Software Project Management

As per Choice Based Credit System (CBCS) Scheme)

SEMESTER-IV

Subject Code	**MCA-401**	**INTERNAL ASSESSMENT (IA) MARKS**	**30**
Number of Lecture Hours / Week	**03**	**END TERM EXAM (ETE) MARKS**	**70**
Total Number of Lecture Hours	**40**	**SEMESTER END EXAM HOURS**	**03**

Credits: 03

CONTENTS	**Teaching Hours**
Unit-1	**08 Hours**
Project Management: The management spectrum, the people, the product, the process, the project, critical practices Metrics for Process and Project: Metrics in the process and project Domains, software measurements, metrics for software quality, integrating metrics within software process, metrics for small organizations, establishing a software metrics program. Introduction of Project Management tool: Trello, Jira, Asana, Zoho, Wrike.	
Unit-2	**08 Hours**
Estimation: Project planning Process, software scope and feasibility, resources, software project estimation, empirical estimation models, estimation for object oriented projects, estimation for Agile development and web engineering projects, the make/buy decision.	
Unit-3	**08 Hours**
Project Scheduling: Basic concepts, project scheduling, defining a task set and task network, scheduling, earned value analysis. Risk Management: Reactive V/S proactive Risk Strategies, software risks, Risk identification, Risk projection, risk refinement, risk mitigation, monitoring and management, the RMMM plan Quality Planning: Quality Concepts, Procedural Approach to Quality Management, Quantitative Approaches to Quality Management, Quantitative Quality Management Planning, Setting the Quality Goal, Quality Process Planning, Defect Prevention Planning.	
Unit-4	**08 Hours**
Quality Management: Quality Concepts, Software Quality assurances, software reviews, formal technical reviews, Formal approaches to SQA, Statistical Software Quality assurances, Change Management: software Configuration Management, The SCM repository, SCM Process, Configuration Management for Web Engineering	
Unit-5	**08 Hours**
Project Execution And Closure: Reviews. The Review Process, Planning, Overview and Preparation, Group Review Meeting, Rework and Follow-up, One-Person Review, Guidelines for Reviews in Projects, Project Closure: Project Closure Analysis, The Role of Closure Analysis, Performing Closure Analysis. **Project Monitoring and Control:** Project Tracking, Activities Tracking, Defect Tracking, Issues Tracking, Status Reports, Milestone Analysis, Actual Versus Estimated Analysis of Effort and Schedule, Monitoring Quality.	

Text Books:

- Bob Hughes , Mike Cotterell and Rajib Mall "Software Project Management", 6th Edition, McGraw Hill Edition, 2017.
- PankajJalote, "Software Project Management in practice", 5th Edition, Pearson Education, 2017.
- Murali K. Chemuturi ,Thomas M. Cagley Jr." Mastering Software Project Management: Best Practices, Tools and Techniques", J. Ross Publishing, 2010
- Sanjay Mohapatra, " Software Project Management" , Cengage Learning, 2011

References:

- Dr. P. Rizwan Ahmed, " Software Project Management", 1st Edition, Margham Publications, 2016
- Walker Royce, "Software Project Management, A Unified Framework", 1st Edition, 2006.
- Joel Henry, "Software Project Management", 1st Edition, Pearson Education, 2006.
- PradeepPai, "Project Management",, First Edition, Pearson, 2019

Principles of Management and Information System [Elective-2(a)]

As per Choice Based Credit System (CBCS) Scheme)

SEMESTER-IV

Subject Code	**MCA-402-2(a)**	**INTERNAL ASSESSMENT (IA) MARKS**	**30**
Number of Lecture Hours / Week	**03**	**END TERM EXAM (ETE) MARKS**	**70**
Total Number of Lecture Hours	**40**	**SEMESTER END EXAM HOURS**	**03**

