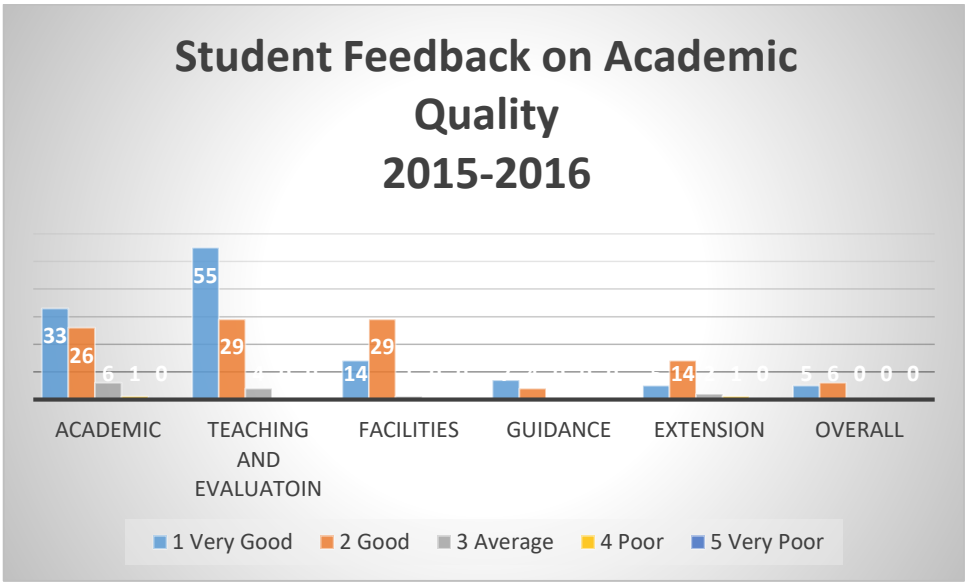
FEEDBACK ANALYSIS



ACTION TAKEN REPORT FOR THE FEEDBACK GIVEN BY STUDENTS, ALUMNI, INDUSTRY AND EMPLOYER FOR THE YEAR 2015-2016

Feedback 1: Coaching for competitive exams (CSIR-NET) can be given

The curriculum is designed to meet the CSIR-NET based syllabus for the physical sciences.

Feedback 2: Nanoscale, Nanomaterials based papers can be incorporated

15PH3020 PHYSICS OF NANOSCALE SYSTEMS

Credits: 3:0:0

Course Objective:

- To learn the various modern technologies used in nano devices and sensors.
- To know about the Semiconductor, bio and Photonics based sensors and its electronic properties of such nanostructure devices.
- To understand the effect of the reduced dimensionality on the electronic charge transport.

Course Outcome:

- To apply the operating principle of various nanodevices and its single atom manipulation

Course Description

Electronic level modification of 0D, 1D, 2D -Esaki and resonant tunneling diodes, Mott-wannier excitons - molecular electronics, molecular switching, Schottky devices, Mesoscopic Devices, Metal Insulator Semiconductor devices, MOSFET characteristics - NanoFET - Single Electron Transistors, Resonant Tunneling Devices, Carbon Nanotube based logic gates, optical devices. Connection with quantum dots, quantum wires, and quantum wells. biosensor, micro fluids, Sensors for aerospace and defense: Accelerometer, Pressure Sensor, Night Vision System, Nano tweezers, nano-cutting tools, Integration of sensor with actuators and electronic circuitry as

diagnostic tool, Biosensors- generation, characteristics and applications, conducting Polymer based sensor, DNA Biosensors, optical sensors and Biochips, Magnetoresistance, Spintronics, MEMS and NEMS -Fabrication, Modeling Applications MEMS and NEMS, Packaging and characterization of sensors, Method of packaging at zero level, dye level and first level Sensors. Photonic Nanodevices-Semiconductor quantum dots, Photonic crystals, Metamaterials.

Reference Books

1. Sensors: Micro & Nanosensors, Sensor Market trends (Part 1&2) by H. Meixner.2008
2. Between Technology & Science: Exploring an emerging field knowledge flows & networking on the nanoscale by Martin S. Meyer.2007
4. Nanoscience & Technology: Novel structure and phenomea by Ping Sheng, Talylor and Francis,2003
3. Nano Engineering in Science & Technology : An introduction to the world of nano Design by Michael Rieth,2003
4. Enabling Technology for MEMS and nano devices -Balles, Brand, Fedder, Hierold,John Wiley and sons, 2004
5. Optimal Synthesis Methods for MEMS- G. K. Ananthasuresh,Klower Academic publisher,2003

15PH3027 NANOFLUIDS

Credit: 3:0:0

Course Objective:

- To know the basics of nanofluids
- To learn the nanofluid synthesis methods
- To understand the basics of conductive and convective heat transfer
- To learn the application of nanofluids

Course Outcome:

- Students can understand the basics and industrial application of nanofluids

Course Description:

Fundamentals of Cooling, Making Nanofluids, Materials for Nanoparticles and Nanofluids, Methods of Nanoparticle Manufacture, Mechanism and Models for enhanced thermal support, Structure based Mechanism and Models, Dynamics based Mechanism and Models, Synthesis of nanofluids, Synthesis of colloidal Gold nanoparticles, Turkevich method, Brust method, Microwave Assisted Synthesis, Solvothermal Synthesis,Magnetic Nanofluids, Inert Gas Condensation, Conduction Heat Transfer, Lumped,parameter method, One Dimension Transient Conduction, Guarded Hot Plate method, Transient Hot wire, Thermal conductivity of Oxide nanofluids, Hamilton Crosser Theory, Convective Heat Transfer, Newton's law of cooling, equations of fluid flow and heat transfer, Navier,Stokes equations, Experimental study of natural convection, Eulerian,Eulerian approach, Eulerian,Lagrangian approach, Fundamentals of Boiling, Nukiyama curve, Vehicle cooling, Transformer cooling, Biomedical applications.

Reference Books

1. Nanofluids: Science and Technology, Sarit K. Das, Stephen U. Choi, Wenhua Yu, T. Pradeep, John wiley sons, 2007
2. Holman J.P., 'Heat Transfer', SI Metric Ed., Mc Graw Hill, ISE, 1972.
3. Heat and Mass Transfer, R.K. Rajput, S. Chand, 2008
4. Heat transfer Principles and applications, Binay K. Dutta, Prentice, Hall of India Pvt. Ltd, New Delhi, 2001

Feedback 3: New courses related to Astrophysics and Astronomy can be incorporated in the curriculum

15PH3040 ASTROPHYSICS

Credits: 3:0:0

Course Objective:

- To provide with a fundamental understanding about the stars and their properties
- To provide knowledge of the instruments used to explore the cosmos
- To give an overview of the giant scale structure of the universe such as galaxy and clusters of galaxies
- To know about the origin and fate of the universe

Course outcome:

- Able to demonstrate the mechanisms of different telescopes.
- Able to apply the knowledge of astrophysics in identifying stars and galaxies

Course Description:

Introduction to Solar systems and various models, laws of planetary motions, the formation of stars and planets, properties of stars, spectral classification of stars, Hertzprung Russell diagram, distant measurements of stars, life cycle of stars, neutron stars, black holes and supernovae, theory of telescope and detectors, new generation optical telescopes, The Milkyway, galaxy, interstellar medium, stellar population, different types of galaxies, the cosmological distant scale, The Universe, Cosmological models, the standard Big bang theory, big bounce theory, life in the universe.

Reference Books

1. Michael Zeilik, Stephen . A.Gregory, Introductory Astronomy and Astrophysics, Fourth Edition, Saunders College Pub., Michigan, U.S.A, 1998 ISBN 9780030062285

2. A. B. Bhattacharya, S. Joardar, R. Bhattacharya, Astronomy and Astrophysics, Jones and Barlett Publishers, U.S.A., (2010) ISBN 978-1-934015-05-6

3. Martin V. Zombeck, Book of astronomy and Astrophysics, Cambridge University Press, U.K. (2007) ISBN 978-0-521-78242-5

4. Thanu Padmanabhan, Theoretical Astrophysics (Vol. I, II, II): Cambridge University Press, U.S.A., (2002) ISBN 0 521 56242 2

5. Wolfgang Kundt, Astrophysics: A new approach, Second edition, Springer, 2006

6. Introduction to AstroPhysics The Stars, Jean Dufay, Dover publications,2012, AstroPhysics for Physicists, Chaudhuri, University Press, 2010

BOARD OF STUDIES, DEPARTMENT OF PHYSICS

MINUTES OF MEETING

Date: 5.12.2015 Time: 10.00 am
VENUE: Director's Conference Hall, S & H

Members Present

1. Prof. S.Rajesh, HOD, Dept of Physics, Karunya University
2. Prof.P. Kolandaivel, Dept of Physics, Bharathiar University – External Expert
3. Dr.A. Abiram, Dept of Physics, Karunya University
4. Dr.D.Khanna, Dept of Physics, Karunya University
5. Dr.B.Vidhya, Dept of Physics, Karunya University
6. Dr.A.Sakunthala, Dept of Physics, Karunya University
7. Mr.M.Jeyavelan, Junior Research Fellow, Central University of Tamilnadu, Thiruvaroor

The meeting started with a word of prayer by Dr. D. Khanna.

