PG & Research Department of Physics
NGM College (Autonomous)
Pollachi - 642 001, Tamil Nadu.

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Mapping

PO /PSO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2
CO1	H	M	L	L	-	L	H	H
CO2	M	H	-	-	-	-	M	H
CO3	M	M	M	H	-	-	M	H
CO4	-	-	-	H	-	-	-	H
CO5	-	-	-	-	H	M	H	H

H – High; M – Medium; L – Low

Syllabus

Unit	Content	Hrs
I	**Thin film** Nature of thin film, Thermodynamics of nucleation, Film growth, Deposition parameters& grain size, Epitaxy, Incorporation of defects, Impurities in thin films. **Deposition Techniques:** Physical Vapour deposition: Thermal Evaporation, RF Sputtering, Reactive sputtering**, Chemical vapour deposition:** Pyrolysis, Chemical deposition: Chemical Bath deposition.	13

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II	**Properties of thin films** **Optical properties:** Reflection, Transmission, Absorption, Energy band gap, Transition. **Electrical properties:** Conducting properties of metal, semiconductor and insulator films, Hall effect and Magneto resistance **Film Thickness Measurement:** Interferometry, Fringes of equal thickness (FET), Fringes of equal chromatic order (FECO), Step gauges, Ellipsometry, Multiple beam interferometry.	13
III	**Nanoscience** Introduction- Moore's laws- classification of nanostructures- quantum confinement in nanostructures- Electronic density of states- excitons- Influence of nanoscale dimension on properties: Structural properties, Thermal properties, chemical properties, Mechanical properties, Magnetic properties, Optical properties, Electronic properties, Biological systems- Metal nanoclusters- Semiconducting nanoparticles- **Carbon nanostructures**: Carbon nanoclusters-carbon nanotubes-properties	13
IV	**Synthesis and Characterization of Nanoparticles** **Growth mechanism :** Vapour liquid solid growth(VLS)- Vapour solid growth(VS) **Top down approach (Physical method):** Lithography-Ball milling -Laser induced evaporation **Bottom up approach (Chemical method):** Sol-gel process-Self assembly-Solvo thermal process- Electro chemical synthesis - Thermolysis **Characterization:** XRD – SEM -TEM- EDAX-Particle size analyzer- IR and Raman spectroscopy-UV spectroscopy-Photo luminescence spectroscopy.	13

Dr. T.E. Manjulavalli, M.Sc.,M.Phil.,Ph.D.,
Assistant Professor and Head
PG & Research Department of Physics
NGM College (Autonomous)
Pollachi - 642 001, Tamil Nadu.

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V	**Applications of Nanomaterials:** NEMS – MEMS - coulomb blockade effect – SET – QDLED- Quantum dot sensitized solar cell - Quantum dot laser - Quantum cascade laser – SET - Carbon nanotube transistors - Silicon nanowire biosensor - drug delivery.	13
	Total contact hours	65

Pedagogy and Assessment Methods:

Seminar, Power Point Presentation, Chalk and talk, Quiz, Assignments, Group Task

Text Book

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS \ EDITION	YEAR OF PUBLICATION
1	Goswami A	Thin film fundamentals	New Age International	2006
2	L. T. Meissel and R. Glang	Hand book of Thin Film technology	McGraw -Hill	1978
3	Kasturi L Chopra	Thin film phenomena	McGraw -Hill	1979

Dr. T.E. Manjulavalli, M.Sc.,M.Phil.,Ph.D.,
Assistant Professor and Head
PG & Research Department of Physics
NGM College (Autonomous)
Pollachi - 642 001, Tamil Nadu.

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4	Charles P. Poole, Frank J. Owens,	Introduction to Nanotechnology	John Wiley & Sons, New York	2011
5	Robert W.Kelsall, Ian W. Hamley, Mark Geoghegan	Nanoscale Science and Technology	John Wiley & Sons, New York	2005
6	Michael F. Ashby, Paulo J. Ferreira, Daniel L. Schodek	Nanomaterials, Nanotechnologies and an introduction for engineers and design architecture	Elsevier Science	2009
7	Guozhong CAO	Nano Structures and Nano Materials: Synthesis, Properties and Applications	Imperial College plus, London	2004

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Reference Books

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS \ EDITION	YEAR OF PUBLICATION
1	Milton Ohring	Materials Science of Thin films	Academic Press	2001
2	Muralidharan V.S. Subramania A	Nanoscience and Technology	Ane Books Pvt Ltd – I Edition, New Delhi	
3	Masuo Hosokawa, Kiyoshi Nogi,Makio Naito, Toyokazu Yokoyama	Nanoparticle Technology Handbook	Elsevier Science	2007
4	Hari Singh Nalwa	Handbook of Nanostructured Nanotechnology	Academic Press Vol(1-5)	2000
5	**Related online contents [MOOC, SWAYAM, NPTEL, Websites etc]** http://www.ncpre.iitb.ac.in/slotbooking/SOP/62SOP.pdf https://en.wikipedia.org/wiki/Nanomaterials https://www.nano.gov/you/nanotechnology-benefits			

Dr. T.E. Manjulavalli, M.Sc.,M.Phil.,Ph.D.,
Assistant Professor and Head
PG & Research Department of Physics
NGM College (Autonomous)
Pollachi - 642 001, Tamil Nadu.

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