**Sardar Patel Institute of Technology**
Bhavan's Campus, Munshi Nagar, Andheri (West), Mumbai-400058-India
(Autonomous Institute Affiliated to University of Mumbai)

# Bharatiya Vidya Bhavan's
# Sardar Patel Institute of Technology

(Autonomous Institute Affiliated to University of Mumbai)

*Revision:SPIT-3-20*

## Master Of Computer Application

## Third Year MCA

## (Sem. V Sem. VI)

## Effective from Academic Year 2020-21

**Board of Studies Approval: May 8, 2019**

**Academic Council Approval: May 14, 2019**

Raundale.

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SARDAR PATEL INSTITUTE OF TECHNOLOGY Andheri (W) Mumbai-58.

**BharatiyaVidyaBhavan's**

# Sardar Patel Institute of Technology

(Autonomous Institute Affiliated to University of Mumbai)

*Revision:SPIT-3-19*

## Master Of Computer Application

## Third Year MCA
## (Sem. V and Sem. VI)
## Effective from Academic Year 2019 -20

**Board of Studies Approval:** **08/05/2019**

**Academic Council Approval:** **14/05/2019**

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**TYMCA**

**2019-20**

**SEM V**

| Course Code | Course Name | Group | Teaching Scheme (Hrs/week) | | | Credits |
|---|---|---|---|---|---|---|
| | | | L | T | P | |
| MCA51 | Distributed Computing and Cloud Computing | ICT | 3 | 1 | -- | 4 |
| MCA52 | Data Analytics | ICT | 3 | 1 | -- | 4 |
| MCA 53 | Internet of Things | ICT | 3 | 1 | -- | 4 |
| MCAE53 | Elective-III<br>MCAE53 A Cyber-Security and Forensics<br>MCAE53 B Machine Learning<br>MCAE53 C Customer Relationship Management<br>MCA E53 D Digital Marketing<br>MCAE53 E Web Services | PE | 3 | 1 | -- | 4 |
| MCAL51 | Distributed Computing and Cloud Computing Lab | ICT | -- | -- | 2 | 1 |
| MCA L52 | Data Analytic Lab | ICT | -- | -- | 2 | 1 |
| MCA L53 | Animation and Graphic Design Lab | ICT | -- | -- | 2 | 1 |
| MCAP51 | Mini Project | PR | -- | -- | 2 | 1 |
| MCAOE1 | MOOC | ICT | 40 hrs module with hands on practice | | | 4 |
| | Total | | 12 | 4 | 8 | 24 |

**SEM VI**

| Course Code | Course Name | Group | Teaching Scheme (Hrs/week) | | | Credits |
|---|---|---|---|---|---|---|
| MCASP6.1 | INTERNSHIP – Project | SP | -- | -- | 40 | 20 |
| MCASP6.2 | Seminar- Research Paper | SP | -- | -- | -- | 02 |
| | Total | | -- | -- | 40 | 22 |

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## Evaluation Scheme

## 2019-20

**SEM V**

| Course Code | Course Name (Theory) | Marks | | | |
|---|---|---|---|---|---|
| | | ISE | MSE | ESE | Total |
| MCA51 | Distributed Computing and Cloud Computing | 20 | 20 | 60 | 100 |
| MCA52 | Data Analytics | 20 | 20 | 60 | 100 |
| MCA 53 | Internet of Things | 20 | 20 | 60 | 100 |
| MCAE53 | Elective-III<br>MCAE53 A Cyber-Security and Forensics<br>MCAE53 B Machine Learning<br>MCAE53 C Customer Relationship Management<br>MCA E53 D Digital Marketing<br>MCAE53 E Web Services | 20 | 20 | 60 | 100 |
| MCAL51 | Distributed Computing and Cloud Computing Lab | 40 | -- | -- | 40 |
| MCAL52 | Data Analytic Lab | 40 | -- | -- | 40 |
| MCAL53 | Animation and Graphic Design Lab | 40 | -- | -- | 40 |
| MCAP51 | Mini project | 25 | -- | 25 | 50 |
| MCAOE1 | MOOC | -- | | -- | -- |
| | | | | **Total** | **570** |

**SEM VI**

| Course Code | Course Name | Marks | | | |
|---|---|---|---|---|---|
| | | ISE | MSE | ESE | Total |
| MCASP6 .1 | INTERNSHIP – Project | 25 | 25 | 100 | 150 |
| MCASP6 .2 | Seminar | -- | -- | 50 | 50 |
| | **Total** | | | | **200** |

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# Semester V

# Sardar Patel Institute of Technology

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| Course Code | Course Name | Teaching Scheme (Hrs/ week) | | | Credits Assigned | | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | L | T | P | Total |
| MCA51 | Distributed Computing and Cloud Computing | 3 | 1 | -- | 3 | 1 | -- | 4 |
| | | Examination Scheme | | | | | | |
| | | ISE | | MSE | ESE | | | |
| | | 20 | | 20 | 60 | | | |

| | | |
|---|---|---|
| **Pre-requisite Course Codes** | MCA22 | |
| | Student will be able to | |
| **Course Outcomes** | CO1 | Apply principles and communication protocols to Distributed Systems |
| | CO2 | Apply clock synchronization and Distributed shared memory |
| | CO3 | Analyze Distributed file system and management |
| | CO4 | Illustrate the fundamentals of Cloud Computing. |

