SHRI G. S. INSTITUTE OF TECHNOLOGY & SCIENCE, INDORE

DEPARTMENT OF APPLIED PHYSICS & OPTOELECTRONICS

Date : December 16, 2022

Minutes of the meeting of Board of Studies held on Dec. 16, 2022 at 4.00 pm

Meeting of Board of Studies (BOS) of Department of Applied Physics & Optoelectronics was held on Dec. 16, 2022 at 4.00 pm in hybrid mode.

Following members attended the meeting:

1.	Dr. J. T. Andrews	Chairman
2.	Ms. Nidhi Oswal	Member
3.	Dr. Pragya Ojha	Member
4.	Dr. Vipin Kaushik	Member
5.	Dr. Depti Pawar Nagar	Spl. Invitee
6.	Mr. Ashish Singh Bais	Spl. Invitee
7.	Dr. R. Chouhan	Spl. Invitee
8.	Dr. Arup Banerjee, SO-H, Professor, HBNI, RRCAT, Indore	External Member
9.	Dr. Krushna Mawani, Professor & Head Dept. of Physics, IIT, Indore	External Member
10.	Mr. Praneet Pandey, CTO and CSO - Verizon comm. India P. Ltd.,	External Member
11.	Mr. Hitesh Mehta MD, Fiber Optica Tech., Mumbai	External Member

Dr. Jitendra Gangarade, IIT-ISM-Dhanbad, external member could not attend the meeting.

The Chairman welcomed the members of BOS. The deliberations of the meeting are as follows:

Agenda 1: To discuss syllabus of B.Tech. (PH10016) and M.Sc. (Appl. Physics) courses
Agenda 2: To discuss the scheme and syllabus of New Course on M.Tech. (Quantum Computing).

I. **B.Tech. (PH10016) and M.Sc. (Appl. Physics) courses**

a. Since PH10016: Physics is updated and revised recently, no corrections are proposed.

b. As Python program language is becoming popular for scientific computing, the unit on Mathcad is replaced with Python in the subject PH97206: Computer Programing. Old and new syllabi are enclosed as Annexures -a and -b, respectively.

II. It was proposed and discussed at length on starting a 5 Year integrated BS-MS / B.Sc. – M.Sc. program with exit options. The BOS recommended the proposal for starting from the AY 2023-24 subjected to the approval from Academic Council.

The session concluded with the vote of thanks to the chair.

Dr. J. T. Andrews
Chairman, BOS-Dept. of Appl. Phys. & OE
and Prof. & Head, Dept. of Appl. Phys. & OE SGSITS, Indore

PH 97206: COMPUTER PROGRAMING											
Subject Code	Subject Nomenclature	Contact Hrs			Maximum Marks				Credits		
		L	T	P	CW	End	SW	End	T	P	Tot
PH97206	Computer Programing	**4**	-	-	**30**	**70**	-	-	**4**	-	**4**

COURSE CONTENTS

1. **Programing in C**$^{++}$: Constants, variable and data types, operators, expressions, decision making, branching and looping, functions, declaration of functions, passing values of functions, arrays, initialization, arrays to functions printers, pointers as a addresses.
2. **MatLAB/Scilab:** Introduction to basics, Array and matrices, Scripts and functions, additional functions, Graphics, Speed enhancement, styles and tricks, advanced data structures, Scientific computing (root finding, iterative algebra, optimization, data fitting, initial value, boundary value and initial-boundary value problems,
3. **MathCAD**: Regions, menus and basic operations. Solving linear equations with Mathcad, optimization using equations, blocks, solving ODE and PDE, programming, data exchange and analysis, image processing. Analysis to thin film layers, to boundary value problems is electromagnetism, animation with projectile motions.
4. **LabVIEW:** Front and diagram panels, icon, connectors, functions, acquisition, saving and loading data, using complex math functions, working with data types (array, cluster, strings, matrix, complex, etc), displaying, processing, printing and publishing results.
5. **COMSOL Multiphysics:** Intr. To various modules, 1D model, wave propagation, boundary conditions, transient response, meshing, 2D Model, perfectly matched layers (PML), scattering boundary conditions, frequency domain solutions, impedance boundary conditions, 2D axisymmetric model and 3D models, RF module applied to em wave propagation.

References :

1. R. W. Pryor, PhD, Multiphysics Modelling Using COMSOL:A First Principle Approach, (Jones & Bartlett, Ontario, 2000)
2. R. Bitter, T. Mohiuddin, M. Nawrocki, LabVIEW Advanced Programming Techniques, (CRC Press, New York 2000)
3. Course work DVDs Basic LabVIEW Training Courses, National Instruments.
4. B. R. Hunt, R. L. Lipsman, J. M. Rosenberg, A Guide to Matlab, (Cambridge, 2010).
5. B. Maxfield, Engineering with Mathcad (Butterworth-Heinemann. 2006)
6. E. Balagurusamy, OOP with C++, 7ed (Tata McGraw, New Delhi 2017).

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PH97206	Computer Programing	4	-	-	30	70	-	-	4	-	4

Course Objectives (CO):

The objective of this course is to

1. develop the concepts of computer basics & programming with particular attention to Engineering examples.
2. skill the students for programming in C++, MatLAB, Python, LabVIEW and COMSOL Multiphysics.
3. explain the working of i/p, o/p devices and recognize the basic terminology used in computer programming.
4. develop the understanding of various 1D, 2D models and wave propagation under boundary conditions.

Expected Course Outcome (ECO):

By the end of the course the students will be able to

1. write, compile, and debug programs and use different data types for writing the programs.
2. design programs connecting decision structures, loops, and functions, pointers, address.
3. use different data structures and create basic data files and developing applications for real world problem.
4. solve the problems attributed to scattering and impedance boundary conditions of wave propagations.

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2. **MatLab/SciLab:** Introduction to basics, Array and matrices, Scripts and functions, additional functions, Graphics, Speed enhancement, styles and tricks, advanced data structures, Scientific computing (root finding, iterative algebra, optimization, data fitting, initial value, boundary value and initial-boundary value problems,
3. **Python:** Basic types, python as calculator, Boolean values, variable assignment, strings, lists, assignment, if statement, for and while loops, functions, writing scripts, modules, reading and writing files, timing functions. Scientific programing with NumPy, SciPy, Matplotlib, Pandas, Numba and Anaconda.
4. **LabVIEW:** Front and diagram panels, icon, connectors, functions, acquisition, saving and loading data, using complex math functions, working with data types (array, cluster, strings, matrix, complex, etc), displaying, processing, printing and publishing results.
5. **COMSOL Multiphysics:** Intr. To various modules, 1D model, wave propagation, boundary conditions, transient response, meshing, 2D Model, perfectly matched layers (PML), scattering boundary conditions, frequency domain solutions, impedance boundary conditions, 2D axisymmetric model and 3D models, RF module applied to em wave propagation.

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3. T. J. Sargent & J. Stachurski, Python for Scientific Computing, QuantEcon (2020).
4. R. W. Pryor, PhD, Multiphysics Modelling Using COMSOL:A First Principle Approach, (Jones & Bartlett, Ontario, 2000).
5. R. Bitter, T. Mohiuddin, M. Nawrocki, LabVIEW Advanced Programming Techniques, (CRC Press, New York 2000), Course work DVDs Basic LabVIEW Training Courses, National Instruments.