

**DEPARTMENT OF COMPUTER APPLICATIONS
NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI**

COURSE PLAN – PART I

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| Name of the programme and specialization | M.C.A | | |
| Course Title | MATHEMATICAL FOUNDATIONS OF COMPUTER APPLICATIONS | | |
| Course Code | CA 713 | No. of Credits | 3 |
| Course Code of Pre-requisite subject(s) | nil | | |
| Session | Jan 2021 | Section (if, applicable) | A and B |
| Name of Faculty | Dr. N.P.Gopalan | Department | Computer Applications |
| Email | npgopalan@nitt.edu | Telephone No. | 9443416970 |
| Name of PAC Chairman | Dr Sangeetha | | |
| E-mail | Sangeetha@nitt.edu | Telephone No. | |
| Course Type | Core Course | | |
| Syllabus (approved in BoS) | | | |
| Sets - Relations – Posets - Functions - Mathematical Inductions (Simple and strong) – Principles of Counting (Addition & Multiplication) Mathematical Logic – Predicate Calculus – Scope – Binding – Resolution | | | |
| Graphs - Basic concepts - Isomorphism – complements - Matrix representation of graphs - Trees, Spanning trees, Minimal Spanning tree Algorithms - Euler graphs - Hamiltonian graphs. | | | |
| Recurrence Relations and Generating Functions - Homogeneous and non-homogeneous recurrences and their solutions - solving recurrences using generating functions | | | |
| Regular Grammars -Finite Automata – Context-Free Grammars – Chomsky’s Normal form -Greibach Normal Form - Push-down Automata - Equivalence of CFL’s and PDA’s - Non-context free languages | | | |
| REFERENCES: | | | |
| 1. Thomas Koshy, “Discrete Mathematics with Applications”, Elsevier,2006. | | | |
| 2. NarsinghDeo, “Graph theory and applications to Engineering and Computer Science”, PHI,1986. | | | |
| 3. Arthur Gill, “Applied Algebra for the Computer Sciences”, Prentice Hall,1976. | | | |
| 4. Michael Sipser, “Introduction to Theory of Computation”, PWS Publishing Co,1996. | | | |
| COURSE OBJECTIVE(S) | | | |
| <ul style="list-style-type: none"> To learn the mathematical foundations applicable to computing. | | | |
| COURSE OUTCOMES (CO) | | | |
| Course Outcomes | Aligned Programme Outcomes (PO) | | |
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| 1.Explain functions and related concepts and illustrate its direct application in Computer languages | PO I, II, III, IV, V |
| 2. Solve the problems using the concepts of Graphs, Trees. | PO I, II, IV, V |
| 3. Deduce complex task by various Mathematical logic. | PO I, II, III, V |
| 4. Solve recurrence relations for a given problem | PO II, III, IV |

COURSE PLAN – PART II

COURSE OVERVIEW

This course provides a thorough understanding of all Mathematical concepts needed for the MCA curriculum.

COURSE TEACHING AND LEARNING ACTIVITIES

| S.No. | Week/ Contact Hours | Topic | Mode of Delivery |
|--------------|--------------------------------|--|---|
| 1 | Week 1 (4 Classes) | Sets - Relations – Posets - Functions - Mathematical Inductions (Simple and strong) – Principles of Counting (Addition & Multiplication) | Online teaching modes with online tools |
| 2 | Week 2 (4 Classes) | Mathematical Logic – Predicate Calculus – Scope – Binding – Resolution | Online teaching modes with online tools |
| 3 | Week 3 (4 Classes) | Distribution of objects and Ferrers graph | Online teaching modes with online tools |
| 4 | Week 4 (3 Classes) | Graphs - Basic concepts - Isomorphism – complements - Matrix representation of graphs | Online teaching modes with online tools |
| 5 | Week 5 (4 Classes) | Trees, Spanning trees, Minimal Spanning tree Algorithms - Euler graphs - Hamiltonian graphs | Online teaching modes with online tools |
| 6 | Week 6 (4 Classes) | Recurrence Relations and Generating Functions - Homogeneous and non-homogeneous recurrence and their solutions. | Online teaching modes with online tools |
| 7 | Week 7 (4 Classes) | solving recurrences using generating functions | Online teaching modes with online tools |
| 8 | Week 8 (4 Classes) | Regular Grammars -Finite Automata – Context-Free | Online teaching modes with online tools |
| 9 | Week 9(4 Classes) | Grammars – Chomsky's Normal form -Greibach Normal Form | Online teaching modes with online tools |
| 10 | Week 10(4 classes) | Push-down Automata - Equivalence of CFL's and PDA's - Non-context free languages | Online teaching modes with online tools |

COURSE ASSESSMENT METHODS

| S. No. | Mode of Assessment | Week/Date | Duration | % Weightage |
|--------|-------------------------------|-----------------------|-------------|-------------|
| 1 | Cycle Test-1 | 6 th Week | 60 Minutes | 30 |
| 2 | Assignment-1/Quiz-1/Project-1 | 8 th week | - | 10 |
| 3 | Cycle Test 2 | 10 th Week | 60 Minutes | 30 |
| 4 | Final Assessment | - | 120 Minutes | 30 |

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

- **At least 75% attendance in each course is mandatory.**
- Students with **less than 65% of attendance** shall be prevented from writing the final assessment and **shall be awarded 'V' grade.**

ACADEMIC DISHONESTY & PLAGIARISM

- Talking to other students, copying from others during an assessment will be treated as punishable dishonesty.
- Zero mark to be awarded for the offenders. For copying from another student, both students get the same penalty of zero mark.
- The departmental disciplinary committee including the course faculty member, PAC chairperson and the HoD, as members shall verify the facts of the malpractice and award the punishment if the student is found guilty. The report shall be submitted to the Academic office.

The above policy against academic dishonesty shall be applicable for all the programmes.

ADDITIONAL INFORMATION

NIL

FOR APPROVAL


Course Faculty


CC-Chairperson _____


HOD _____