PG and Research Department of Physics Minutes of the Meeting of Board of Studies in Physics (PG)

The meeting of the Board of Studies in Physics (PG) was held on Wednesday, 24th November, 2021 at 03.45 PM through Google meet. The following members were present for the meeting.

Members Present

Chairperson

Dr. M.Jose

Members

: Dr.A.Albert Irudayaraj

: Mr. C. Tirupathy

Mr. D. Daniel Lawrence Mr. M. Aravinthraj Dr. S. Kalaiarasi Mr. D. Rajkumar Dr. A. Dhayal Raj Mr. N. Madhayan

Dr. S.A. Martin Britto Dhas

Mr. G. Jayakumar

Rev.Dr. G.Theophil Anand SDB

Mr. L.Anandaraj Dr. S. John Sundaram

Rev. Dr. Gandhi Kallarasan SDB

Dr. P. Kannappan

University Nominee

Dr. D. Jaikumar

Head, Department of Physics, Voorhees College, Vellore

Subject Expert1

Dr. J. Suresh

Principal & Associate Professor,

Department of Physics,

The Madura College (Autonomous), Madurai.

Subject Expert2

Dr. A. Basherrudin Mahmud Ahmed

Assistant Professor School of Physics

Department of Theoretical Physics Madurai Kamaraj University, Madurai

Meritorious Alumni:

Mr.M.Selvam

Assistant Headmaster and PG Assistant in Physics

Government Hr.Sec.School Palnangkuppam, Tirupattur

Industry representative Mr. S. Naresh

Student Representatives:

1. Mr. M. Ezhilarasan (BP200314)

2. Ms. V. Gayathri (BP210310)

Mr R.Ramesh did not attend the meeting as he was on leave

Agenda

To discuss and recommend programme structure, syllabi for theory, practical papers, and regulations for project work for the students admitted from the academic year 2021-2022 and thereafter.

Business transacted:

- 1. The chairperson of the PG board of Studies welcomed the University Nominee, Subject Experts, Meritorious Alumini, industry representative and all the other board members for the Board of Studies Meeting. The minutes of the previous board of studies meeting held on 9th April, 2021 was read by Dr.S.John Sundaram and it was passed.
- 2. As a follow-up action, the chairperson briefed the members of the Board of studies that he has taken up the issue of giving more self-study papers with the CDC and noted that the CDC has permitted the Board of studies to go ahead. In this regard, he further added that there were ten papers on different titles designed by the faculty members and needs more time to fine-tune the syllabus. He also assured that the syllabus will be finalized within five days and the same will be sent to the external board members for their comments/suggestions, and after incorporating their comments/suggestions, the papers will be passed in the standing committee of the Board of studies and will be presented in the forthcoming Academic council so that the changes will be implemented from the II semester onwards.
- 3. However, since the proposed syllabi for all the self-study papers have already been communicated to the external board members, the subject expert Dr. A. Basherrudin Mahmud Ahmed, while commenting on the spirit of giving more self-study papers. has suggested the following points (i) Since, the credit for each self-study paper is only 2, the content has to be reduced proportionately (ii) Instead of giving the whole crystal growth, any one growth method can be given in full so that the students can learn easily (iii) The software oriented paper like DFT can be given and (iv) While evaluating, some project oriented tasks also can be given to the students.
- 4. The University nominee Dr. D. Jaikumar wanted to know whether appropriate books and website references were given for the self-study papers to which the Chairperson replied that this was already taken care of.
- 5. The subject expert Dr. J. Suresh wanted to know the evaluation pattern for the selfstudy papers to which Dr. A. Albert Irudayaraj clarified that all the self-study papers

are offered purely internal and evaluated by the respective course teachers for 100 marks.

- 6. The alumni representative asked about the passing minimum for the self-study papers to which the chairperson replied that a minimum of 50% marks is essential for a pass.
- 7. The subject expert Dr. J. Suresh also wanted to know the rationale for offering a paper on research and publication ethics especially in the context of this paper being offered in the Ph.D course work, Dr.M.Jose, who has designed the paper responded that this paper is offered for two reasons: (i) the project work undertaken by the PG students are getting published in reputed journals and (ii) every year, few students are going for pursuing Ph.D. Therefore, it is only appropriate that we give them this particular paper so that they will be aware of the importance of academic integrity, plagiarism in research and how to do research.

Resolutions

Recommend the existing programme structure, syllabi for theory, practical papers, and regulations for project work for the students admitted from the academic year 2021-2022 and thereafter.

