

K.S. Rangasamy College of Arts and Science (Autonomous)
Tiruchengode- 637 215
Department of Physics


M.Sc., Physics

Details of New Courses Introduced

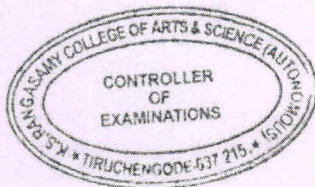
- IDC Practical I: Multimedia Tools (18PCSPHIP201)
- IDC I: Computer Graphics and Multimedia (18PCSPHI201)
- Elective II: Instrumental Methods of Analysis (18PPHEL303)
- Core Practical IV: Computation using MATLAB (18PPHMP401)
- Core XII : Computational Physics (18PPHM403)



HOD

Dr. G. SURESH KUMAR, M.Sc., M.Phil., Ph.D.
Assistant Professor and Head,
Department of Physics,
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COE

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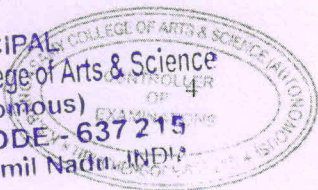

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M.Sc., Physics (Students admitted from 2018-2019 onwards)

SCHEME OF EXAMINATION

Subject Code	Subject	Hrs of Instruction	Exam Duration (Hrs)	Max Marks			Credit Points
				CA	CE	Total	
First Semester							
Part A							
18PPHM101	Core I : Mathematical Physics	6	3	25	75	100	5
18PPHM102	Core II: Classical Mechanics	6	3	25	75	100	5
18PPHM103	Core III: Statistical Mechanics	6	3	25	75	100	5
18PPHM104	Core IV: Condensed Matter Physics	6	3	25	75	100	5
18PPHMP101	Core Practical I: Advanced Physics Practical I	5	4	40	60	100	3
Non-credit							
18PLS101	Career Competency Skills I	1	-	-	-	-	-
Total		30		500			23
Second Semester							
Part A							
18PPHM201	Core V: Quantum Mechanics I	6	3	25	75	100	5
18PPHM202	Core VI : Electromagnetic Theory	6	3	25	75	100	5
	Elective I	5	3	25	75	100	4
18PPHMP201	Core Practical II: Advanced Physics Practical II	5	4	40	60	100	3
18PCSPHI201	IDC I: Computer Graphics and Multimedia	3	3	25	75	100	2
18PCSPHIP201	IDC Practical I: Multimedia Tools	2	3	40	60	100	2
Part B							
18PVE201	Value Education: Human Rights	2	3	25	75	100	2
Non-credit							
18PLS201	Career Competency Skills II	1	-	-	-	-	-
Total		30		700			23

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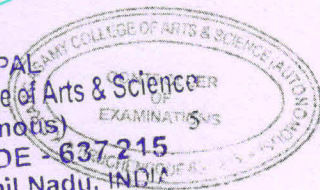


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Subject code	Subject	Hrs of Instruction	Exam Duration (Hrs)	Max Marks			Credit Points
				CA	CE	Total	
Third Semester							
Part A							
18PPHM301	Core VII: Quantum Mechanics II	6	3	25	75	100	5
18PPHM302	Core VIII: Advanced Electronics	6	3	25	75	100	4
18PPHM303	Core IX: Microprocessor and Microcontroller	5	3	25	75	100	4
	Elective II	5	3	25	75	100	4
18PPHMP301	Core Practical III: Advanced Electronics Practical	4	3	40	60	100	3
Optional Papers							
18PECPHI301	IDC II: Modern Biomedical Instrumentation	4	3	25	75	100	4
18PBCPHI301	IDC II: Molecular Biophysics						
Total		30		600			24
Fourth Semester							
Part A							
18PPHM401	Core X: Spectroscopy	6	3	25	75	100	4
18PPHM402	Core XI: Nuclear and Particle Physics	6	3	25	75	100	4
18PPHM403	Core XII: Computational Physics	6	3	25	75	100	4
18PPHMP401	Core practical IV: Computation using MATLAB	3	3	40	60	100	2
18PPHPR401	Project & Viva-Voce	5	-	50	150	200	6
Total		26		600			20
Grand total				2400			90

