

॥ सा विद्या या विमुक्तये ॥



स्वामी रामानंद तीर्थ मराठवाडा विद्यापीठ, नांदेड

“ज्ञानतीर्थ” परिसर, विष्णुपुरी, नांदेड - ४३१६०६ (महाराष्ट्र)

SWAMI RAMANAND TEERTH MARATHWADA UNIVERSITY NANDED

“Dnyanteerth”, Vishnupuri, Nanded - 431606 Maharashtra State (INDIA)

Established on 17th September 1994 – Recognized by the UGC U/s 2(f) and 12(B), NAAC Re-accredited with 'A' Grade

ACADEMIC (1-BOARD OF STUDIES) SECTION

Phone: (02462) 229542

Website: www.srtmun.ac.in

E-mail: bos.srtmun@gmail.com

Fax : (02462) 229574

प्रस्तुत विद्यापीठातील संगणकशास्त्र संकुल, उपकेंद्र लातूर व संलग्नित महाविद्यालयातील येथील विज्ञान व तंत्रज्ञान विद्याशाखेतील पदव्युत्तर स्तरावरील MCA I Year (II Semester) या विषयाच्या अभ्यासक्रम शैक्षणिक वर्ष २०२०-२१ पासून लागू करण्याबाबत.

प रि प त्र क

या परिपत्रकान्वये सर्व संबंधितांना कळविण्यात येते की, प्रस्तुत विद्यापीठातील संगणकशास्त्र संकुल, उपकेंद्र लातूर व संलग्नित महाविद्यालयातील विज्ञान व तंत्रज्ञान विद्याशाखेतील पदव्युत्तर स्तरावरील MCA I Year (II Semester) या विषयाच्या C.B.C.S. (Chose Based Credit System) Pattern नुसारच्या अभ्यासक्रमास शैक्षणिक वर्ष २०२०-२१ पासून लागू करण्याच्या दृष्टीने मा. कुलगुरू महोदयांनी मा. विद्यापरिषदेच्या मान्यतेच्या अधीन राहून मान्यता दिलेली असून त्यानुसार MCA I Year (II Semester) या विषयाचा अभ्यासक्रम लागू करण्यात येत आहे.

सदरील परिपत्रक व अभ्यासक्रम प्रस्तुत विद्यापीठाच्या www.srtmun.ac.in या संकेतस्थळावर उपलब्ध आहेत. तरी सदरील बाब ही सर्व संबंधितांच्या निदर्शनास आणून द्यावी.

जा.क्र.:शैक्षणिक-१/परिपत्रक/पदव्युत्तर-सीबीसीएस अभ्यासक्रम/

R-२०२०-२१/३८

दिनांक : २९.०५.२०२१

प्रत माहिती व पुढील कार्यवाहीस्तव :

- १) मा. अधिष्ठाता विज्ञान व तंत्रज्ञान, यांचे कार्यालय, प्रस्तुत विद्यापीठ.
- २) मा. संचालक, परीक्षा व मूल्यमापन मंडळ यांचे कार्यालय, प्रस्तुत विद्यापीठ.
- ३) प्राचार्य, सर्व संबंधित संलग्नित महाविद्यालये, प्रस्तुत विद्यापीठ.
- ४) सिस्टम एक्सपर्ट, शैक्षणिक विभाग, प्रस्तुत विद्यापीठ.
- ५) अधीक्षक, परीक्षा विभाग विज्ञान विद्याशाखा प्रस्तुत विद्यापीठ.