Members Present

Chairperson

Dr. M. Jose

Members

Dr. A. Albert Irudayaraj

Mr. C. Tirupathy

Mr. D. Daniel Lawrence

Mr. M. Aravinthraj

Mr. D. Rajkumar

Dr. S. Kalaiarasi

Dr. A. Dhayal Raj

Mr. N. Madhavan

Dr. S.A. Martin Britto Dhas

Rev. Dr. G.Theophil Anand SDB

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Industry representative

Mr. S. Naresh

Student Representatives:

- Mr. M. Ezhilarasan (BP200314) M. Ezhilarasan
 Ms. V. Gayathri (BP210310) V. Gayathri .

PG and Research Department of Physics Minutes of the Meeting of Standing Committee of the Board of Studies in Physics (PG)

The meeting of the standing committee of the Board of Studies in Physics (PG) was held on Thursday 2nd December, 2021 at 06.30 PM through Google meet. The following members were present for the meeting.

Members Present

Chairperson

: Dr. M. Jose

Members

Dr. A. Albert Irudayaraj

: Mr. C. Tirupathy

Mr. D. Daniel Lawrence Mr. M. Aravinthraj Dr. S. Kalaiarasi Mr. R. Ramesh

Mr. R. Ramesh Mr. D. Rajkumar Dr. A. Dhayal Raj Mr. N. Madhavan

Dr. S.A. Martin Britto Dhas

Mr. G. Jayakumar Mr. L.Anandaraj Dr. S. John Sundaram

Rev. Dr. Gandhi Kallarasan SDB

Dr. P. Kannappan

Rev. Dr. G. Theophil Anand SDB did not attend the meeting.

Agenda:

To consider and pass the syllabus for new self-study papers for the students admitted from the academic year 2021-2022 onwards and thereafter.

Resolutions:

After due deliberations and incorporating the suggestions/recommendations of the members of the Board of studies, the following decisions have been made.

- Recommend the following syllabus for the below mentioned four self-study papers for the students admitted from the academic year 2021 onwards and thereafter.
 - 1. Dielectric spectroscopy
 - 2. Crystal growth techniques
 - 3. Electrical appliances
 - 4. Research and publication ethics

Together with the already existing two self-study papers whose syllabi have already been passed in the previous Board of Studies meeting held on 09th April, 2021, the six self-study papers are offered in the following manner.

SEMESTER-II

- 1. Ultrasonics and its Applications
- 2. Dielectric Spectroscopy
- 3. Crystal Growth techniques

SEMESTER -III

- 1. Shock waves and high pressure Physics in Material Science
- 2. Electrical Appliances
- 3. Research and Publication ethics

Regulations

A student can take a maximum of only two self-study papers one each from the papers offered in the II semester and III semester. There shall be no contact hours, however, there shall be an end semester examination and upon successful completion of each paper, the candidates shall be declared to have earned two extra credits.

DIELECTRIC SPECTROSCOPY

Semester-II Objectives:

Credits:2

- 1. To enable the students to understand polarization and its dependence on frequency and temperature
- 2. To make the students to comprehend impedance spectrum and modulus spectrum and to derive the contribution to electrical conductivity due to grains and grain boundaries
- 3. To do hands on training and to interpret the data

Learning Outcomes: After the end of this course, students will be able to

- 1. Understand the various polarization mechanisms and dependence of polarization on frequency and temperature
- 2. Separate the contribution to electrical conductivity due to grains and grain boundaries using impedance spectrum, cole-cole formalism and modulus spectrum
- 3. Collect data and to interpret the data

UNIT-I INTRODUCTION

Evolution of Broadband dielectric spectroscopy-Dielectric materials-Polarization-Different types of polarization-Frequency and temperature dependence of polarization-Dielectric permittivity-Real and Imaginary part of permittivity-Dielectric loss

UNIT-II INSTRUMENTATION AND DATA COLLECTION

Principle-Basic Instrumentation-LCR meter-sample preparation and data collection.

UNIT-III IMPEDANCE SPECTRUM

Importance -Real and Imaginary part of impedance-Variation of Real and Imaginary part of impedance with frequency and temperature-Cole-Cole plot-Equivalent circuit-Ideal Debye and Non-Debye circuits-Bulk resistance-Grain boundary resistance

UNIT- IV MODULUS SPECTRUM

Importance-Real and Imaginary part of modulus-Variation of Real and Imaginary part of modulus with frequency and temperature.

UNIT-V CONDUCTIVITY STUDIES

Conductivity measurements-ac conductivity- dc conductivity- Interpretation.