| Module No. | Module name | Topics | Ref. | Hrs. |
|---|---|---|---|---|
| 1 | **Introduction to Distributed Computing Concepts** | Basic concepts of distributed systems, Distributed computing models, Software concepts/Hardware concepts, Issues in designing distributed systems, Client server model | **1,3** | **3** |
| 2 | **Formal Model Specifications and Communication** | Fundamental concepts related to inter process communication including message passing mechanism, API for Internet Protocol, Basic concepts of formal model definitions, Different types of communication systems, Algorithms for message passing systems, Basic concept of middleware, Remote Procedural Call (RPC) , Remote Method Invocation (RMI) | **1,3** | **6** |
| 3 | **Clock synchronization** | Introduction of clock synchronization, Physical and logical clocks, Global state mutual Exclusion algorithms, Election algorithms. | **1,3,4** | **5** |
| 4 | **Distributed Shared Memory** | Fundamental concepts of DSM, Types of DSM, Various hardware DSM systems, Consistency models, Issues in designing , Implementing DSM systems | **1,3** | **6** |
| 5 | **Distributed System Management and Object based System** | Resource management, Process management, Fault tolerance, Code Migration | **1,3** | **5** |

| | | | | |
|---|---|---|---|---|
| **6** | **Distributed File System** | Distributed file system, Concepts of a distributed file system (DFS), File models, Issues in file system design, Naming transparency and semantics of file sharing, Techniques of DFS implementation | **1,3,4** | **5** |
| **7** | **Basics of Cloud Computing** | Fundamentals of Cloud computing, Grid computing versus Cloud Computing, Key Characteristics of Cloud computing | **5,6** | **6** |
| **8** | **Cloud models** | Cloud models ,Benefits of Cloud models, Types of Cloud, Types of Private Cloud, Savings and cost impact, Web services delivered from cloud,Platform as a service, Infrastructure as a service, Software as a service | **5,6** | **6** |
| | | | Total | **42** |

**Reference Books**:


1. Dr. SunitaMahajan, Seema Shah "Distributed Computing" Oxford University Press,2010.
2. Tanenbaum S "Distributed Systems", Pearson Education,2017.
3. Pradeep K. Sinha "Distributed OS", PHI
4. ArunKulkarni, Nupur Prasad Giri,Nikhilesh Joshi, BhushanJadhav "Parallel and Distributed systems" (2nd Edition), Wiley publication.
5. Dr. Kumar Saurabh"Cloud Computing insights into new-era infrastructure", Wiley India
6. Cloud computing, black book, Dreamtech publication, 2014.


| Sr.no | Tutorial Topics | No of Hours |
|---|---|---|
| 1 | Scenarios based on Distributed models | 2 |
| 2 | Scenarios based on RPC ,IPC | 2 |
| 3 | Problems on Clock synchronization | 2 |
| 4 | Problems on Election Algorithm | 2 |
| 5 | Case study for Distributed File system | 2 |
| 6 | Case study for Cloud Models | 2 |
| 7 | Case study for Cloud Services | 1 |
| 8 | Case study on XaaS as service | 1 |
| | **Total** | **14** |

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| Course Code | Course Name | Teaching Scheme (Hrs/ week) | | | Credits Assigned | | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | L | T | P | Total |
| MCA52 | Data Analytics | 3 | 1 | -- | 3 | 1 | -- | 4 |
| | | Examination Scheme | | | | | | |
| | | ISE | | MSE | ESE | | | |
| | | 20 | | 20 | 60 | | | |

| Pre-requisite Course Codes | MCA13, MCA 25 | |
|---|---|---|
| | Student will be able to | |
| Course Outcomes | CO1 | Apply data analysis and visualization techniques to communicate findings and present results effectively. |
| | CO2 | Apply the basic theory underlying machine learning algorithms. |
| | CO3 | Evaluating learning algorithms for model selection. |
| | CO4 | Apply knowledge of network analysis to real world problems. |
| | CO5 | Analyze ethical issues in business related to data science. |

| Module No. | Module name | Topics | Ref no | No. of Hrs. |
|---|---|---|---|---|
| 1 | **Introduction** | The data science process, The roles in a data science project, Stages of a data science project, Setting expectations, Determining lower and upper bounds on model performance | 3 | 2 |
| 2 | **Statistical Inference** | -Populations and samples, Statistical modeling, probability distributions, fitting a model, - Intro to R | 1 | 3 |
| 3 | **Exploratory Data Analysis and the Data Science Process** | Types of Data - Continuous/ Discrete/Categorical Scale - Nominal, Ordinal, Interval and Ratio, Data Sources & Cleaning, Data Wrangling, Data Quality - Missing/ Outliers/ Standardization, Web ScrapingThe Data Science Process- Case Study: Real Direct (online real estate rm) | 1 | 4 |
| 4 | **Introduction - Machine Learning** | The Learning Problem - Introduction; supervised, unsupervised, and reinforcement learning, Components of the learning problem, Is Learning Feasible? - Can we generalize from a limited sample to the entire space? Relationship between in-sample and out-of-sample. The Linear Model I - Linear classification and linear regression. Extending linear models through nonlinear transforms. Error and Noise - The principled choice of error measures. What happens when the target we want to learn is noisy. Training versus Testing - The difference between training and testing in mathematical terms. What makes a learning | 2 | 8 |

| | | | | |
|---|---|---|---|---|
| | | model able to generalize? | | |
| 5 | **Machine Learning Algorithms** | Linear Regression with Multiple variables, Cost Function - (OLSR)/ Gradient Descent, Over fitting & Regularization, Polynomial Regression, Feature scaling, Logistic Regression, K-fold cross validation<br>K- Means/ Affinity propagation & mean shift/ Spectral clustering, - PCA & Dimension reduction | 1 | 7 |
| 6. | **Feature Generation and Feature Selection** | Motivating application: user (customer) retention<br>Feature Generation (brainstorming, role of domain expertise, and place for imagination), Feature Selection algorithms, - Filters; Wrappers; Decision Trees; Random Forests | 1 | 5 |
| 7 | **Recommendation Systems: Building a User-Facing Data Product** | Algorithmic ingredients of a Recommendation Engine, Dimensionality Reduction, Singular Value Decomposition, Principal Component Analysis Exercise: build your own recommendation system | 1 | 4 |
| 8 | **Mining Social-Network Graphs** | Social networks as graphs, Clustering of graphs<br>Direct discovery of communities in graphs, Partitioning of graphs, - Neighborhood properties in graphs | 1 | 3 |
| 9 | **Data Visualization** | Basic principles, ideas and tools for data visualization<br>Examples of inspiring (industry) projects | 1 | 3 |
| 10 | **Data Science and Ethical Issues** | Discussions on privacy, security, ethics, A look back at Data Science, - Next-generation data scientists | 1 | 3 |
| | | | Total | **42** |