स्वाक्षरित

उपकुलसचिव

शैक्षणिक (१-अभ्यासमंडळ) विभाग

SWAMI RAMANAND TEERTH MARATHWADA UNIVERSITY,
NANDED
(NAAC Re-accredited with 'A' Grade)



**Curriculum Framework and Syllabus for
Outcome Based Education in
Master of Computer Applications (M.C.A) Degree Program
(02 Years Revised Course)
Second Semester
For the students admitted from the Academic year 2020-2021 onwards**

PREAMBLE

Now onwards, the MCA program is a two years full time AICTE approved program which is normally completed in four semesters. The AICTE always specifically draft Model Curriculum for MCA program. Since the duration of the MCA is now reduced to two years, an AIBITE – All India Board for Information Technology Education has been set up at National level for drafting the Model Curriculum for Revised MCA program. This committee has not yet come with the model curriculum. The BoS in Computer Science and Application of SRTMUN has conducted one online National Workshop for inputs regarding Revised Curriculum of the MCA program dated 28-01-2021. Eminent Experts and member of the AIBITE committee were invited to discuss. Based on their inputs, course structure for first two semesters is prepared. Keeping in mind the delay in starting current academic year due to COVID-19 crisis, it is decided to float the First Semester syllabi first and then second semester. This first year syllabi is as per CBCS (Choice Based Credit System) pattern, in which core, skill oriented courses are available. The Evaluation of performance of a student for the courses under Choice based Credit System (CBCS) are based on principle of continuous assessment through internal and external evaluation mechanisms.

The detailed structure for remaining semesters along with program objectives / outcomes, course objectives / outcomes, mappings of PO-CO, elective subjects, project development, open elective, etc shall be communicated soon once the AICTE Model Syllabus is out.

2 Years Master of Computer Applications (M.C.A) Degree Program

MCA -First Year [Second Semester]

Code No.	Title	Credit Pattern as per CBCS Policy*					
		Affiliated Colleges/ Institutes			Univ. Campus Schools		
		Internal Credits	External Credits	Total Credits	Internal Credits	External Credits	Total Credits
Core Courses							
MCA-R201	Understanding Operating Systems	01	03	04	02	02	04
MCA-R202	Introduction to Theory of Computations	01	03	04	02	02	04
MCA-R203	Software Engineering and Software Testing	01	03	04	02	02	04
Skill Empowering Courses							
MCA-R204	OOPs with Java	01	03	04	02	02	04
Elective Courses (Chose any one)							
MCA-R205 A	Design and Analysis of Algorithms	01	03	04	02	02	04
MCA-R205 B	Advanced Database Management System						
Practical / Lab							
MCA-R206	Lab -4: Based on MCA-R203	01	01	02	01	01	02
MCA-R207	Lab-5: Based on MCA-R204	01	01	02	01	01	02
MCA-R208	Lab-6: Based on Elective Course 205 A or 205 B	01	01	02	01	01	02
Open Elective Course (Chose any one)							
MCA-R209 A	University recognized MOOC (NPTEL/ SWAYAM / others) OR Intra / Inter Departmental OR Intra / Inter School OR RUSA sponsored Future Oriented Courses OR	01	00	01	01	00	01
MCA-R209 B	Professional Communication Skills (In-house Open Elective)						
Total Credits		09	18	27	14	13	27

* As per the SRTMUN policy for affiliated colleges as well as for Campus

The detailing of second semester is as below,

UNIT 1: Overview of Operating System

Operating System as an Extended Machine, as a Resource Manager, OPERATING SYSTEM CONCEPTS- Processes, Address Spaces, Files, Input/Output, Protection, Shell, SYSTEM CALLS-System Calls for Process Management, System Calls for File Management, System Calls for Directory Management, OPERATING SYSTEM STRUCTURE-Monolithic Systems, Layered Systems, Microkernels, Client-Server Model, Virtual Machines, Exokernels

UNIT 2: Process management and Threads

Process Model ,Process Creation, Process Termination, Process Hierarchies, Process States, Implementation of Processes, THREADS- Thread Usage, Classical Thread Model, POSIX Threads, Implementing Threads in User Space, Implementing Threads in the Kernel, Hybrid Implementations SCHEDULING-Introduction, Scheduling in Batch Systems, Scheduling in Interactive Systems, Scheduling in Real-Time Systems

UNIT 3: Memory management

MEMORY ABSTRACTION: ADDRESS SPACES, Notion of an Address Space, Swapping Managing Free Memory, VIRTUAL MEMORY- Paging, Page Tables, PAGE REPLACEMENT ALGORITHMS-Optimal Page Replacement, Not Recently Used Page Replacement, First-In First-Out (FIFO) Page Replacement, Least Recently Used (LRU) Page Replacement, SEGMENTATION