Text Books:

- 1. J. Ross Macdonald, Impedence spectroscopy Theory, Experiment and Applications-Wiley Interscience, 2005
- 2. Vadim F. Lvovich, Impedence spectroscopy Applications to Electrochemical and Dielectric phenomena- Wiley Publications, 2012

Books for References:

- 1. W. H. Hunter Woodward, Broadband Dielectric Spectroscopy-A Practical Guide-Chapter-I, ACS Symposium Series; American Chemical Society: Washington DC,
- 2. Friedrich Kremer, Andreas Schonhals, Broadband Dielectric Spectroscopy, Springer, Berlin, Heidelberg, 2003.

Website references:

- 1. https://www.sciencedirect.com/science/article/pii/B9780323461405000108
- 2. https://www.novocontrol.de/php/intro_overview.php
- 3. https://link.springer.com/article/10.1007/BF00776148
- 4. https://sci-hub.se/https://doi.org/10.1016/B978-0-323-46140-5.00010-8
- 5. https://www.cmc.ca/wpcontent/uploads/2019/08/Basics_Of_MeasuringDielectrics_5989-2589EN.pdf

CRYSTAL GROWTH TECHNIQUES

Semester-II

Credits:2

- **Objectives:**
 - 1. To provide a qualitative idea on the fundamentals of growing crystals and characterizing of the grown samples.
 - 2. This paper will serve as an eye opener for students keen in research activities particularly in experimental physics.

Learning Outcomes: After the end of this course, students will be able

- 1. To acquire a qualitative idea on the fundamentals of growing crystals
- 2. To understand low temperature growth techniques
- 3. To understand melt and vapour techniques
- 4. To study advantages of SR method

UNIT 1: NUCLEATION: Phase -Different kinds of nucleation - equilibrium stability and metastable state - effect of soluble impurities on nucleation - determination of solubility supersaturation - steady state nucleation rate - nucleation parameters.

UNIT II: LOW TEMPERATURE GROWTH TECHNIQUES: Low temperature solution growth- criteria for optimizing solution growth parameters-basic apparatus for solution growthslow evaporation method-Growth of ADP and KDP crystals--slow cooling - growth of NaCl crystal

UNIT III SR METHOD: Introduction to temperature gradient- Sankaranarayanan-Ramasamy (SR) method - Experimental setup-Types-single coil and double coil-modification- Growth of KDP crystal -Advantages - Applications.

UNIT IV GEL GROWTH: Principle - Various types - structure of silica gel and gelling mechanism - nucleation control - merits of gel method - experimental methods - Single and double diffusion method - Advantages of gel method.

UNIT V: HIGH TEMPERATURE GROWTH: Growth from melt - Bridgman, Czochralski, zone melting - flux growth.

Books for study

- 1. Ramasamy P and Santhana Raghavan P, Crystal Growth Processes and Methods, KRU Publications, Kumbakonam, 1999.
- 2. James Coble Brice, Crystal growth processes, John Wiley and Sons, New York, 1986
- 3. John Chadwick, Brice North, The growth of crystals from liquids, Holland Pub. Co.,
- 4. Harold Eugene, Buckley, Crystal growth, John Wiley and Sons, New York, 1951
- 5. Heinz K. Henisch, Crystals in Gels and Liese gang Rings, Cambridge University Press,

Books for reference

- 1. Valentin G. Dmitriev, Gagik G. Gurzadyan, David N. Nikogosyan, Handbook of Nonlinear Optical Crystals, Springer, 2010.
- 2. Govindhan Dhanaraj, Kullaiah Byrappa, Vishwanath Prasad, Springer Handbook of Crystal Growth, Springer, 2010.
- 3. Binay Kumar, R. P. Tandon, University of Delhi. Dept. of Physics and Astrophysics, Advances in technologically important crystals, Macmillan, 2007.

Website references

https://application.wiley-vch.de/books/sample/352732514X_c01.pdf https://www.acadpubl.eu/hub/2018-119-12/articles/2/489.pdf https://www.alineason.com/en/knowhow/crystal-growth/ https://www.sciencedirect.com/topics/materials-science/crystal-growth-from-melt https://link.springer.com/chapter/10.1007/978-3-540-74761-1_1 https://pubs.acs.org/doi/10.1021/acs.cgd.7b00759

ELECTRICAL APPLIANCES

Semester-III

Credits:2

Objectives

- 1. To identify the discrete components used in electrical circuits.
- 2. To know basics of household electrical connections.
- 3. To expose the principle and design of electrical appliances used in day-today life.
- 4. To teach basics of semiconductors and related electronics circuits.

Learning Outcomes: After studying this course, the students will be able to

- 1. Identify the given discrete components like resistors using color coding method.
- 2. Understand the theory of household electrical connections.
- 3. Know the principle and working of some household electrical appliances.