Credits: 03

CONTENTS	**Teaching Hours**
Unit-1	**08 Hours**
Management:An Overview Definition, Concept, Functions, Process, Scope and Significance of Management. Nature of Management, Managerial Roles, Managerial Skills and Activities, Difference between Management and Administration. Significance of Values and Ethics in Management.	
Unit-2	**08 Hours**
Planning & Organizing: Nature and purpose of planning, Significance of Planning, Elements and Steps of Planning, Types of planning, Objectives and Policies Decision Making, Organizing Principles, Span of Control, Departmentalization, Line and Staff Authority &Relationship, Authority, Delegation and Decentralization. Formal and Informal Organizations	
Unit-3	**08 Hours**
Directing & Controlling: Effective Directing, Supervision, motivation theories, motivational techniques, Job Satisfaction, Job Enrichment, Leadership-Concept, Styles and Theories System and Process of Controlling, Concept, Types and Process, Techniques of Controlling, Coordination-Concept, Importance, Principles and Techniques of Coordination, use of computers and IT in Management control	
Unit-4	**08 Hours**
Information System: Data vs. Information vs. Knowledge, Information Systemsmeaning, functions and dimensionsand need. Categorization of Organizational InformationSystems –hierarchical and functional perspective, Interdependence between organization and IS, IS strategies for competitive advantageusing Porter's Five Forces Model and Value Chain Model	
Unit-5	**08 Hours**
Information Systems Management: Planning the Use of IT, Managing the Computing Infrastructure, Enterprise Applications, Developing Business/IT Solutions, Outsourcing, User Rights and Responsibilities, Implementation and Controlling of Information System.	

Text Books:

1.Kenneth Laudon, JaneLaudonEssentials ofManagement Information Systems, PHI Publication, 10th Edition
2.Terry and Franklin, Principles of Management, AITBS Publishers & Distributors, Delhi, Eighth Edition.
3.Joseph L Massie "Essentials of Management", Prentice Hall of India, Fourth Edition, 2003.
4. W.S. Jawadekar, "Management Information Systems", TMH Publication, Latest Edition

Reference Books:

1.PC Tripathi and PN Reddy, "Principles of Management", Tata McGraw-Hill, Fourth Edition 2008.
2.Koontz. Essentials for Management: An International Perspective. Tata McGraw-Hill.
3.Peter Ferdinand Drucker, The Practice of Management, HarperCollins Publishers, 2010.

Machine Learning [Elective-2(b)]

[As per Choice Based Credit System (CBCS) Scheme]

SEMESTER-IV

Subject Code	**MCA-402-2(b)**	**INTERNAL ASSESSMENT (IA) MARKS**	**30**
Number of Lecture Hours / Week	**03**	**END TERM EXAM (ETE) MARKS**	**70**
Total Number of Lecture Hours	**40**	**SEMESTER END EXAM HOURS**	**03**

Credits: 3

CONTENTS	**Teaching Hours**
Unit-1	**08 Hours**
Introduction Machine Learning – Machine Learning Foundations,Overview,Applications, Types of Machine Learning – Basic Concepts in Machine Learning – Examples of Machine Learning, Perspectives/Issues in Machine Learning, AI vs. Machine Learning.	
Unit-2	**08 Hours**
Supervised Learning Introduction, Linear Models of Classification – Linear Regression – Logistic Regression – Bayesian Logistic Regression – Probabilistic Models Neural Network-Feed Forward Network Functions – Error Back Propagation – Regularization - Bayesian Neural Networks – Radial Basis Function Networks, Ensemble Methods – Random Forest – Bagging – Boosting.	
Unit-3	**08 Hours**
Unsupervised Learning Clustering – K-Means Clustering – EM (Expectation Maximization) – Mixtures of Gaussians – EM algorithm in General – The Curse of Dimensionality – Dimensionality Reduction – Factor Analysis – Principal Component Analysis – Probabilistic PCA – Independent Component Analysis.	
Unit-4	**08 Hours**
Probabilistic Graphical Models Directed Graphical Models – Bayesian Networks – Exploiting Independence Properties – From Distributions to Graphs – Examples – Markov Random Fields – Inference In Graphical Models – Learning - Naïve Bayes Classifiers – Markov Models – Hidden Markov Models. Undirected graphical Models – Conditional Independence Properties.	
Unit-5	**08 Hours**
Advanced Learning Basic Sampling Method – Monte Carlo, Reinforcement Learning-Introduction-The Learning Task, and Elements of Reinforcement Learning. Computer Vision: Applications of Computer Vision Using Machine Learning: Speech Processing, Natural Language Processing.	

