BHARATHIDASAN UNIVERSITY
TIRUCHIRAPPALLI – 620 024

M. Phil., MATHEMATICS PROGRAMME (CBCS)
(For the candidates to be admitted from the year 2009-2010 onwards)

Semester	Courses
I	4 Courses
II	1 Dissertation

Semester I	Title of the Course	Marks			Credits
		IA	UE	Total	
Course –I	Research Methodology	40	60	100	4
Course - II	Algebra and Analysis	40	60	100	4
Course- III	Paper on Topic of Research (Guide will prepare the syllabus and it will be sent to the COE)	40	60	100	4
Course – IV	Teaching and Learning skills (Common Paper)	40	60	100	4
Semester II					
	Dissertation and Viva-Voce Viva Voce 50 marks Dissertation 150 marks			200	8

For each Course other than the Dissertation

Continuous Internal Assessment	–	40 Marks
End Semester Examination	–	60 Marks
Total	–	100 Marks

Question paper pattern for Course I - III

10 questions compulsory	10 x 01 = 10 Marks (2 from each unit)
5 questions	05 x 04 = 20 Marks (either or type, one from each unit)
3 questions from 5	03 x 10 = 30 Marks (one question from each unit)
Total	60 Marks

Question paper pattern for Course IV

5 Questions   05 x 12 = 60 Marks (either or type, one from each unit)

CIA components

Tests	(2x10) -	20 Marks
Term Paper	–	10 Marks
Seminar	-	10 Marks

COURSE - I

RESEARCH METHODOLOGY

Course I   **Credits 4**

UNIT – I
    LOGIC: Propositions and Logical Operations – Conditional Statements – Methods of Proof – Mathematical Induction.

UNIT –II
    MATLAB : Programming in Matlab – Polynomials, Curve Fitting and Interpolation -Applications in Numerical Analysis.

UNIT –III
    TOPOLOGY : Homotopy of paths – The Fundamental Group – Covering Spaces - The Fundamental Group of the Circle – Retractions and Fixed Points.

UNIT –IV
    TOPOLOGY : Deformation Retracts and Homotopy Type – The fundamental Group of S^n - Fundamental Groups of Some Surfaces.

UNIT – V
    DIFFERENTIAL EQUATIONS: Uncoupled Linear systems – Diagonalization – Exponentials of operators – Fundamental theorem for Linear systems – Linear Systems in R^2 – Complex eigen values – Multiple eigen values – Jordan forms – Stability theory – Non-homogeneous linear systems.

TEXT BOOK(S):

1.   B. Kolman, R.C. Busby and S.C. Ross, Discrete Mathematical Structures, Fourth Indian reprint, Pearson Education Pvt Ltd, New Delhi, 2003.
    Unit I – Chapter 2

2.   Amos Gilat, MATLAB An Introduction with Applications, John wiley & sons, 2004.
    Unit II   – Chapters 7, 8 and 10

3.   James R. Munkres, Topology (2nd Edition), Prentice Hall of India, Pvt. Ltd., New Delhi, 2004.
    Unit III - Chapter 9 : Sections 51 -55.
    Unit IV - Chapter 9: Sections 58-60.

4.   L. Perko, Differential Equations and Dynamical systems, Springer-Verlag, First Indian Reprint, 2004.
    Unit V   –   Chapter 1 – 1.1 to 1.10

REFERENCES

[1] J.P. Tremblay and R. Manohar, Discrete Mathematical Structures with Applications to Computer Science, Tata McGraw-Hill, New Delhi, 1997.
[2] I.M. Singer and J.A. Thorpe, Lecture Notes on Elementary Topology and Geometry, Springer Verlag, 2004.
[3]   E.A Coddington and N. Levinson, Theory of Ordinary differential equations , Tata McGraw Hill, New Delhi, 1972.

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COURSE II - ALGEBRA AND ANALYSIS

Credits 4

UNIT I
      MODULES: Basic definitions – Group of homomorphisms – Direct products and sums of modules – Free modules – Vector spaces – The dual space and dual module.

UNIT II
      NOETHERIAN RINGS: Basic criteria – Associated primes – Primary decomposition - Nakayama's lemma

UNIT III
      REISZ REPRESENTATION THEOREM: Topological preliminaries - Riesz representation theorem – Regularity properties of Borel measures –Lebegue measure – continuity properties of measurable functions

UNIT IV
      FOURIER TRANSFORSMS: Formal properties – Inversion theorem – The Plancherel theorem – Banach Algebra L^1

UNIT V
      RIEMANN MAPPING THEOREM: Preservation of angles – Linear fractional transformations – Normal families - Riemann Mapping Theorem

TEXT BOOKS

[1]   Serge Lang, "Algebra", Springer - Verlag, Revised Third Edition, 2002.
      Unit – I - Chapter III: Sections 1 to 6
      Unit – II - Chapter X: Sections 1 to 4.