UNIT-1: BASICS OF ELECTRICITY-I

Resistor and its types-capacitor and its types-Colour codes-inductance and its units-Electrical Charge-Current-Electrical Potential-Ohm's law-Galvanometer, Ammeter, Voltmeter and Multimeter-Analog and Digital-Electrical Energy-Power-Watt-kWh- Consumption and electrical power.

UNIT-II: BASICS OF ELECTRICITY-II

AC-Single phase and three phase connections-House wiring - Star and delta connection overloading-Earthling-Color code for insulation wires- Transformers

UNIT-III: PARALLEL AND SERIES CIRCUITS

Parallel and series circuits-short and open in parallel circuits-Detecting short and open in parallel circuits-short and open in series circuits-Detecting short and open in series circuits -**Fuses**

UNIT-IV: ELECTRICAL APPLIANCES - I

Principle and Design: Electric iron Box- Ceiling fan - Table fan-Water Heater-Types-Wet Grinder-Mixer Grinder

UNIT-V: ELECTRICAL APPLIANCES -II

Principle and Design: Laser Printer-Refrigerator-Washing Machine-Semi and Fully Automatic-Top and Front loading-washing technique-Air Conditioner- Microwave Oven

Books for study

- 1. Theraja B.L, A text book in Electrical Technology, S. Chand & Co., New Delhi, 2013
- 2. Metha V.K, Principles of Electronics, S. Chand & Co, New Delhi., 2001.
- 3. Sedha R.S, A Text Book of Digital Electronics, S. Chand & Co., Ltd., New Delhi, 2010
- 4. Bali S.P, Consumer Electronics, Pearson, 2004

Books for reference

- 1. Bagde and Singh, Elements of Electronics, S. Chand & Co., New Delhi, 2000.
- 2. Mitchel Schultz, Grob's Basic Electronics, McGraw Hill NY,2010.

Website references

- 1. https://www.allaboutcircuits.com/textbook/reference/chpt-2/resistor-color-codes/
- 2. https://www.youtube.com/watch?v=SjlnW5g9np4
- 3. https://circuitglobe.com/difference-between-single-phase-and-three-phase.html
- 4. https://www.youtube.com/watch?v=r_DGW3OrPVg
- 5. https://www.youtube.com/watch?v=NNkoAJkXUAw
- 6. https://www.slideshare.net/ideseditor/533-28626238
- 7. https://en.wikipedia.org/wiki/Semiconductor
- 8. https://www.youtube.com/watch?v=CjAVfW_6juw
- 9. https://www.youtube.com/watch?v=7HiNABH1kYE
- 10. https://mrwashingmachine.in/working-principle-of-washing-machine/

RESEARCH AND PUBLICATION ETHICS

Semester-III

Objectives:

Credits:2

- 1. To create awareness about publication ethics and publications misconduct
- 2. To ensure academic integrity and to create awareness about predatory publications
- 3. To help identify good journals for publishing one's research article
- 4. To help the students to check plagiarism using plagiarism software like Turnitin, Urkund

Learning outcomes: After the end of the course, students will be able to

- 1. Acquire awareness about publication ethics and publications misconduct
- 2. Acquire knowledge about predatory and fraudulent journals
- 3. Identify good journals for publishing their research articles
- 4. Check plagiarism using plagiarism software like Turnitin, Urkund and other open source

UNIT I: SCENTIFIC CONDUCT: Ethics with respect to science and research-Intellectual honesty and research integrity-scientific misconducts: Falsification, Fabrication and Plagiarism-Redundant publications: duplicate and overlapping publications-Selective reporting and

UNIT II: PUBLICATION ETHICS: Definition, introduction and importance-Best practices/ standards setting initiatives and guidelines-Conflicts of interest-Publication misconduct: definition, concept, problems that leads to unethical behavior and vice versa, types

UNIT III: PUBLICATION MISCONDUCT: Violation of Publication ethics, authorship and contributorship-Identification of publication misconduct-Predatory publishers and journals.