**Reference Book**


1]Cathy O'Neil and Rachel Schutt Doing Data Science, Straight Talk From The Frontline O'Reilly-2013,1st Edition.

2]Yaser S. Abu-Mostafa , Malik Magdon-Ismail, Hsuan-Tien Lin Learning From Data – 2012, 1st Edition.

3] Nina Zumel John MountPractical Data Science With R -2014,1st Edition.


**Tutorial on Data Analytics**

| Tutorial No. | Tutorial Details | Hours |
|---|---|---|
| 1 | Problem solving based on probability distributions and fitting a model | 2 |
| 2 | Problem solving based on data preprocessing and data cleaning | 2 |
| 3 | Problem solving based on types of Learning | 2 |
| 4 | Problem solving based on types of Machine Learning Algorithm | 2 |
| 5 | Problem solving based on Decision Trees; Random Forests | 2 |
| 6 | Case study based on Designing recommendation system. | 2 |
| 7 | Tutorial based on clustering of graphs. | 2 |
| 8 | Tutorial based on study of inspiring (industry) projects | 2 |
| | **Total** | **14** |

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| Course Code | Course Name | Teaching Scheme (Hrs/ week) | | | Credits Assigned | | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | L | T | P | Total |
| MCA53 | Internet of Things | 3 | 1 | -- | 3 | 1 | -- | 4 |
| | | Examination Scheme | | | | | | |
| | | ISE | | MSE | ESE | | | |
| | | 20 | | 20 | 60 | | | |

| Pre-requisite Course Codes | MCA22 | |
|---|---|---|
| | Student will be able to | |
| Course Outcomes | CO1 | Relate the concept ofIoT as Market perspective |
| | CO2 | Design the IoT Reference Architecture and Real World Constraints |
| | CO3 | Compare various IoT Protocols ( Datalink, Network, Transport, Session, Service) |
| | CO4 | Build State of the Art – IoT Architecture with Security features |

| Module No. | Module Name | Topics | Ref. | Hrs. |
|---|---|---|---|---|
| 1 | **M2M to IoT A Market Perspective** | The Vision-Introduction, From M2M to IoT, M2M towards IoT-the global context, A use case example, Differing Characteristics, M2M Value Chains, IoT Value Chains, An emerging industrial structure for IoT | 1 | 6 |
| 2 | **IoT Technology Fundamentals** | Devices and gateways, Local and wide area networking, Data management, Business processes in IoT, Everything as a Service(XaaS), M2M and IoT Analytics, Knowledge Management | 2 | 8 |
| 3 | **IOT system Architecture** | IoT system components: IoT Devices, IoT Gateways, Cloud Access, Cloud Components<br>Cross connectivity across IoT system components:,Device to Gateway –Short Range Wireless(Cell Phone as Gateway, Dedicated Wireless Access Point), Gateway to Cloud- Long Range connectivity(Wired, Cellular, Satellite, WAN), Direct Device to Cloud connectivity, IoT Device Power Constraints, Powered and Unpowered Sensors, Power Harvesting, Energy Storage Technologies | 3 | 10 |
| 4 | **IOT networking** | Networking Architectures: Star, Mesh, Tree<br>Networking Protocols: TCP/IP, 6LowPan, RPL, Thread<br>IoT Devices Application Level Protocols: MQTT, CoAP, REST, Proprietary, More (to be added) | | 6 |
| 5 | **IOT Security** | Security Requirements in IoT Architecture - Security in Enabling Technologies - Security Concerns in IoT Applications. Security Architecture in the Internet of Things - Security Requirements in | 3 | 6 |

| | | | | |
|---|---|---|---|---|
| | | IoT- Attacks Specific to IoT.<br>Symmetric Encryption Standards: Symmetric Encryption (DES, AES 128…), Hashing, Authentication, CCMP Authentication and Encryption protocol, Non Symmetric Encryption Standards, Diffie Hellman (principle, Man in the Middle attack), RSA | | |
| 6 | **Use case examples** | AMR (Automatic Meter Reading), Smart City, Smart Home Industrial Control, Smart Social Networks, Big Data Analytics | 1,2, 3,4, 5 | 6 |
| | | | Total | 42 |

References :


1. Vijay Madisetti and ArshdeepBahga, "Internet of Things (A Hands-on-Approach)", 1 st Edition, VPT, 2014. 2.
2. Francis daCosta, "Rethinking the Internet of Things: A Scalable Approach to Connecting Everything", 1st Edition, Apress Publications, 2013
3. Practical Internet of Things Security (Kindle Edition) by Brian Russell, Drew Van Duren
4. Jan Holler, VlasiosTsiatsis, Catherine Mulligan, Stefan Avesand, StamatisKarnouskos, David Boyle, "From Machine-to-Machine to the Internet of Things: Introduction to a New Age of Intelligence", 1 st Edition, Academic Press, 2014.
5. Peter Waher, "Learning Internet of Things", PACKT publishing, BIRMINGHAM – MUMBAI
6. Bernd Scholz-Reiter, Florian Michahelles, "Architecting the Internet of Things", ISBN 978-3-642-19156-5 e-ISBN 978-3-642-19157-2, Springer