[2]   W. Rudin, Real and Complex Analysis, 3rd edition, McGraw Hill International, 1986.
      Unit III – Chapter 2
      Unit IV – Chapter 9
      Unit V - Chapter 14 Pages 278-289

REFERENCES

[1] C. Musili, Rings and Modules, 2nd edition, Narosa, 1994.
[2] P.B. Bhattacharya et al., Basic Abstract Algebra, 2nd edition, Cambridge University Press, 1995.
[3] Serge Lang, Complex Analysis, Addison Wesley, 1977.
[4] V. Karunakaran, Complex Analysis 2 edn, Narosa, New Delhi, 2005.
[5] C.D. Aliprantis and O.Burkinshaw, Priniciples of Real Analysis 2edn, Academic Press, Inc. New York, 1990.

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COURSE –IV – TEACHING AND LEARNING SKILLS

Objectives:

⋗ acquaint different parts of computer system and their functions

⋗ understand the operations and use of computers and common Accessories

⋗ develop skills of ICT and apply them in teaching learning context and Research

⋗ appreciate the role of ICT in teaching, learning and Research

⋗ acquire the knowledge of communication skill with special reference to its elements, types, development and styles

⋗ understand the terms communication Technology and Computer mediated teaching and develop multimedia / e-content in their respective subject

⋗ understand the communication process through the web

⋗ acquire the knowledge of Instructional Technology and its Applications

⋗ develop different teaching skills for putting the content across to targeted audience

Unit I – Computer Application Skills

Computer system: Characteristics, Parts and their functions – Different generations of Computer – Operation of Computer: switching on / off / restart, Mouse control, Use of key board and some functions of key – Information and Communication Technology (ICT): Definition, Meaning, Features, Trends – Integration of ICT in teaching and learning – ICT applications: Using word processors, spread sheets, Power point slides in the classroom – ICT for Research: On-line journals, e-books, Courseware, Tutorials, Technical reports, Theses and Dissertations

Unit II – Communication Skills

Communication: Definitions – Elements of Communication: Sender, Message, Channel, Receiver, Feedback and Noise – Types of Communication: Spoken and written; Non-verbal communication – Intrapersonal, Interpersonal, Group and Mass communication – Barriers to communication: Mechanical, Physical, Linguistic & Cultural – Skills of communication: Listening, Speaking, Reading and writing – Methods of developing fluency in oral and written communication – style, Diction and Vocabulary – Classroom communication and dynamics

Unit III – Communication Technology

Communication Technology: Bases, Trends and Developments – Skills of using Communication Technology – Computer Mediated Teaching: Multimedia, E-content – Satellite-based communication: EDUSAT and ETV channels, Communication through web: Audio and Video applications on the Internet, interpersonal communication through the web.

Unit IV – Pedagogy

Instructional Technology: Definition, Objectives and Types – Difference between Teaching and Instruction – Lecture Technique: Steps, Planning of a Lecture, Delivery of a lecture – Narration in tune with the nature of different disciplines – Lecture with power point presentation – Versatility of lecture technique – Demonstration, Characteristics, Principles, Planning Implementation and Evaluation – Teaching – Learning Techniques: Team Teaching, Group discussion, Seminar, Workshop, Symposium and Panel Discussion – Models of teaching: CAI, CMI and WBI

Unit V – Teaching Skills

Teaching skill: Definition, Meaning and Nature – Types of Teaching skills: Skill of Set Induction, Skill of Stimulus Variation, Skill of Explaining, Skill of Probing Questions, Skill of Black Board writing and Skill of Closure – Integration of Teaching Skills – Evaluation of Teaching Skills

References:

1. Bela Rani Sharma (2007), Curriculum Reforms and Teaching Methods, Sarup and sons, New Delhi
2. Don Skinner (2005), Teacher Training, Edinburgh University Press Ltd., Edinburgh
3. Information and Communication Technology in Education: A Curriculum for Schools and programme of Teacher development, Jonathan Anderson and Tom Van Weart, UNESCO, 2002
4. Kumar K.I (2008) Educational Technology, New Age International Publishers, New Delhi
5. Mangal, S.K. (2002) Essential of Teaching – Learning and Information Technology, Tandon Publications, Ludhiana
6. Michael D. and William (2000), Integrating Technology into Teaching and Learning: Concepts and Applications, Prentice Hall, New York
7. Pandey S.K. (2005) Teaching Communication, Commonwealth Publishers, New Delhi
8. Ram Babu A. and Dandapani S (2006) Microteaching (Vol.1&2) Neelakamal Publications, Hyderabad
9. Singh V.K. and Sudarshan K.N. (1996) Computer Education, Discovery Publishing Company, New York
10. Sharma R. A. (2006) Fundamentals of Educational Technology, Surya Publications, Meerut
11. Vanaja. M. and Rajasekar S. (2006) Computer Education, Neelkamal Publications, Hyderabad.

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