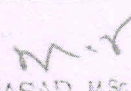
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18PCSPHI201	INTER DISCIPLINARY COURSE I: COMPUTER GRAPHICS AND MULTIMEDIA	SEMESTER - II	
COURSE OBJECTIVES			
The course aims			
<ul style="list-style-type: none"> To provide better knowledge of display systems, image synthesis and shape modeling of 3D applications To understand the basic concepts related to multimedia including data standards, algorithms and design. 			
Credits: 3		Total Hours: 40	
UNIT	CONTENTS	Hrs	CO
I	2D transformations - Clipping - Point clipping - Line clipping - Polygon clipping - Text clipping - Exterior clipping - Window to view port mapping - Interactive input methods - Picture construction techniques.	8	CO1
II	3D concepts - 3D transformations - 3D viewing - Visible surface detection methods - Back face detection method - Depth buffer method - Scan line method - Virtual reality environment.	8	CO2
III	Introduction to multimedia - Applications - Hypermedia - Authoring - File formats - Color models - Digital audio - Digital music making - MIDI - Digital video - Video compression techniques - Video performance measurements -Multimedia databases - Animation.	8	CO3
IV	Multimedia network services - Network protocols - Requirements for multimedia communications - Multimedia conferencing architectures - Quick time movie file format - MHEG - Multimedia file sharing - Multimedia & Internet - Real time interchange.	8	CO4
V	Design of a multimedia system - Content based information retrieval - HDTV, ATV, EDTV, IDTV standards - Development of user interface design - Multimedia broadcasting - Social media sharing - Multimedia development issues - Sample multimedia project.	8	CO5
TEXT BOOKS:			
1	Donald Hearn and M. Pauline Baker, 2012. Computer Graphics C Version. [Second Edition]. Pearson Education, India.		
2	David Hillman, 2008. Multimedia: Technology and applications. Delmar Cengage Learning, USA.		


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REFERENCE BOOKS:	
1	John F. Koegel Buford. 2009. Multimedia Systems. [Sixth Edition]. Pearson Education, India.
2	Tom McCreynolds and David Blythe. 2005. Advanced Graphics Programming Using OpenGL. Amsterdam, Netherlands.

COURSE OUTCOMES (CO)

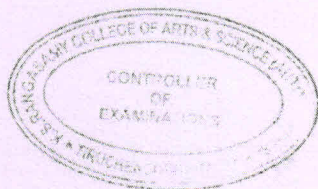
After completion of the course, the students will be able to

CO 1	Know the concept of 2D transformations, image clipping methods and picture construction techniques.
CO 2	Describe the 3D concepts and 3D modeling.
CO 3	Know the fundamentals of multimedia and its various applications.
CO 4	Describe the various multimedia network services and real time interchange.
CO 5	Explain the design of various multimedia systems.

MAPPING

PSO CO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO 1	M	L	H	H	H
CO 2	M	M	H	H	H
CO 3	M	L	H	H	H
CO 4	M	M	H	H	H
CO 5	M	L	H	H	H

H-High; M-Medium; L-Low;



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18PCSPHIP201	INTER DISCIPLINARY COURSE PRACTICAL I: MULTIMEDIA TOOLS	SEMESTER - II
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COURSE OBJECTIVE:

The course aims

- To give practice in multimedia tools for making combination such as text, audio, images, animations, video and interactive element.

Credits: 2

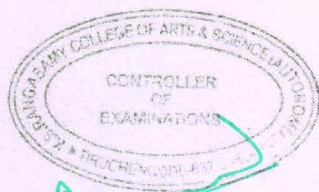
Total Hours: 20

Ex.No.	LIST OF EXPERIMENTS	Hrs	CO
1	Retouching of images	2	CO 1
2	Gray scale to color conversion of an image	2	CO 2
3	Image optimization	2	CO 1
4	Image manipulation using filters	2	CO 1
5	Image compression	2	CO 1
6	Guide layer effects in an image.	2	CO 3
7	Frame by Frame animation	2	CO 3
8	Interactive animation	2	CO 3
9	Object and motion tweening	2	CO 3
10	Video and audio effects	2	CO 3

COURSE OUTCOMES (CO)

After completion of the course, the students will be able to

CO 1	Work with retouch, manipulate and compress the given images using multimedia tools.
CO 2	Practice on converting gray image to color image.
CO 3	Practice on various kinds animation as well as video and audio effects.