**Tutorial on Internet of Things**

| Tutorial No. | Tutorial Topics | No of Hours |
|---|---|---|
| 1 | To study Market perspective of IOT | 2 |
| 2 | To study about companies using XaaS as a service | 1 |
| 3 | To compare Amazon, google and Azure services | 1 |
| 4 | To differentiate TCP/IP and 6LowPan | 1 |
| 5 | To study the application of CoAP in real world. | 1 |
| 6 | To study the application of REST in real world. | 1 |
| 7 | To study attacks on IOT system and its prevention | 1 |
| 8 | To solve Symmetric encryption standards | 2 |
| 9 | To solve Non Symmetric encryption standards | 2 |
| 10 | To solve a case study on smart home appliances | 2 |
| | Total | 14 |

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| Course Code | Course Name | Teaching Scheme (Hrs/week) | | | Credits Assigned | | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | L | T | P | Total |
| MCAE53A | Cyber Security and Forensic | 3 | 1 | -- | 3 | 1 | -- | 4 |
| | | Examination Scheme | | | | | | |
| | | ISE | MSE | ESE | | | | |
| | | 20 | 20 | 60 | | | | |

| Pre-requisite Course Codes | MCAE35 A | |
|---|---|---|
| | Student will be able to | |
| Course Outcomes | CO1 | Analyze the issues and challenges faced due to cyber crime. |
| | CO2 | Evaluate various tools and methods used in cybercrime |
| | CO3 | Explain the laws for various cyber crime |
| | CO4 | Analyze forensics of Computer andHandheld Devices for investigation. |

| Module No. | Module Name | Topics | Ref. | Hrs. |
|---|---|---|---|---|
| 1 | **Cyber offenses & Cybercrime: Issues and challenges** | Cybercrime definition and origins of the world, Classifications of cybercrime, How criminals plan the attacks, Social Engineering, Cyber stalking, Botnets,Attack vector, Cloud computing, Credit Card Frauds in Mobile and Wireless Computing Era, Attacks on Mobile/Cell Phones, Ransomware, Web Treats for Organizations: The Evils and Perils, Best practices with social media marketing tools | 1,2 | **8** |
| 2 | **Tools and Methods Used in Cybercrime** | Proxy Servers and Anonymizers, Password Cracking, Key loggers and Spywares, Virus and Worms, Steganography, DoS, DDoS Attacks, SQL Injection, Buffer Over Flow, Attacks on Wireless Networks, Phishing, (Methods, Techniques, Countermeasures), Identity Theft (Types, Techniques, Countermeasures) | 1,2 | **10** |
| 3 | **Cybercrimes and Cyber security** | The Legal Perspectives Why do we need Cyber law: The Indian Context, Positive and Weak areas of ITA 2000, Information Security Standard compliances: SOX, GLBA, HIPAA, ISO, FISMA, NERC, PCI-DSS, International Laws: E-Sign, CIPA and COPPA | 1,2 | **8** |

| | | | | |
|---|---|---|---|---|
| **4** | **Understanding Computer Forensics** | Historical background of cyber forensic, Need for computer forensic, Cyber forensic and Digital Evidence, Forensic Analysis of E-mail, Digital Forensic life cycle. Chain of custody, network forensic, Approaching a forensic Investigation, Computer Forensic and Steganography, Relevance of OSI 7 layer model to computer forensic, Forensic and social networking sites: The security/ privacy threats | 1,8 | **10** |
| **5** | **Forensics of Hand-held devices** | Mobile Phone Forensics, Printer and scanner forensics, Smartphone, Challenges in Forensics of the digital Images and Still Camera, Toolkits for Hand-Held Device, Forensics(EnCase,Forensic card reader,MOBILedit), Organizational Guidelines on Cell Phone Forensics. | 1,7 | **6** |
| | | | **Total** | **42** |

**Reference Books:**


[1] Nina Godbole, SunitBelapure, *"Cyber Security: Understanding Cyber Crimes, Computer Forensics and Legal Perspectives",* Wiley India, New Delhi,
[2] NinaGodbole "Information Systems Security", Wiley India, New Delhi
[3] Dan Shoemaker, William Arthur Conklin, Wm Arthur Conklin *"Cybersecurity: The Essential Body of Knowledge"*, Cengage Learning.
[4] Edward Amoroso *"Cyber Security",* Silicon Press, First Edition
[5] Cory Altheide and Harlan Carvey , "Digital Forensics with open source tools" , ISBN: 978-1-59749-586 8,Elsevier Publications, April 2011
[7] EoghanCasey ,"Digital Evidence and Computer crime 3rd Edition: Forensics Science, Computers and the Internet", 2011
[8] Marjie T. Britz, "Computer Forensic and Cyber Crime: An Introduction", 3rd Edition , 2013


**Tutorial on Cyber Security and Forensic**

| Tutorial No. | Tutorial Topics | No of Hours |
|---|---|---|
| 1 | To demonstrate tools for Active and Passive attack | 1 |
| 2 | To Illustrate Password Sniffing tools | 1 |
| 3 | To study Password Cracking tools | 2 |
| 4 | To Demonstrate Network Vulnerability Assessment tools | 2 |
| 5 | To examine Social Engineering methods | 2 |
| 6 | To show SQL Injection attack | 1 |
| 7 | To study the working of Steganography | 1 |
| 8 | To demonstrate DOS Attack methods | 1 |
| 9 | To study Keylogger Software | 1 |
| 10 | To study Wireless Attack techniques | 2 |
| | **No of Hours** | **14** |