Text Books:

1. Christopher Bishop, “Pattern Recognition and Machine Learning”, Springer 2006
2. EthemAlpaydin, “Introduction to Machine Learning”, Prentice Hall of India, 2005
3. Joel Grus, “Data Science from Scratch- First Principles with Python”, O’Reilly, 2015
4. Tom Mitchell, “ Machine Learning”, McGraw-Hill, 1997

ReferenceBooks:

1. Stephen MarsLand, “Machine Learning-An Algorithmic Perspective”, CRC Press, 2009
2. Kevin P. Murphy, “Machine Learning: A Probabilistic Perspective”, MIT Press, 2012
3. M. Gopal, “Applied MACHINE LEARNING”, McGraw-Hill, 2018
4. Mark Summerfield, “Programming in Python 3: A Complete Introduction to the Python Language”, Addison Wesley, 2010

Data Science with R [Elective-2(c)]

[As per Choice Based Credit System (CBCS) Scheme]

SEMESTER-IV

Subject Code	**MCA-402-2(c)**	**INTERNAL ASSESSMENT (IA) MARKS**	**30**
Number of Lecture Hours / Week	**03**	**END TERM EXAM (ETE) MARKS**	**70**
Total Number of Lecture Hours	**40**	**SEMESTER END EXAM HOURS**	**03**

Credits: 03

CONTENTS	Teaching Hours
Unit-1	**08 Hours**
Introduction R: Concept, Advantages of R over Other Programming Languages - R Studio: R command Prompt, R script file, comments – Handling Packages in R: Installing a R Package, Few commands to get started: installed.packages(), package Description(), help(), find.package(), library() - Input and Output – Entering Data from keyboard – Printing fewer digits or more digits – Special Values functions : NA, Inf and –inf.	
Unit-2	**08 Hours**
R Data Types: Vectors, Lists, Matrices, Arrays, Factors, Data Frame – R – Variables, Data types of Variable, R Operators,R Decision Making: if statement, if – else statement, if – else if statement, switch statement – R Loops: repeat loop, while loop, for loop - Loop control statement: break statement, next statement.	
Unit-3	**08 Hours**
R-Function : function definition, Built in functions: mean(), paste(), sum(), min(), max(), seq(), user-defined function, calling a function, calling a function without an argument, calling a function with argument values - R-Strings – Manipulating Text in Data: substr(), strsplit(), paste(), grep(), toupper(), tolower() - R Vectors – Sequence vector, rep function, vector access, vector names, vector math, vector recycling, vector element sorting - R List - Creating a List, List Tags and Values, Add/Delete Element to or from a List, Size of List, Merging Lists, Converting List to Vector - R Matrices – Accessing Elements of a Matrix, Matrix Computations: Addition, subtraction, Multiplication and Division- R Arrays: Naming Columns and Rows, Accessing Array Elements, Manipulating Array Elements, Calculation Across Array Elements - R Factors –creating factors, generating factor levels gl().	
Unit-4	**08 Hours**
Data Frames –Create Data Frame, Data Frame Access, Understanding Data in Data Frames: dim(), nrow(), ncol(), str(), Summary(), names(), head(), tail(), edit() functions - Extract Data from Data Frame, Expand Data Frame: Add Column, Add Row - Joining columns and rows in a Data frame rbind() and cbind() – Merging Data frames merge() – Melting and Casting data melt(), cast(). Loading and handling Data in R: Getting and Setting the Working Directory – getwd(), setwd(), dir() - R-CSV Files - Input as a CSV file, Reading a CSV File, Analyzing the CSV File: summary(), min(), max(), range(), mean(), median(), apply() - Writing into a CSV File – R -Excel File – Reading the Excel file.	
Unit-5	**08 Hours**
Descriptive Statistics: Data Range, Frequencies, Mode, Mean and Median: Mean Applying Trim Option, Applying NA Option, Median - Mode - Standard Deviation – Correlation - Data Visualization: visually Checking Distributions for a single Variable - R – Pie Charts: Pie Chart title and Colors – Slice Percentages and Chart Legend, 3D Pie Chart – R Histograms – Density Plot - R – Bar Charts: Bar Chart Labels, Title and Colors.	
Text Books: • SandipRakshit, R Programming for Beginners, McGraw Hill Education (India), 2017, ISBN : 978-93-5260-455-5. • SeemaAcharya, Data Analytics using R, McGrawHill Education (India), 2018, ISBN: 978-93-5260-524-8.	