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18PPHEL303	ELECTIVE II: INSTRUMENTAL METHODS OF ANALYSIS	SEMESTER - III	
COURSE OBJECTIVES:			
The course aims			
<ul style="list-style-type: none"> To impart knowledge on different errors, analysis of experimental data and concept of stress analysis. To impart knowledge on the basic theories, construction and working of various analytical instruments for analyze the materials. 			
Credits: 4		Total Hours: 50	
UNIT	CONTENTS	Hrs	CO
I	Errors and analysis of experimental data: Types of errors - Mean, variance and standard deviation - Sampling techniques - Chi square test. Experimental stress analysis: Stress analysis by strain gauging - high temperature strain gauge techniques - Photoelasticity and holography.	10	CO1
II	Thermal analysis: Thermogravimetric analysis - Instrumentation and applications - Differential scanning calorimetric - Instrumentation - Specific heat capacity measurements - Determination of thermochemical parameters - Differential thermal analysis - Basic principles - Melting point determination and analysis.	10	CO2
III	X-ray analysis: Single crystal and powder X-ray diffraction - Interpretation of diffraction patterns - Indexing - Unknown and phase identification - Thin film characterization - Energy dispersive X-ray analysis - X-ray fluorescence method and its applications.	10	CO3
IV	Optical methods and electron microscopy: IR and Raman spectroscopy - X-ray photoelectron spectroscopy - Diffuse reflectance spectra - Photoluminescence spectroscopy - Near field scanning optical microscopy - Transmission electron microscopy - Scanning probe microscopy - Atomic force microscopy.	10	CO4
V	Electrical methods : Hall Effect - Carrier density - Resistivity - Two probe and four probe methods - CV characteristics - Schottky barrier capacitance - Impurity concentration - Electrochemical CV profiling - Limitations. Magnetic methods: SQUID - VSM.	10	CO5


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TEXT BOOKS:	
1	Sivasankar, B. 2012. Instrumental Methods of Analysis, Oxford University Press, Oxford.
2	Belk, J.A. 1979. Electron microscopy and Microanalysis of Crystalline Materials, Applied Science Publishers, London.
REFERENCE BOOKS:	
1	Willard, Merritt, Dean and Settle. 2012. Instrumental Methods of Analysis, CBS Publishers, New Delhi.
2	Philips, V.A. 1971. Modern Metallographic Techniques and their Applications, Wiley Interscience, USA.
WEB REFERENCES:	
1	https://nptel.ac.in/syllabus/103108100/
2	https://epgp.inflibnet.ac.in/ahl.php?csrno=831
3	https://nptel.ac.in/courses/113104004/

COURSE OUTCOMES (CO)

After completion of the course, the students will be able to

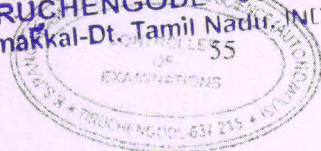
CO 1	Explain the different errors, analysis of experimental data and concept of stress analysis.
CO 2	Describe the principle and working of different analytical methods for thermal analysis.
CO 3	Utilize the X-ray diffraction technique for characterizing the crystals and thin films.
CO 4	Explain the fundamentals of various optical and electron microscopic techniques.
CO 5	Apply the various analytical methods for measuring the electrical properties of materials.

MAPPING

PSO \ CO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO 1	M	H	H	H	M
CO 2	H	H	H	H	L
CO 3	H	H	H	H	M
CO 4	H	H	H	H	H
CO 5	H	M	H	H	M

H-High; M-Medium; L-Low;

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18PPHMP401	CORE PRACTICAL IV: COMPUTATION USING MATLAB	SEMESTER - IV	
COURSE OBJECTIVES			
The course aims			
<ul style="list-style-type: none"> To develop computation skill for computing simple equations through Matlab programming. 			
Credits: 3		Total Hours: 36	
Ex.No.	LIST OF EXPERIMENT (Any twelve experiments)	Hrs	CO
1	Matlab Programming - Charging of a capacitor in an RC circuit with three time constants.	3	CO 1
2	Matlab programming - Full wave rectifier - Determination of (a) peak-to-peak value of ripple voltage (b) DC output voltage (c) Discharge Time of the Capacitor (d) period of ripple voltage.	3	CO 1
3	Matlab programming - Frequency response of a low pass Op-Amp filter circuit.	3	CO 1
4	Matlab programming - Plot of voltage and current in RLC circuit under steady state conditions.	3	CO 2
5	Matlab programming - NPN Transistor - plotting Input & Output characteristics.	3	CO 2
6	Matlab Programming - Roots of a quadratic equation and solution of a system of linear equations.	3	CO 2
7	Matlab Programming - Solution of ordinary differential equations.	3	CO 2
8	Matlab programming - Diode - Plot of forward characteristics & load line plot- estimation of operating point.	3	CO 2
9	Matlab Programming - Solutions of roots of polynomial equations by graphic method	3	CO 3
10	Matlab Programming - Runge-Kutta method.	3	CO 3
11	Matlab Programming - Newton - Raphson method.	3	CO 3
12	Matlab Programming - Solutions Mean, median & standard deviation.	3	CO 3
13	Matlab Programming - Curve fitting & Interpolation.	3	CO 3
14	Matlab Programming - Matrix summation, subtraction and multiplication.	3	CO 4
15	Matlab Programming - Matrix inversion and solution of simultaneous Equations.	3	CO 4
REFERENCE: M.Sc., Physics lab manual			