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| Course Code | Course Name | Teaching Scheme (Hrs/ week) | | | Credits Assigned | | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | L | T | P | Total |
| MCAE53 B | Machine Learning | 3 | 1 | -- | 3 | 1 | -- | 4 |
| | | Examination Scheme | | | | | | |
| | | ISE | | MSE | ESE | | | |
| | | 20 | | 20 | 60 | | | |

| | | |
|---|---|---|
| Pre-requisite Course Codes | MCAE45 B | |
| | Student will be able to | |
| Course Outcomes | CO1 | Apply Regression and classification techniques to solve real world problems |
| | CO2 | Categorize different unsupervised learning techniques |
| | CO3 | Describe various reinforcement learning techniques |
| | CO4 | Implement various machine learning algorithms in a range of real-world applications |

| Module No. | Module Name | Topics | Ref. | Hrs. |
|---|---|---|---|---|
| 1 | **Introduction To Machine Learning** | Need of machine learning, Learning types : Supervised Learning, Unsupervised learning, Reinforcement learning, Applications of machine learning | 1,2, 4 | 3 |
| 2 | **Supervised Learning** | Regression: Regression fundamentals, Linear Regression and Logistic Regression<br>Classification: Classification fundamentals<br>Decision trees(Constructing a decision tree, Decision Tree algorithm, testing and storing a classifier, Classification tree, Regression tree)<br>Naïve Bayes (Classifying with Bayesian decision theory, conditional probability, classifying with conditional probabilities, Document classification with Naïve Bayes)<br>Support Vector Machine(Separating data with maximum margin, Finding maximum margin, Efficient optimization with the SMO algorithm) | 1,2, 4 | 10 |
| 3 | **Unsupervised Learning** | Clustering: K-means clustering, Expectation-Maximization algorithm, Supervised learning after clustering, K-nearest neighbour Estimator<br>Deep machine learning: Deep feed forward network, Applications of Deep learning | 4,5 | 10 |
| 4 | **Reinforcement Learning** | The learning task, Q learning, Temporal difference learning, Generalizing from Examples, Relationship to Dynamic programming | 3 | 6 |

| | | | | |
|---|---|---|---|---|
| 5 | **Implementation Of Algorithm Using R / Python /MATLAB Programming** | Linear Regression, Logistic Regression<br>Decision Tree, SVM, Naive Bayes<br>K Nearest Neighbour , K-Means algorithm implementation | 6 | 10 |
| | | | **Total** | 42 |


References:

1. Peter Harrington, "Machine Learning In Action", DreamTech Press First Edition Year 2012
2. ShaiShalev-Shwartz, "UNDERSTANDING MACHINE LEARNING From Theory toAlgorithms", Cambridge University Press
3. Tom M.Mitchell,"Machine Learning", McGraw Hill First Edition Year 1997
4. EthemAlpaydın, "Introduction to Machine Learning", MIT Press Third Edition Year 2014
5. Deep Learning by Ian GoodfellowYoshuaBengio Aaron Courville


## Tutorials on Machine Learning

| Sr. No | Suggested List of Topics | No. of hours |
|---|---|---|
| 1 | Solve real time problem on Regression | 02 |
| 2 | Solve real time problem on Classification | 02 |
| 3 | Solve real time problem on Clustering | 02 |
| 4 | Solve Q-Learning Example | 02 |
| 5 | Solve Dynamic programming problems | 02 |
| 6 | Implementation Of Algorithm Using R / Python /Matlab Programming | 04 |
| | Total | 14 |

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| Course Code | Course Name | Teaching Scheme (Hrs/ week) | | | Credits Assigned | | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | L | T | P | Total |
| MCAE53C | Customer Relationship Management | 3 | 1 | -- | 3 | 1 | -- | 4 |
| | | Examination Scheme | | | | | | |
| | | ISE | | MSE | ESE | | | |
| | | 20 | | 20 | 60 | | | |

| Pre-requisite Course Codes | MCA14 | |
|---|---|---|
| | Student will be able to | |
| Course Outcomes | CO1 | To compare the strategic nature of CRM and e-CRM |
| | CO2 | To analyze decision making and cognitive experimental process |
| | CO3 | To develop a plan to build CRM |
| | CO4 | To evaluate the integrating phase and quality analysis phase of CRM. |

| Module No. | Module Name | Topics | Ref. | Hrs. |
|---|---|---|---|---|
| 1 | CRM Basics | What is customer, CRM. Customer Life Cycle, B2B CRM, Customer Asset, Goal of CRM, CRM functions | 1 | 8 |
| | | CRM architecture | 4 | |
| | | Scale to measure the depth of relationship, types of relationship, stages of relationship, customer life cycle., CRM process framework | 2 | |
| | | Knowledge management with focus on CRM, Knowledge management conceptual framework, CRM value chain, proposed customer knowledge management for effective CRM, | 2 | |
| | | CRM methodology | 1 | |
| 2 | E-Customer Relationship Management | Merging CRM and the internet, customer expectations and importance of E-CRM, Delivering CRM on the internet, | 1 | 5 |
| | | Changing pattern of E-CRM, customer value service matrix, existing CRM solutions and future CRM solutions | 2 | |
| | | Recognizing barriers to internet adoption. | 1 | |
| 3 | Customer Cognitive and Experimental Process | Cognitive learning<br>Perceptual process<br>Customer information Acquisition, Customer Information Processing Model<br>Marketing Communication Process | 3 | 6 |
| 4 | Planning CRM | CRM Culture, Realistic expectations,<br>CRM strategy – Strategic planning tools, collecting data, assessing findings, creating strategic proposal, | 1 | 4 |

| | | | | |
|---|---|---|---|---|
| **5** | **Building CRM** | Steps for building infrastructure, gathering business requirements, analyzing and designing components. Understanding data and information, process engineering steps, choose process automation software. Technology engineering steps, Managing the project – developing the project, controlling the project, finishing the project. | **1** | **8** |
| **6** | **Integrating and Using CRM** | Combine process, technology and people Create customer profile, segmenting customers, targeting customer, tools to find right customers. Prepare offers for customer, present the offer Evaluating performance metrics, understand value metrics | **1** | **7** |
| **7** | **Managing Quality and Customer Privacy** | Identify data quality issues, planning information quality Customer information management Elements of customer privacy | **1** | **4** |
| | | | **Total** | **42** |

**References:**


[1]Judith W. Kincaid, "Customer Relationship Management – Getting it Right!", first edition., 2015, Pearson.