Reference Books: • Foster Provost & Tom Fawcett, " Data Science for Business", O' Reilly, 2013 • James Warren and Nathan Marz, "Big Data: Principles and Best Practices of Scalable Realtime Data Systems", Manning Publications, 2015 • Anil Maheshwari, " Data Analytics", McGrawHill Publications, 2017	

Industrial Project

[As per Choice Based Credit System (CBCS) Scheme)
SEMESTER-IV

Subject Code	**MCA-451**	**INTERNAL ASSESSMENT (IA) MARKS**	**30**
Number of Lecture Hours / Week	**12**	**END TERM EXAM (ETE) MARKS**	**70**
Total Number of Lecture Hours	**40**	**SEMESTER END EXAM HOURS**	**03**

Credits: 06

The industrial project as part of the curriculum will be held in the institute as one of the laboratories. This may be in continuationto the project under taken by the student during industrial training and/or of industrial nature and/or have good industrial significance and/or may be done in collaboration with industry (as per suitability at the institute level).

The evaluation will be done in the institute by one internal examiner and one external examiner (from outside the institute) appointed by RTU.

Guidelines for Submission of Industrial Project

All the candidates of MCA are required to submit a **Final Project Report** based on the work done by him/her during the project period.

THE GUIDE

The Guide for MCA would be a person having MCA with 3 years' experience in academic/Industry.

PROJECT TIME
The MCA Major Projects would be at list 12 Weeks and carries a total of 100 marks. The Project topics should be based on syllabus or as per the requirement of specific industry in sync with the course. Every student has to prepare and submit the project work in a group or separately (Max two students). Plagiarism would not be accepted under any circumstances.

Project Report should compulsorily include the software development/ soft copy should also be submitted in CD along with Hard Bound Project report.

Project Evaluation Guidelines.

The project is evaluated on the basis of following aspects:

Presentation & Software execution: 40% of total marks.

Project report (documentation): 30% of total marks.

Viva-Voce: 30% of total marks.

SUMMARY/ABSTRACT
All students must submit a summary/abstract separately with the project report. Summary, preferably, should be of about 3-4 pages. The content should be as brief as is sufficient enough to explain the objective and implementation of the project that the candidate is going to take up. The write up must adhere to the guidelines and should include the following :

- Name / Title of the Project and about the Problems
- Why is the particular topic chosen?
- Objective and scope of the Project
- Methodology (including a summary of the project)
- Hardware & Software to be used
- Testing Technologies used
- What contribution would the project make?

TOPIC OF THE PROJECT- This should be explicitly mentioned at the beginning of the Synopsis. This being the overall impression on the future work, the topic should be able to corroborate the work.

OBJECTIVE AND SCOPE: This should give a clear picture of the project. Objective should be clearly specified. What the project ends up to and in what way this is going to help the end user has to be mentioned.

PROCESS DISCRIPTION: The process of the whole software system proposed, to be developed, should be mentioned in brief. This may be supported by DFDs / Flowcharts to explain the flow of the information.

RESOURCES AND LIMITATIONS: The requirement of the resources for designing and developing the proposed system must be given. The resources might be in form of the hardware/software or the data from the industry. The limitation of the proposed system in respect of a larger and comprehensive system must be given.

CONCLUSION: The write-up must end with the concluding remarks-briefly describing innovation in the approach for implementing the Project, main achievements and also any other important feature that makes the system stand out from the rest.

The following suggested guidelines must be followed in preparing the Final Project Report:

The industrial project as part of the curriculum will be held in the institute as one of the laboratories. This may be in continuation to the project under taken by the student during industrial training and/or of industrial nature and/or have good industrial significance and/or may be done in collaboration with industry (as per suitability at the institute level). The evaluation will be done in the institute by one internal examiner and one external examiner (from outside the institute) appointed by RTU.