The Head of the Department of Physics welcomed the committee members. The agenda of the BoS was explained by him at the outset. He informed that the revised course curriculum for M.Sc Physics will be deliberated upon with particular focus on employability, entrepreneurship and skill development.

The External expert Dr P. Kolandaivel, Dept of Physics, Bharathiar University gave valuable inputs on introducing new courses in M.Sc Physics curriculum so that the students can have skill oriented training and employability and are equipped to write competitive exams like CSIR-NET, GRE, GATE, and JEST. The following are the list of new courses that were discussed and deliberated thoroughly and incorporated into the curriculum.

1. Advanced Statistical Mechanics
2. Radiation Physics
3. Crystal Growth Techniques
4. Physics of Advanced Materials
5. Simulations of Nanoscale Systems
6. Astrophysics

The External member Mr.M.Jeyavelan (Alumni), Junior Research Fellow, Central University of Tamilnadu, Thiruvarur has given inputs on incorporating nano-technology based courses for the MSc Physics as it is gaining prominence in nano-technology based companies and it has tremendous employment opportunities in the coming years. The following are the subjects that are discussed and included in the curriculum.

1. Physics of Nanoscale Systems
2. Nano Fluids

Table 1

M.Sc (Physics) – 2015, 2016 Batch (90 credits)
REVISED COURSE COMPONENTS

S.No	Subject Code	Program core- 52 credits & a full semester project Name of the Subject	Credits
1	15PH3002	Classical Mechanics	3:0:0
2	15PH3003	Statistical Mechanics and Thermodynamics	3:0:0
3	15PH3004	Mathematical Physics I	3:1:0
4	15PH3005	Semiconductor Physics	3:0:0
5	15PH3006	Quantum Mechanics I	3:0:0
6	15PH3008	Mathematical Physics II	3:1:0
7	15PH3009	Atomic and Molecular Spectroscopy	3:0:0
8	15PH3010	Electromagnetic Theory	3:0:0
9	15PH3011	Quantum Mechanics II	3:0:0
10	15PH3012	Nuclear and Particle Physics	3:0:0
11	15PH3013	Spectroscopy	3:0:0
12	15PH3014	Solid State Physics	3:0:0
13	15PH3030	General Physics Lab I	0:0:2
14	15PH3031	General Physics Lab II	0:0:2
15	15PH3032	Advanced Physics Lab I	0:0:4
16	15PH3033	Advanced Physics Lab II	0:0:4
17	14VE3001/3002	Value Education III/ IV	2:0:0
		Total Credits	**52**
18	FSP3999	Full Semester Project	20
		Total	**72**

Table 2

S.No	Subject Code	**Soft Core- I (Nanoscience and Technology) Min. of 12 credits to be earned**	Credits
		Name of the Subject	
1	15PH3028	Physics of Advanced Materials	3:0:0
2	15PH3015	Physics of Nanomaterials	3:0:0
3	15PH3020	Physics of Nanoscale Systems	3:0:0
4	15PH3039	Simulations of Nanoscale Systems	3:0:0
5	15PH3034	Materials Characterization Lab	0:0:2
6	16NT3002	Nanoelectronics	3:0:0
7	16NT3013	Nanoscale transistors	3:0:0
8	16NT3017	Advanced Material Characterization Lab	0:0:2

Table 3

S.No	Subject Code	**Soft Core- II (Optics) Min. of 12 credits to be earned**	Credits
		Name of the Subject	
1	15PH3007	Physical Optics	3:0:0
2	15PH3017	Photonics	3:0:0
3	15PH3029	Solitons in Optical Fibers	3:0:0
4	15PH3035	Computational Physics Lab	0:0:2
5	15PH3036	Simulations in Statistical Physics Lab	0:0:2
6	15PH3037	Heat and Optics Lab	0:0:2
7	16NT3011	Photovoltaics: Advanced materials and devices	3:0:0
8	16NT3012	Luminescent materials	3:0:0

Table 4

S.No	Subject Code	**Electives Min. of 12 credits to be earned**	Credits
		Name of the Subject	
1	15PH3016	Advanced statistical mechanics	3:0:0
2	15PH3018	Thin Film Technology	3:0:0
3	15PH3019	Principles of Renewable Energy	3:0:0
4	15PH3025	Crystal Growth Techniques	3:0:0
5	15PH3026	Radiation Physics	3:0:0
6	15PH3027	Nanofluids	3:0:0
7	16NT3040	Astrophysics	3:0:0

Table 5

Classification	Credits
Core Subjects	72
Soft core	12
Elective	6
Total Credits	90

The BOS committee felt that there should be more emphasis on physics courses for M.Sc Nano science and Technology (Int.) so that the students are able to understand the physics concepts in a better manner. They have framed relevant subjects to be included in the curriculum. As suggested by the experts, the following are the new basic physics courses offered to all branches of B.Tech. (16PH1001) and M.Sc. Nano science and Technology (Int.).

