

RAJIV GANDHI UNIVERSITY

(A Central University)

RONO HILLS :: DOIMUKH



DEPARTMENT OF MATHEMATICS

One Semester Course Structure

Ph. D. (Course Work)

Mathematics & Computing

w.e.f. 2019-20



  
Department of Mathematics

**HEAD**  
Department of Mathematics  
Rajiv Gandhi University  
Rono Hills, Doimukh (A.P.)




## STRUCTURE OF THE SYLLABUS FOR Ph. D. COURSE WORK

<i>Ph. D. Course Work (One Semester)</i>			
<i>Semester</i>	<i>Paper Code</i>	<i>Title</i>	<i>Marks Distribution</i>
<i>I-Semester (Two Papers) Compulsory</i>	<i>MATH -701</i>	<i>Research Methodology</i>	<i>Theory-60, Internal- 20, Project-20</i>
	<i>MATH -702</i>	<i>Computer Applications</i>	<i>Theory-50, Internal- 20, Practical-30</i>

***(Approved by the BPGS in Mathematics held on 16 May 2019)***



  
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# Ph. D. (Course Work) Syllabus FIRST SEMESTER

## MATH: 601: RESEARCH METHODOLOGY

Maximum marks	: 100 (Terminal–60, Sessional–20, Project–20)
Term end	: 60
Terminal Examination duration	: 2 and ½ hours

Unit	Contains	Marks
<b>I</b>	<b>An overview of Research Methodology:</b> Research concept, characteristics of Research, the choice and statement of research problem, justification and hypothesis. Literature collection-textual and digital. <b>Elementary Scientific Method:</b> Authority in science, observation and descriptions, analysis and synthesis, Hypothesis, Deduction, Models and Mathematics, Testing of Hypothesis, Preparation of research synopsis, Significance of Research Work.	<b>20</b>
<b>II</b>	<b>Scientific writing skills and Technical writing skills:</b> Form of scientific and technical writing: Planning and Producing documents, Documents types, elements of technical documents, Graph and figure, Paragraphs, Mechanism of, citing sources and listing Reference, Reference Writings, Different types of Article and Theses writing styles.	<b>20</b>
<b>III</b>	<b>Numerical Analysis:</b> Interpolations, Differentiations and Integrations. Solving differential equations by Euler and Euler modified methods, Finite Difference Methods.	<b>20</b>

### UNIT-IV : PROJECT WORK

Contact Hours Per Week	: 2 hours
Examination Duration	: 1 hour
Maximum Marks	: <b>20</b> (Record-10, Presentation-5, Viva-5)

### **Research Project Proposal and Resource Generation:**

1. Write a Research Project Proposal;
2. Getting funds from different funding agencies.

### **Internal Assessment: Seminar Presentation.**

**Marks – 20**

### **Text and Reference Books**

1. Nicholas J. Higham: Handbook of Writing for the Mathematical Sciences, Second Edition, SIAM Publisher (1998).
2. Robert K, Yin: Case Study Research: Design and Methods, Sage Publications Ltd., London (2008).
3. Leslie C. Prerelman: The Mayfield Technical Scientific Writing, Tata James parade & McGraw Hills (2001).
4. H. C. Saxena: Finite Difference and Numerical Analysis, S. Chand & Co. (2005).



# **FIRST SEMESTER**

## **MATH: 602: COMPUTER APPLICATIONS**

Maximum marks	: 100 (Terminal–50, Sessional–20, Practical–30)
Term end	: 50
Terminal Examination duration	: 2 hours

Unit	Contains	Marks
<b>Plane Geometry</b>		
I	<i>Fundamental of Computing, Windows and UNIX (Linux) operating systems, MS- Office, Problem Solving Techniques, Networking.</i>	<b>20</b>
II	<i>Programming in C, MATLAB and MATHEMATICA, Complete idea on LaTeX and LyX.</i>	<b>30</b>

### **UNIT-III : PRACTICAL**

Contact Hours Per Week	: 2 hours
Examination Duration	: 2 hours
Maximum Marks	: <b>30</b> ( Expt-20, Viva-5, Record-5)

### **Experiments**

1. *Summation of series through MATHEMATICA / MATLAB / C – Programming.*
2. *Plotting the graphs of the polynomial of degree 2 to 5 through MATHEMATICA / MATLAB / C – Programming.*
3. *Solution of quadratic equations MATHEMATICA / MATLAB / C – Programming.*
4. *Obtaining adjoint and inverse of a matrix through MATHEMATICA / MATLAB / C – Programming.*
5. *Find the sum of Gregory's series by MATLAB.*
6. *Matrix operation (addition, multiplication, inverse, transpose) by MATHEMATICA / MATLAB.*
7. *Display Mathematical statements/Mathematical equations etc. by LaTeX.*
8. *Solution of ODE & PDE by MATHEMATICA / MATLAB.*
9. *Evaluation of Standard Deviation, Correlation, Regression etc by MATHEMATICA / MATLAB.*
10. *Solution of system of linear equations by Gauss Elimination method through MATHEMATICA / MATLAB / C – Programming.*

**Internal Assessment:      Seminar Presentation      Marks– 20**

### **Text and Reference Books**

1. *V. Rajarman: Fundamentals of Computing, PHI.*
2. *Jon Sticklen & M. Taner Eskil : An Introduction to Technical Problem Solving with MATAB v.7, 2e, 2006, Great lakes press.*
3. *Michel Trott: The Mathematical Guide Book for Programming, 2004, Springer-Verlag.*



4. *P. Dey and M. Ghosh: Computer Fundamentals and Programming in C, 2007, Oxford University Press*
5. *Shubhi Lall: Computer Fundamentals and Introduction to IBM. PC, 2005, University Book House*
6. *E.Balagurusamy: Programming in ANSIC, Tata McGraw Hill, 2001.*
7. *Laslie Lamport : LaTeX: a document preparation system, User's guide and reference Manual, 2<sup>nd</sup> Edition, Addison Wesley, 1994.*
8. *F. Mittelbach: The LaTeX Companion, 2<sup>nd</sup> Edition, Addison Wesley, 2004.*