[2] Jagdish N Sheth, AtulParvatiyar, G. Shainesh, "Customer Relationship management", Emerging concepts, tools and applications, first edition, 2001, Tata McGrawHill publication.

[3] Henry Assael, "Consumer Behavior and marketing action", sixth edition, Cengage Learning.

[4] H Peeru Mohamed, A Sagadevan, "Customer Relationship Management", A step by step approach, first edition, 2003, Vikas publication.


**List of Tutorials on Customer Relationship Management**

| Tutorial No. | Title | No. of Hrs |
|---|---|---|
| 1 | Case study on need for customer relationship and customer support | 2 |
| 2 | Case study on various goals and basics of CRM and E-CRM | 1 |
| 3 | Case study on Cognitive learning and experimental process | 1 |
| 4 | Case study on strategy for CRM | 1 |
| 5 | Case study on building phase of CRM | 2 |
| | Case study on integrating tools and components in CRM | 1 |
| 6 | Case study on Quality checking & security for customer data | 1 |
| 7 | Case study on services marketing:<br>CRM in Services Marketing<br>CRM in Banking<br>CRM in Insurance<br>CRM in Hospital Industry | 4 |
| 8 | Case study on future of E-CRM | 1 |
| | Total | 14 |

# Sardar Patel Institute of Technology

Bhavan's Campus, Munshi Nagar, Andheri (West), Mumbai-400058-India
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| Course Code | Course Name | Teaching Scheme (Hrs/ week) | | | Credits Assigned | | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | L | T | P | Total |
| MCA E53D | Digital Marketing | 3 | 1 | -- | 3 | 1 | -- | 4 |
| | | Examination Scheme | | | | | | |
| | | ISE | | MSE | ESE | | | |
| | | 20 | | 20 | 60 | | | |

| | | |
|---|---|---|
| **Pre-requisite Course Codes** | MCA14, MCA 15 | |
| | Student will be able to | |
| **Course Outcomes** | **CO1** | Explain the foundation for Global Digital Marketing. |
| | **CO2** | Apply online branding activities for the assigned product |
| | **CO3** | Develop strategies which would help to achieve marketing objectives and achieve Online Reputation Management. |
| | **CO4** | Determine emerging trends in Digital marketing. |

| Module No. | Module Name | Topics | Ref. | Hrs. |
|---|---|---|---|---|
| 1 | **Introduction to digital marketing** | Marketing in the digital age – the present and the future, The technology behind digital marketing. Digital marketing framework, Need a digital marketing strategy, Your business and digital marketing, Digital Consumer, 10 Ps of digital marketing, Website a hub of digital marketing world, E-commerce basics, advantages, disadvantages, People power, market research versus market reality, 3i principles, Digital marketing models | **1,2,3** | **6** |
| 2 | **Search Engine Optimization** | SEO : Four stage SEO process, Goals, On-page, off-page optimization, Keyword research, Google webmaster tool, Google Adwords, Google Analytics | **1,3** | **6** |
| 3 | **Online Marketing : Social media, e-mail marketing, mobile marketing** | Different forms of social media<br>E-mail marketing process, leads and sales with email marketing, design and content, delivery, discovery, campaign planning, success measurement.<br><br>Mobile advertising, Mobile gaming, Mobile applications, mobile privacy, mobile data<br>Video Marketing, Statistics on video marketing, Augmented and virtual reality | **1,3** | **15** |
| 4 | **Digital Marketing Strategy** | Digital marketing strategy groundwork<br>Defining digital marketing mix<br>Digital marketing strategy roadmap | **2** | **6** |
| 5 | **ORM,** | Online Reputation Management | **1** | **4** |

| | | | | |
|---|---|---|---|---|
| | **Performance Marketing & Web Analytics** | Performance marketing<br>Web analytics | | |
| **6** | **The future of Digital Marketing** | Digital marketing – Global landscape, The Indian view Emerging trends and concepts, Emerging opportunities for digital marketing professionals. | **2** | **5** |
| | | | **Total** | **42** |

**References:**


[1] Damian Ryan, "Understanding Digital Marketing: Marketing strategies for engaging the digital generation", 4th edition, 2017, Kogan Page Limited.

[2] Puneet Singh Bhatia, "Fundamentals of Digital Marketing", 1st edition, 2017, Pearson Edition.

[3] Ian Dodson, "The Art of Digital Marketing : The definitive guide to creating strategic targeted and measurable online campaigns", 2016, Wiley.


