



DEPARTMENT OF PHYSICS

COURSE PLAN – PART I			
Name of the programme and specialization	I M.Tech. NDT, I & II M.Sc. Physics and Ph.D. (Physics)		
Course Title	Computational Techniques		
Course Code	PH674	No. of Credits	3
Course Code of Pre-requisite subject(s)	NIL		
Session	January 2020	Section (if, applicable)	NIL
Name of Faculty	Dr. S.Krishnaraj	Department	Physics
Official Email	krishs@nitt.edu	Telephone No.	9842463747
Name of Course Coordinator(s) (if, applicable)	Dr. B. Karthikeyan		
Official E-mail	Telephone No.	Telephone No.	0431-250-3616
Course Type (please tick appropriately)	<input type="checkbox"/> Core course	<input checked="" type="checkbox"/> Elective course	
Syllabus (approved in BoS)			
<p>Unit I - C programming C Programming basics - arithmetic operators– library functions – data input and output – relational operators – control statements – looping arrays functions – simple programs – user defined functions – pointers – passing pointers to functions – structures.</p> <p>Unit II - Introduction to MATLAB MATLAB environment – working with data sets – data input/output – logical variables and operators – array and X-Y Plotting – simple graphics – data types matrix, string, cell and structure – file input and output – Matlab files – simple programs.</p> <p>Unit III - Applications of MATLAB Matrices and array operation – elemental matrix functions – file functions – application of matlab– solving linear algebraic equations – curve fitting – interpolation – numerical integration –basic 2D Plots – overlay plots – specialized 2D plots – 3D plots – view</p> <p>Unit IV - Introduction to LABVIEW Introduction to LABVIEW tools palette, controls & functions palette, data types, conversion – front panel, block diagram construction, parallel data flow, create</p>			



indicators/controls/constants math operations, booleans, arrays, case structures, sequences – for loops, while loops – I/O reading and writing to files, paths, graphing, timed loops, signal generation/processing, waveform types - connecting to hardware, DAQ.

Unit V - Modeling Approaches

Finite Element Methods: Introduction to 1D FEM – Problems in wave propagation and structural mechanics using 2D elements- Plane stress and plane strain analysis, 3D stress analysis-Simulation packages – ABAQUS-COMSOL Multiphysics-Modeling Applications.

COURSE OBJECTIVES

- To introduce Programming tools in C language, MATLAB and LABView which will be useful for further research studies
- To prepare the students to use MATLAB/LABVIEW in their project works.
- To provide a foundation in use of this softwares for real time applications

MAPPING OF COs with POs

Course Outcomes	Programme Outcomes (PO) (Enter Numbers only)
1. Familiarize with the computational tools available in MATLAB, LabVIEW and COMSOL for variety of physical problems.	P1, P5
2. Model the structural behavior using various simulation tools	P2, P6
3. Articulate importance of software’s in research by simulation work	P2, P4, P6
4. Operate the computational tools for signal processing related problems.	P4, P5, P6
5. In-depth knowledge of providing virtual instruments on LabVIEW Environment.	P1,P3,P5,P10

COURSE PLAN – PART II

COURSE OVERVIEW

- The elective course (Code:PH-674) is offered to the M.Tech –NDT, M.Sc (Physics) and Ph.D course work.
- The subject has 3 credit weightage for theory.

COURSE TEACHING AND LEARNING ACTIVITIES

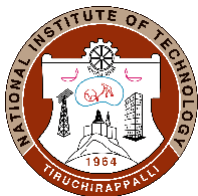
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S.No.	Week/Contact Hours	Topic	Mode of Delivery
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NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI

1	06-10 Jan.2020	C Programming basics - arithmetic operators– library functions – data input and output Relational operators – control statements looping arrays functions.	Chalk & Talk, CD
2	13-17 Jan.2020	Simple programs user defined functions – pointers, Passing pointers to functions structures.	Chalk & Talk, CD, PPT
3	20-24 Jan.2020	MATLAB environment – working with data sets – data input/output Logical variables and operators array and X-Y Plotting	Chalk & Talk, CD, PPT
4	27-30 Jan 2020	Simple graphics data types matrix, string, cell and structure. File input and output – matlab files Simple Programs.	Chalk & Talk, CD, PPT
5	03-07 Feb.2020	Applications of MATLAB Matrices and array operation elemental matrix functions – file functions – application of matlab.	Chalk & Talk, CD, PPT
6	10-14 Feb.2020	solving linear algebraic equations curve fitting interpolation numerical integration Basic 2D Plots overlay plots specialized 2D plots 3D plots view	Chalk & Talk, CD, PPT
7	17-21 Feb.2020	Introduction to LABVIEW tools palette, controls & functions palette, data types, conversion Front panel, block diagram construction.	Chalk & Talk, CD, PPT
8	24-28 Feb 2020	Parallel data flow, create indicators/controls/constants math operations.	Chalk & Talk, CD, PPT
9	02-06 Mar.2020	Booleans, arrays, case structures, sequences – for loops, while loops.	Chalk & Talk, CD, PPT
10	09-13 Mar.2020	I/O reading and writing to files paths, graphing, timed loops.	Chalk & Talk, CD, PPT
11	16-20 Mar.2020	signal generation/processing waveform types connecting to hardware, DAQ	Chalk & Talk, CD
12	23-27 Mar 2020	Finite Element Methods Introduction to 1D FEM.	Chalk & Talk, CD, PPT



13	30 Mar -03 Apr Apr.2020	Problems in wave propagation and structural mechanics using 2D elements.	Chalk & Talk, CD
14	07-09 Apr.2020	Plane stress and plane strain analysis, 3D stress analysis.	Chalk & Talk, CD, PPT
15	14-17 Apr.2020	Simulation Packages ABAQUS-COMSOL Multiphysics-Modeling Applications.	Chalk & Talk, CD, PPT

COURSE ASSESSMENT METHODS (shall range from 4 to 6)

S.No.	Mode of Assessment	Week/Date	Duration	% Weightage
1	Cycle Test - I	Feb. 2 nd Week	60 min	20
2	Quiz/Seminar	Mar. 1 st Week	30 min	10
3	Cycle Test - II	Mar. 4 th Week	60 min	20
CPA	Compensation Assessment	Apr. 2 nd Week	60 min	--
4	Final Assessment	Apr. 3 rd Week	180 min	50
Total Marrks				100

COURSE EXIT SURVEY (mention the ways in which the feedback about the course shall be assessed)

- Asking summary of each class at the end of class.
- Performance in the assessment methods.
- Questionnaire about the effectiveness of the delivery method, topics and the knowledge gained.

COURSE POLICY (including compensation assessment to be specified)

MODE OF CORRESPONDENCE (email/ phone etc)

- Both e-mail and phone

COMPENSATION ASSESSMENT POLICY

- It is a test with duration of 60 min. appropriate weightage (20 or 10) will be calculated.

ATTENDANCE POLICY (A uniform attendance policy as specified below shall be followed)

- At least 75% attendance in each course is mandatory.



Guidelines

- a) The number of assessments for any theory course shall range from 4 to 6.
- b) Every theory course shall have a final assessment on the entire syllabus with at least 30% weightage.
- c) One compensation assessment for absentees in assessments (other than final assessment) is mandatory. Only genuine cases of absence shall be considered.
- d) The passing minimum shall be as per the regulations.

B.Tech. Admitted in				P.G.
2018	2017	2016	2015	
35% or (Class average/2) whichever is greater.		(Peak/3) or (Class Average/2) whichever is lower		40%

- e) Attendance policy and the policy on academic dishonesty & plagiarism by students are uniform for all the courses.
- f) Absolute grading policy shall be incorporated if the number of students per course is less than 10.
- g) Necessary care shall be taken to ensure that the course plan is reasonable and is objective.