UNIT 4: File Systems

FILES-File Naming, File Structure, File Types, File Access, File Attributes, File Operations DIRECTORIES-Single-Level Directory Systems, Hierarchical Directory Systems, Path Names Directory Operations, FILE-SYSTEM IMPLEMENTATION-File-System Layout, Implementing Files, Implementing Directories, Shared Files

UNIT 5: Virtualization and the Clouds

History, Requirements For Virtualization, Type 1 And Type 2 Hypervisors, Techniques For Efficient Virtualization-Virtualizing the unvirtualizable , Cost Of Virtualization, Memory Virtualization, I/O Virtualization, Virtual Appliances Virtual Machines On Multicore Cpus, Licensing Issues, Clouds-Clouds As A Service, Virtual Machine Migration, Check Pointing

Reference Books

1. Operating Systems Concepts- Silberschatz A., Galvin P., Gagne G, Wiley Publication.
2. Modern Operating Systems, Andrew S. Tanenbaum, III rd Edition, PHI Publication.
3. Operating System-Internal and Design Principles, William Stallings, Pearson Education.
4. Principles of Operating Systems-Naresh Chauhan, First Edition, Oxford University press.
5. Operating Systems in Depth- Thomas W. Doeppner, Wiley Publications

UNIT 1: Fundamentals

Strings, Alphabet, Language, Operations, Finite state machine, definitions, finite automaton model, acceptance of strings, and languages, deterministic finite automaton and non deterministic finite automaton, transition diagrams and Language recognizers.

UNIT 2: Finite Automata

NFA- Significance, acceptance of languages. Conversions and Equivalence : NFA to DFA conversion, minimisation of FSM, equivalence between two FSM's, Finite Automata with output-Moore and Melay machines.

UNIT 3: Regular Languages

Regular sets, regular expressions, identity rules, Constructing finite Automata for a given regular expressions, Conversion of Finite Automata to Regular expressions. Closure properties of regular sets. (proofs not required).

UNIT 4: Context Free Grammars

Ambiguity in context free grammars. Minimisation of Context Free Grammars. Chomsky normal form, Greiback normal form. Enumeration of properties of CFL .

UNIT 5: Push Down Automata and Turing Machines

Push down automata, definition, model, acceptance of CFL, Acceptance by final state and acceptance by empty state and its equivalence. Equivalence of CFL and PDA, interconversion. (Proofs not required). Introduction to DCFL and DPDA, Turing Machine, definition, model, representation of TM.

TEXT BOOKS:

1. "Introduction to Automata Theory Languages and Computation". Hopcroft H.E. and Ullman J.
2. Introduction to Theory of Computation –Sipser 2nd edition Thomson

REFERENCE BOOKS:

1. Introduction to Computer Theory, Daniel I.A. Cohen, John Wiley.
2. Introduction to languages and the Theory of Computation ,John C Martin, TMH
3. "Elements of Theory of Computation", Lewis H.P. & Papadimition C.H. Pearson /PHI.
- 4 Theory of Computer Science – Automata languages and computation -Mishra and Chandrashekar, 2nd edition, PHI

UNIT 1: Software and Software Engineering

The nature of Software, The unique nature of Web Applications, Software engineering-A layered technology, General principles of software engineering practice, Software myths, Agile development: What is an Agile Process, Capability Maturity Model Integration (CMMI).

UNIT 2: Process models

A Generic process model (framework), Process assessment and improvement, Prescriptive process models: The waterfall model, Incremental process models, Evolutionary process models, The Unified process,

UNIT 3: Requirements Engineering

Understanding the Requirement, Requirement Modeling, Requirement Specification (SRS), Requirement Analysis and Requirement Elicitation, Requirement Engineering.