**List of Tutorials on Digital Marketing**

| Tutorial No. | Title | No. of Hrs |
|---|---|---|
| 1 | Case study :Dulux,<br>Entertainer<br>Social media marketing and optimization<br>YouTube Marketing<br>Facebook marketing<br>LinkedIn<br>Google Plus<br>Twitter | 2 |
| 2 | Case study: Mobile conversions increased year on year.<br>The rise and rise of mobile advertising | 2 |
| 3 | Case study on content marketing and native advertising<br>Info graphics Content Marketing<br>Optimize customer and user experience | 2 |
| 4 | Case study on video marketing ,<br>Webinar Marketing<br>Live Streaming | 2 |
| 5 | Case study on Online Reputation Management.<br>Online Marketing Plan. | 2 |
| 6 | Case study: Creating & publishing Blogs | 1 |
| 7 | Adobe analytics – SiteCatalyst, Life without Google | 1 |
| 8 | Develop Strategy for Digital Marketing<br>Discussion on Future development in video marketing. | 2 |
| | Total | 14 |

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| Course Code | Course Name | Teaching Scheme (Hrs/week) | | | Credits Assigned | | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | L | T | P | Total |
| MCAE 53 E | Web Services | 3 | 1 | -- | 3 | 1 | -- | 4 |
| | | Examination Scheme | | | | | | |
| | | ISE | MSE | | ESE | | | |
| | | 20 | 20 | | 60 | | | |

| | | |
|---|---|---|
| Pre-requisite Course Codes | MCAL16 | |
| | Student will be able to | |
| Course Outcomes | CO1 | Conceptualize working of web service architecture |
| | CO2 | Relate messaging framework with SOAP |
| | CO3 | Analyze business policy implemented in web services |
| | CO4 | Integrating concept of security for web services |

| Module No. | Module Name | Topics | Ref. | Hrs. |
|---|---|---|---|---|
| 1 | Web Services: A Realization of SOA | Scope of the Architecture, Transport Services<br>Messaging Services: SOAP, WS-Addressing<br>Service Description: WSDL, Policy<br>Discovery Services: UDDI, MetaData Exchange<br>Quality of Service: WS-Security, Reliable Messaging, Transactions<br>Service Components: Composition of Web Services Composeability | 1 | 4 |
| 2 | Messaging Framework | SOAP: A Brief History of SOA<br>Architectural Concepts: Defining Some Terms, The SOAP Processing Model, SOAP Roles (Enforcing SOAP Roles—The "must Understand" Attribute, Passing Headers—The "relay" Attribute), SOAP Faults/, Documents and RPC, Message Exchange Patterns, Request/Response MEP, Long-Running Conversational MEP, SOAP Bindings, SOAP and HTTP, SOAP, SOAP Attachments | 1 | 4 |
| 3 | Web Services Addressing | Addressing Web Services<br>Architectural Concepts: Endpoint References, Comparing Endpoints, Message Information Headers, Binding Endpoint References to SOAP Messages, Request-Reply Pattern in WS-Addressing, Request Message, Reply Message | 1 | 2 |
| 4 | Describing Metadata : Web Services Description Language (WSDL) | Role of WSDL in WS-*/SOA<br>Architectural Concepts: Extensibility, Support for Multiple Type Systems, Unifying Messaging and RPC, Separation of "What" from "How" and "Where", Support for Multiple Protocols and Transports, No Ordering, No Semantics | 1 | 6 |
| 5 | Web Services Policy | Architectural Concepts : Policy Framework( The Policy Container, Policy Operators, ExactlyOne Operator, All Operator, ."Optional" Operator, Policy Vocabulary, Policy | 1 | 4 |

| | | | | |
|---|---|---|---|---|
| | | Identification and Inclusion, Policy Intersection, Attaching Policies to Web Service | | |
| 6 | Discovering Metadata: Universal Description, Discovery, and Integration (UDDI) | Role of UDDI in SOA and the WS Stack: Use of UDDI During Design and Development, Use of UDDI at Runtime, Motivation for UDDI Architectural Concepts<br>UDDI and WSDL: Mapping of WSDL portType Element, Mapping of WSDL Binding Element, Mapping of WSDL Service Element, Mapping of WSDL Port Element, UDDI and WSDL at Development Time, UDDI and WSDL at Runtime<br>UDDI and WS-Policy: Referencing Remote Policy Expressions Directly, Referencing Remote Policy Expressions Indirectly, Querying UDDI Using Policy Expressions | 1 | 4 |
| 7 | Reliable Interaction | Reliable Messaging, Motivation for Reliable Messaging<br>Reliable Messaging Scenarios: Store and Forward, Batch Window, Failure Recovery, Long-Running Transactions<br>Processing Model: Sequence Lifecycle, Basic Syntax, Sequence Element, Sequence Acknowledgement Element, AckRequested Element, Sequence Fault Element, Delivery Semantics Supported, Policy Assertions, Inactivity Timeout | 1 | 4 |
| 8 | Motivation for Transactions: Classic Transactions, Business Transactions | Definition of Transaction Architectural Terms: Coordination, Protocols for Atomic Transactions (WS-Atomic Transaction), Protocols for Business Transactions (WS-BusinessActivity)<br>Services and Protocols: WS-Coordination Service, Context, Activation Service, Registration Service, Transaction Protocols, WS-Atomic Transaction, Completion Protocol, Durable Two-Phase Commit Protocol, Volatile Two-Phase Commit Protocol, WS-Business Activity, Business Agreement with Participant Completion, Business Agreement with Coordinator Completion, General Considerations<br>Example: Travel Agent Scenario Using Atomic Transaction( Activation, Application Calls Web Service, Registration, Completion/Coordination), Travel Agent Scenario Using Business Activity(Activation, Application Calls Web Service, Registration, Web Service Completion), Coordination Security<br>A Motivating Example: Travel Agent Web Services<br>Roles of Security in Web Services<br>Motivation for Using WS-Security | 1 | 4 |
| 9 | End-to-End Security When Intermediaries Are Present | Federating Multiple Security Domains, A Brief History, Architectural Concepts, Processing Model: XML Signature, XML Encryption, Putting the Pieces Together: The Basic Model, Model with Intermediary, Trust Relationships, Interoperability: Basic Security Profile<br>Future Directions, Summary, Advanced Security | 1 | 4 |
| | | | Total | 42 |