Subject Code	Subject Title	Credit
16PH1001	Applied Physics for Engineers	3 : 0 : 1
16PH2001	Semiconductor Physics I	3 : 0 : 0
16PH2002	Properties Of Matter Lab	0 : 0 : 2
16PH2003	Semiconductor Physics Ii	3 : 0 : 0
16PH2004	Semiconductor Logic Devices	3 : 0 : 0
16PH2005	Semiconductor Physics Lab-I	0 : 0 : 2
16PH2006	Semiconductor Physics Lab-Ii	0 : 0 : 2
16PH2007	Physics Of Semiconductor Memories & Microprocessors	3 : 0 : 0
16PH2008	Physics Of Linear Integrated Circuits & Vlsi Design	3 : 0 : 0
16PH2009	Photonics	3 : 0 : 0

LIST OF SUBJECTS

S.No	Subject Code	Subject Name	Credits
1	16PH1001	Applied Physics	3 : 0 : 1
2	16PH2001	Semiconductor physics I	3 : 0 : 0
3	16PH2002	Properties of matter lab	0 : 0 : 2
4	16PH2003	Semiconductor physics II	3 : 0 : 0
5	16PH2004	Semiconductor logic devices	3 : 0 : 0
6	16PH2005	Semiconductor physics lab I	0 : 0 : 2
7	16PH2006	Semiconductor physics lab II	0 : 0 : 2
8	16PH2007	Physics of semiconductor memories & microprocessors	3 : 0 : 0
9	16PH2008	Physics of linear integrated circuits & VLSI design	3 : 0 : 0
10	16PH2009	Photonics	3 : 0 : 0
11	15PH3001	Advanced Mechanics of Solids	3:0:0
12	15PH3002	Classical Mechanics	3:0:0
13	15PH3003	Statistical Mechanics and Thermodynamics	3:0:0
14	15PH3004	Mathematical Physics I	3:1:0
15	15PH3005	Semiconductor Physics	3:0:0
16	15PH3006	Quantum Mechanics I	3:0:0
17	15PH3007	Physical Optics	3:0:0
18	15PH3008	Mathematical Physics II	3:1:0
19	15PH3009	Atomic and Molecular Spectroscopy	3:0:0
20	15PH3010	Electromagnetic Theory	3:0:0
21	15PH3011	Quantum Mechanics II	3:0:0
22	15PH3012	Nuclear and Particle Physics	3:0:0
23	15PH3013	Spectroscopy	3:0:0
24	15PH3014	Solid State Physics	3:0:0
25	15PH3015	Physics of Nanomaterials	3:0:0
26	15PH3016	Advanced statistical mechanics	3:0:0
27	15PH3017	Photonics	3:0:0
28	15PH3018	Thin Film Technology	3:0:0
29	15PH3019	Principles of Renewable Energy	3:0:0
30	15PH3020	Physics of Nanoscale Systems	3:0:0
31	15PH3021	Radiation Treatment and Planning	3:0:0
32	15PH3022	Medical Radiation Dosimetry	3:0:0
33	15PH3023	Research Methodology	3:0:0
34	15PH3024	Material Characterization	3:0:0
35	15PH3025	Crystal Growth Techniques	3:0:0
36	15PH3026	Radiation Physics	3:0:0
37	15PH3027	Nanofluids	3:0:0
38	15PH3028	Physics of Advanced Materials	3:0:0

39	15PH3029	Solitons in Optical Fibers	3:0:0
40	15PH3030	General Physics Lab I	0:0:2
41	15PH3031	General Physics Lab II	0:0:2
42	15PH3032	Advanced Physics Lab I	0:0:4
43	15PH3033	Advanced Physics Lab II	0:0:4
44	15PH3034	Materials Characterization Lab	0:0:2
45	15PH3035	Computational Physics Lab	0:0:2
46	15PH3036	Simulations in Statistical Physics Lab	0:0:2
47	15PH3037	Heat and Optics Lab	0:0:2
48	15PH3038	Properties of matter Lab	0:0:2
49	15PH3039	Simulations of Nanoscale Systems	3:0:0
50	15PH3040	Astrophysics	3:0:0

The above courses were approved by the BOS committee after detailed deliberations by the members and the external experts.

Prof. S. Rajesh

Prof. P. Kolandaivel

Dr. A. Abiram

Dr. D. Khanna

Dr. B. Vidhya

Dr. A. Sakunthala

Mr. M. Jeyavelan