UNIT 4: Software Design concepts

Design Concepts and Design Principal, Software Architectural Design, Component Level Design, Function Oriented Design, Object Oriented Design, User Interface Design, Web Application Design

UNIT 5: Software Testing Strategies

Software Testing ,Software Testing fundamentals, Taxonomy of Software testing, Testing levels, Test case design , White box testing, boundary conditions, Control structure testing, regression testing, black box testing, Testing for specialized Environments, Architecture and applications. Approach to software testing, Strategic issues, Unit testing, Integration Testing, System Testing, Art of Debugging.

Reference Books:

1. Software Engineering –A Practitioner's approach, Sixth Edition, Roger S. Pressman, McGraw-Hill Higher Education; (1 August 2007),ISBN-10: 0077227808
2. Software Engineering –A Practitioner's approach, Fifth Edition, Roger S. Pressman, McGraw-Hill Higher Education; (1 August 2005)
3. Fundamentals of Software Engineering Second Edition, Rajib Mall, Prentic-Hall India.

UNIT 1: Introduction

History, Features, How java differ from C and C++?, Java program structure, Java tokens, Java Statements, Java virtual machine, Command line arguments, Constants, Variable, Data types, Type casting.

UNIT 2: Operators and Expressions

Decision making and branching, Decision making and looping, Class, Methods, Objects, Constructors, Method overloading, Static members, nesting of methods.

UNIT 3: Inheritance

Overriding methods, Final variables, Final methods, Final Classes, Finalizer method, Abstract methods, Abstract Classes, Visibility Control, Interface, Arrays, Strings, Vectors, Wrapper Classes.

UNIT 4: System Package

Naming conventions, Creating and accessing packages, Introduction to multithreaded programming, Creating and extending threads, Life cycle of thread, Thread exception, Thread priority, Synchronization, Implementing Runnable interface, Types of errors, Exceptions, Exception handling code, Multiple catch statements, finally statement, Throwing our own exceptions, Exception for debugging.

UNIT 5: Applets

How applet differ from application?, Applet code, Applet life cycle, Creating an executable applet, designing a web page, Applet tag, Passing parameter to applet.

Reference books

1. Programming with Java A Primer – E.Balaguruswamy, McGraw Hill.
2. Java 7 Programming Black Book -Kogent Learning Solutions Inc,DreamTech press.
3. Java Fundamentals A comprehensive introduction- Herbert Schildt, Dale Skrien,
4. The Complete Reference, Java 2 -, Herbert Schild, (Fourth Edition) - TMH.
5. Core Java Volume-I Fundamentals- Horstmannand Cornell, - Pearson Education.

UNIT 1: Introduction

What is an Algorithm? Fundamentals of Algorithmic Problem Solving, Review of Elementary Data Structures-Heaps and Heap Sort, Hashing, Sets Representation

UNIT 2: Divide-and-conquer

Introduction to Algorithms, Growth of functions, Solving recurrence equations: Substitution method, Iteration method and Master method , Finding Maximum and Minimum, Selection Strassen's Matrix Multiplication – Convex Hull.

UNIT 3: Greedy & dynamic programming

Greedy Approach: General Method, Knapsack problem, Minimum cost spanning trees, Single source shortest path problem. Dynamic Programming: Principle of optimality, All pairs shortest path problem, Longest common subsequence, Traveling salesperson problem.

UNIT 4: Backtracking & branch-and-bound

Backtracking: General method, 8 Queens Problem, Graph coloring, Sum of subset problem , Hamiltonian cycle. Branch and Bound, Knapsack problem, Traveling salesman problem.

UNIT 5: NP problems& approximation algorithms

NP-completeness, Polynomial time verification, Theory of reducibility, Circuit satisfiability NP-completeness proofs, NP-complete problems: Vertex cover, Hamiltonian cycle and Traveling Salesman problems

TEXTBOOKS:

1. Ellis Horowitz, Sartaj Sahni and Sanguthevar Rajasekaran, Fundamentals of Computer Algorithms, Second Edition, Universities Press, Hyderabad, 2008.
2. Thomas H Cormen, Charles E Leiserson, Ronald L Rivest and Clifford Stein, Introduction to Algorithms, Second Edition, Prentice Hall of India, New Delhi, 2007

REFERENCES:

3. Kenneth A. Berman and Jerome L. Paul, Algorithms, Cengage learning India Edition,
4. Sara Baase and Allen Van Gelder, Computer Algorithms – Introduction to Design & Analysis, Third Edition, Pearson Education, New Delhi, 2000.