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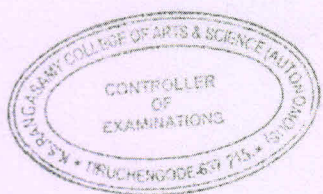
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COURSE OUTCOMES (CO)

After completion of the course, the students will be able to

CO 1	Compute simple equations such as charging of a capacitor and full wave rectifier equation through Matlab program.
CO 2	Plot the characteristic curve of NPN transistor, diode, RLC circuit, Frequency response curve of low pass filter
CO 3	Find out the solution for differential equation as well as numerical problems.
CO 4	Compute matrix and find out the solution.

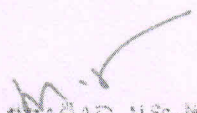


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18PPHM403		CORE XII: COMPUTATIONAL PHYSICS		SEMESTER - IV	
COURSE OBJECTIVE					
The course aims					
<ul style="list-style-type: none"> To impart knowledge on numerical differentiation, integration and MATLAB for computation. 					
Credits : 4			Total Hours: 50		
UNIT	CONTENTS	Hrs	CO		
I	Numerical differentiation: Finding roots of a polynomial - Bisection method - Newton Raphson method - Solution of simultaneous linear equation by Guass elimination method - Solution of ordinary differential equation by Euler, Runge-Kutta fourth order method for solving first order ordinary differential equations.	10	CO1		
II	Numerical integration: Newton's cotes formula - Trapezoidal rule - Simpson's 1/3 rule - Simpson's 3/8 rule - Boole's rule - Gaussian quadrature method (2 point and 3 point formula) - Giraffe's root square method for solving algebraic equation.	10	CO2		
III	Matlab fundamentals: Introduction - Matlab features - Desktop windows: Commands, workspace, command history, array editor and current directory - Matlab help and demos - Matlab functions, operators, and commands. Basic arithmetic in Matlab - Basic operations with scalars, vectors and arrays - Matrices and matrix operations - Complex Numbers - Matlab built - In functions - Illustrative Examples.	10	CO3		
IV	Matlab programming: Control flow statements : <i>if, else, else if, switch</i> statements - <i>for, while</i> loop structures - <i>break</i> statement -Input/output commands - Script M-files - function M-files - Controlling output.	10	CO4		
V	Matlab graphics: 2D plots - Planar plots, log plots, scatter plots, Contour plots - Multiple figures, graph of a function - Titles, labels, text in a graph - Line types, marker types, colors - 3D graphics - Curve plots - Mesh and surface plots - Illustrative examples.	10	CO5		
TEXT BOOKS:					
1	Venkataraman, M.K. 1996, Numerical methods in science and Engineering. [5th Edition]. National Publishing Co., Chennai.				


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2	Rudra Pratap, 2016. Getting Started with MATLAB. [Seventh edition]. Oxford University Press, New Delhi.
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REFERENCE BOOKS:

1	Sastry, S.S., 2005. Introductory methods of Numerical analysis. [Fourth Edition] Prentice Hall of India, Delhi.
2	John Mathews and Kurtis Fink, 2006. Numerical Methods to using MATLAB. [Fourth Edition], Prentice Hall, New Jersey.
3	Sergey E. Lyshevski, 2005. Engineering and Scientific Computations using MATLAB, [First Edition], John Wiley & Sons, USA.
4	Kuncicky, D.C. 2003. Matlab Programming. [Fourth Edition]. Pearson Education.

WEB REFERENCES:

1	https://epgp.inflibnet.ac.in/ahl.php?csrno=25
2	https://nptel.ac.in/courses/103106118/
3	https://www.mathworks.com/discovery/scientific-computing.html

COURSE OUTCOMES (CO)

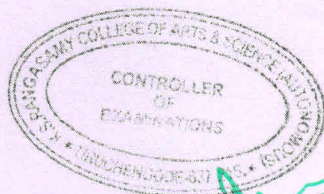
After completion of the course, the students will be able to

CO 1	Solve the problems using various numerical differentiation methods.
CO 2	Solve the problems using various numerical integration methods.
CO 3	Explain the fundamentals of Matlab.
CO 4	Design the simple Matlab program.
CO 5	Create the different 2D and 3D graphics using Matlab.

MAPPING

PSO CO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO 1	L	H	H	H	H
CO 2	L	H	H	H	H
CO 3	M	H	H	H	H
CO 4	M	H	H	H	H
CO 5	M	H	H	H	M

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