The Project study and development should be on the following lines:

FORMAT OF THE STUDENT PROJECT REPORT ON COMPLETION

1. Cover Page as per specifiedformat
2. Declaration Certificate
3. Acknowledgement
4. Certificate of the Company /Institute
5. Main Report

1. Introducton

    1.1 Objectives
    1.2 Problem description
    1.3 About Organization

2. System Study

2.1 System with limitations
2.2 Significance of the Project
2.3 Beneficiaries of the System
2.4 Feasibility study

3. System Analysis

Requirement Specification

i. Functional Requirement.
ii. Non Functional Requirement.
iii. User Requirement
iv. System Requirement

4. System Design

a) Data Flow Diagram

b) E-R Diagrams

c) Use Case Diagrams

d) Flow Charts

e) Database Tables

f) Input output Forms

5. Development

a) Environment
b) Coding Style
c) Coding Techniques
d) Coding

6. Testing

a. Test cases

7. System Security

b. Checks and Control
c. Encryption, secure

8. Conclusion/Future Enhancement

9. Bibliography

The reports prepared by the students MUST NOT have only definitions of the above mentioned topics but should explicitly state these in the context of the project undertaken. They should submit the actual work done in details.

General instructions about preparation of report

Paper: A4

Font: Times New Roman, Bookman Old Style

Chapter Heading: 16pt, Sub heading: 14, Sub-Sub Headings: 12

Bold Running Matter: 12 pt

Paragraph Gap: 6 Pt Maximum

Line Gap: 1.5

Margins: Left 1.5, Right, Top and Bottom 1 inch

All diagrams/figures and tables should be appropriately numbered.

Submission of Project Report to the University:

The student will submit his/her project report in the prescribed format. The Project Report should include:

- Copy of the Summary/Abstract. To be mailed to college/Institute well in advance mentioning the about future project which would be undertaken.
- Two Hard Bound Copies of the Project Report which is around 80 to 120 pages.
- Soft copy of project on CD/DVD/Pen Drive pasted inside of the back cover of the project report.

Binding & Color code of the report/Thesis

For MCA – IV Semester (Industrial Project work)
Hard Bound Report
Cover/Background of the Page of Project Report – **Sky Blue**
Letters in Black

Cover page

An
Industrial Project Report
on
<"Write title of Project>

SubmittedtotheRajasthanTechnicalUniversity,Kotain

Partialfulfillmentoftherequirementforthedegreeof

MASTER OF COMPUTER APPICATIONS

<Logo of your college> **<RTUlogo>**

Supervisor

<Name>

Designation

Submitted By:

<Name of Candidate >

Enrolment No.: .....

<Nameofyour college>

Affiliatedto

Rajasthan Technical University,
Kota(Rajasthan)-324010

Month and Year

Candidate's Declaration

I hereby declare that the work, which is being presented in the MCA-451, Instrial Project , entitled **"**.....(Title).....**"**in partial fulfilment for the award of Degree of "Master of Computer Applications" in Deptartment of Computer Applications **submitted to the** .....(Name of College)....., Rajasthan Technical University is a record of my own work carried under the Guidance of Shri/ Dr. ....., Deptartment of Computer Applications,.....(Name of College)..... .

I have not submitted the matter presented in this Project Report any where for the award of any other Degree.

<Name and Signature of Candidate>

Enrolment No.: .....

.....(Name of College)....,

Name(s) of Supervisor(s)

.....

.....

<college Name>
<name of Department >

Certificate

Date:

This is to certify that the Industrial Project (MCA-451) work entitled "*name of the project*'' submitted by "*name of student***"** (RTU Roll No. ……)to the Department Of Computer Science and Application of <college name> has been examined and evaluated.

The Project work has been prepared as per the regulations of Rajasthan Technical University, Kota and qualifies to be accepted in partial fulfillment of the requirement for the degree of MCA (Master of Computer Applications).

Signature of the student

Supervisor/Guide
(Name with Designation)

External Examiner
(Name with Designation)

Head of Institution/Principal

On Original Company Letter Head

Ref No…….. Date:

Certificate

This is to certify that **your name (RTU Roll No.)** is/was undertraining from _____ (**startdate**) to _____(**enddate**)undermysupervisioninpartialfulfillmentof therequirementforthe award of the Degree of **Master of Computer Applications**.

Duringthis period he /she has workedon……. ("**Project Name**") as a …..(**Role of student**).

TrainingIncharge/Project Leader/HR

(Seal/Sign and Name with Designation)