UNIT IV: ONLINE TOOLS: Open access publications-Software tool to identify predatory publications developed by SPPU-Journal finder/ journal suggestion tools-Elsevier Journal

UNIT V: ETHICAL ISSUES AND PLAGIARISM SOFTWARES-authorship-Conflicts of interest-Complaints and appeals: examples and fraud from India and abroad.-Use of plagiarism software-Turnitin, Urkund and other open source software tools-Text Books:

- 1. Muralidhar K Amit Ghosh A.K Singhvi, Ethics in Science Education, Research and Governance, Indian National Science Academy, New Delhi, 2019.
- 2. Alexander Bird, Philosophy of Science, Routledge, Taylor and Francis Group, London, References:

- 1. MacIntyre, Alasdair, A Short History of Ethics, Cambridge University Press, London,
- 2. Chaddah P, Ethics in Competitive Research: Do not get scooped; do not get plagiarized,
- 3. National Academy of Sciences, National Academy of Engineering and Institute of Medicine, "On Being a Scientist: A Guide to Responsible Conduct in Research: Third Edition. National Academies Press., Washington D.C, 2009. Website references:

1. https://www.niehs.nih.gov/research/resources/bioethics/whatis/index.cfm

2. http://doi.org/10.1038/489179a

Chairperson

Members

Dr.M.Jose Wholpians
Dr.A.Albert Irudayaraj
Mr. C. Tirupathy

Mr. C. Tirupathy

Mr. M. Aravinthraj

Mr. D. Daniel Lawrence

Dr. S. Kalaiarasi

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Mr. L.Anandaraj

Dr. S. John Sundaram

Rev. Dr. Gandhi Kallarasan SDB

Dr. P. Kannappan

PG and Research Department of Physics Minutes of the Meeting of Board of Studies in Physics (PG)

The meeting of the Board of Studies in Physics (PG) was held on Saturday, 26th March, 2022 at 03.30 PM. in the PG Lab. The following members were present for the meeting.

Members Present

Chairperson

Dr. M.Jose

Members

Dr.A.Albert Irudayaraj

Mr. C. Tirupathy

Mr. D. Daniel Lawrence Mr. M. Aravinthraj Dr. S. Kalaiarasi Mr. R. Ramesh Dr. A. Dhayal Raj Mr. N. Madhavan

Dr. S.A. Martin Britto Dhas

Mr. G. Jayakumar Dr.S.John Sundaram

Rev. Dr. Gandhi Kallarasan SDB

Dr. P. Kannappan

University Nominee

Dr. D. Jaikumar

Head, Department of Physics, Voorhees College, Vellore

Meritorious Alumni

Mr.M.Selvam

Assistant Headmaster and PG Assistant in Physics

Government Hr.Sec.School Palnangkuppam, Tirupattur

Industry representative

Mr.S.Naresh

HR Representative,

Catterpillar India Pvt. Ltd., Hosur

Student Representatives

1. V. Gayathri (BP210310)

2. K. Jubi Initha Mary (BP200308)

Dr. J. Suresh, Dr. A. Basherrudin Mahmud Ahmed, Mr. D. Rajkumar, Rev. Dr. G.Theophil Anand SDB and Mr. L.Anandaraj expressed their inability to attend the meeting

Agenda:

- 1. To discuss and approve the programme specific outcomes (PSOs) for M.Sc Physics
- 2. To approve the course outcomes for M.Sc Physics courses.
- 3. To approve the panel of examiners in the PG Board for setting question papers and evaluation.

Resolutions

After due deliberations and incorporating the suggestions/recommendations of the Board members, the following decisions have been made by the board.

- Suggested the external panel of names (Enclosed) to the Academic Council for appointment of examiners in the PG Board for setting question papers for the various courses and evaluation of answer scripts.
- 2. Approved course outcomes for the M.Sc Physics courses.
- 3. Approved the following programme specific outcomes (PSOs) for the M.Sc degree programme in Physics.

On completion of the M.Sc programme in Physics, the students can

- Develop the ability to identify and analyze complex physics problems in classical mechanics, statistical mechanics, quantum mechanics, and electromagnetic theory using the laws and theorems of physics with appropriate mathematical tools and thereby preparing the students to face competitive exams like CSIR-NET/SET/GATE/JEST and other similar exams.
- Develop an in-depth knowledge by understanding the basic concepts of specialized and/or interdisciplinary courses such as nuclear and particle physics, molecular spectroscopy, solid state physics, electronics and experimental physics such as crystal growth and nanoscience.
- ➤ Acquire the ability to handle certain advanced scientific equipments through hands on training in basic as well as advanced areas of physics such as condensed matter physics, optics & lasers, electronics, microprocessors & microcontrollers and programming in C.
- ➤ Create skills required for identifying socially relevant research problems in theoretical and/or experimental physics, collection of relevant data, analyze and interpret data through a supervised project leading to knowledge enhancement in interdisciplinary areas of research and publish their findings in reputed international and national journals following research and publication ethics.
- > Gain an in-depth knowledge in physics to be able to teach it at university/college level and in school level and to apply their skills to develop innovative scientific solutions for industrial and social needs.

Members 1	Present
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Chairperson

Dr. M.Jose

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Mr. C. Tirupathy

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