UNIT 1 : Introduction

Review of the fundamental principles of database management systems, relational databases and SQL.

UNIT 2 : Query Processing

Steps in Query processing, basics of cost optimization, cost estimations for selection operation using liner and binary search, nested loop join and basics of query optimization

UNIT 3 : Transaction Management

Review of the fundamental principles of database management systems, relational databases and SQL, Transaction management: ACID properties, schedules, Concurrency control, Recovery.

UNIT 4 : Advanced Databases

Distributed databases data fragmentation and replication, distributed query processing, distributed transaction management, Parallel databases, components, performance issues, standard architectures, Data Warehouse technology

UNIT 5 : Advanced Database Operations

Basic SQL operations, functions, Advanced database operations using indices, constraints, partitions, backup recovery, PL/SQL Programming : understanding PL/SQL structure, variable declaration, loops, control structures, triggers, exceptions

Text Books

1. Database Management Systems- R. Ramakrishnan and J.Gehrke, 3rd Edition, McGraw Hill
2. Database System Concepts- A.Silberschatz, H.F.Korth and S.Sudarshan, 6th Edition, McGraw-Hill
3. PL/SQL Programming by Oracle Press

Reference Books

1. Principles of Distributed Database Systems - M.T.Oszu and P.Valduriez, Springer,
2. Management of Heterogeneous and Autonomous Database Systems- A.Elmagarmid,
3. M.Rusinkiewicz and A.Sheth (eds), Morgan Kaufmann, Oracle Press Books.

MCA-R206	Second semester	Lab -4: Based on MCA-R203	Credits: 02
Minimum 15 experiments covering all theory aspects as per the lab manual designed by the concerned teacher			

MCA-R207	Second semester	Lab -5: Based on MCA-R204	Credits: 02
Minimum 15 experiments covering all theory aspects as per the lab manual designed by the concerned teacher			

MCA-R206	Second semester	Lab-6: Based on Elective Course 205 A or 205 B	Credits: 02
Minimum 15 experiments covering all theory aspects as per the lab manual designed by the concerned teacher			

MCA-R209 A	Second semester	Open Elective	Credits: 01
Open Elective : University recognized MOOC (NPTEL / SWAYAM / others) OR Intra / Inter Departmental courses			

MCA-R209 B	Second semester	Professional Communication Skills (In-house Open Elective)	Credits: 01
As per following syllabus			

UNIT 1 : Grammar- it's Usage

1. Basics English Grammer
2. Tenses: Present, Past, Future
3. Voice: Active & Passive
4. Speech: Direct & Indirect
5. Common Errors in English
6. Transformation of Sentences

UNIT 2: Communication Skill & Soft Skills

1. Communication Skills: Definition & Concept
2. Process /cycle of Communication,
3. Types/Methods of Communication,
4. Barriers of Communication
5. Soft Skills: Concept, Negotiation skills, Empathy, Manners & Etiquettes.

Unit 3: Language Skills

1. Language: Definition & its Characteristics.
2. Listening Skill: Process and types.
3. Speaking Skill: Process, style.
4. Reading skill : Process , Reading comprehension passage.
5. Writing Skill : Process & importance

UNIT 4 : Presentation skills

1. Seminars
2. Conference
3. Anchoring & Vote of Thanks
4. Narrating Incidents
5. Story Telling

Reference Books:

1. Practical English Grammar by – A.J. Thomson
2. Mac Millan Foundation English by - R. K. Dwivedi, A. Kumar.
3. Soft Skills by - K Alex.
4. Group Discussion for Admissions & Jobs by - AnandGanguly
5. Effective Telephone Skills by - Thomas J. Farrell
6. Written & Spoken English by - V. H. Savant & S. R. Madan
7. Modern English Grammar: An Introduction by - L.S. Deshpande, P.H. Dharamsi.

==000====Ends====000==