Reference Books:

[1] Donald F. Ferguson, Tony Storey, Frank Leymann, Francisco Curbera, SanjivaWeerawarana"Web Services Platform Architecture: SOAP, WSDL, WS-Policy, WS-Addressing, WS-BPEL, WS-Reliable Messaging, and More"Publisher: Prentice Hall First Edition Release Date: March 2005

[2] Sam Ruby, O'Reilly "Restful Web Services: Leonard Richardson", First Edition (May 15, 2007)

[3] Glenn Hostetler, SandorHasznos "Web Service and SOA Technologies"Practicing Safe Techs; First Edition (April 22, 2009)

[4] Raymond Yee Pro "Web 2.0 Mashups: Remixing Data and Web Services"Apress (February 25, 2008)


**List of Tutorials on Web Services**

| TutorialNo. | Title | No. of Hrs |
|---|---|---|
| 1 | Web Services: A Realization of SOA | 2 |
| 2 | Messaging Framework | 2 |
| 3 | Describing Metadata : Web Services Description Language (WSDL) | 2 |
| 4 | Discovering Metadata: Universal Description, Discovery, and Integration | 2 |
| 5 | Motivation for Transactions: Classic Transactions, Business Transactions | 2 |
| 6 | Transactions: Classic Transactions, Business Transactions | 2 |
| 7 | Security concept for Web services | 2 |
| | Total | 14 |

# Sardar Patel Institute of Technology

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| Course Code | Course Name | Teaching Scheme (Hrs/week) | | | Credits Assigned | | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | L | T | P | Total |
| MCAL51 | Distributed Computing and cloud computing Lab | -- | -- | 2 | -- | -- | 1 | 1 |
| | | Examination Scheme | | | | | | |
| | | ISE | | | MSE | | ESE | Total |
| | | 40 | | | -- | | -- | 40 |

| Pre-requisite Course Codes | MCA22 , MCA31 | |
|---|---|---|
| | Student will be able to | |
| Course Outcomes | CO1 | Implement RPC and RMI on the given scenario. |
| | CO2 | Implement Clock Synchronization algorithms |
| | CO3 | Implement Shared memory and load balancing on the given situation |
| | CO4 | Analyze various case studies on cloud computing |

| Sr.no | Experiment details | Ref | Marks |
|---|---|---|---|
| 1 | Implement Chat application using socket | 1,2,3 | 5 |
| 2 | Implement Remote Procedure Call | 1,2,3 | 5 |
| 3 | Implementation of Clock synchronization | 1,2,3 | 5 |
| 4 | Implementation of Mutual exclusion algorithm | 1,2,3 | 5 |
| 5 | Implementation of Election Algorithm. | 1,2,3 | 5 |
| 6 | Implementation of Shared Memory | 1,2,3 | 5 |
| 7 | Study of Virtualization Technologies | 5,6 | 5 |
| 8 | Study of Cloud Technologies | 5,6 | 5 |
| | | Total | 40 |

**Reference Books**:


1. Core Java2 Volume I & II – Horstmann, Cornell and gary, 9th edition,2013.
2. Java Complete Reference – Herbert Schildt, 5th edition,2002.
3. Distributed computing system and concepts – Andrew Tanenbaum, 2nd edition, PHI.
4. Distributed OS - Pradeep K. Sinha , PHI
5. Bernard Golden, "Virtualization for Dummies", Wiley Publication.
6. Dr. Kumar Saurabh, "Cloud computing", Wiley Publication

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| Course Code | Course Name | Teaching Scheme (Hrs/week) | | | Credits Assigned | | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | L | T | P | Total |
| MCAL52 | Data Analytics Lab | -- | -- | 2 | -- | -- | 1 | 1 |
| | | Examination Scheme | | | | | | |
| | | ISE | | MSE | | ESE | | Total |
| | | 40 | | -- | | -- | | 40 |

| Pre-requisite Course Codes | | MCA25 |
|---|---|---|
| | | Student will be able to |
| Course Outcomes | CO1 | Analyze statistical data for data forecasting and visualization. |
| | CO2 | Analyze large data set for selection of model. |
| | CO3 | Implement efficient solution for data manipulation and data analysis. |
| | CO4 | Build responsive Layout of R applications. |

| Experiment No. | Experiment Details | Ref no | Marks |
|---|---|---|---|
| 1 | Introduction R and R Studio, R data types and objects, reading and writing data | 1 | 5 |
| 2 | Control structures, functions, scoping rules, dates and times | 1 | 5 |
| 3 | Loop functions, debugging tools | 1 | 5 |
| 4 | Mathematical Functions in R | 2 | 5 |
| 5 | Fitting Linear Models in R | 2 | 5 |
| 6 | Bayesian Analysis in R | 2 | 5 |
| 7 | Spatial Analysis in R | 2 | 5 |
| 8 | Shiny R Applications and R server deployment | 2 | 5 |
| | | **Total** | **40** |

**Reference Book**

1]R Programming for Data Science by Roger D. Peng-2016,1st Edition.
2] Practical Data Science With R by Nina Zumel John Mount-2014,1st Edition.

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| Course Code | Course Name | Teaching Scheme (Hrs/week) | | | Credits Assigned | | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | L | T | P | Total |
| MCAL53 | Animation and graphic Design Lab | -- | -- | 2 | -- | -- | 1 | 1 |
| | | Examination Scheme | | | | | | |
| | | ISE | | MSE | | ESE | | Total |
| | | 40 | | -- | | -- | | 40 |

| Pre-requisite Course Codes | | MCAE35 D |
|---|---|---|
| | | Student will be able to |
| Course Outcomes | CO1 | Install blender software |
| | CO2 | Demonstrate 3D space and camera setting |
| | CO3 | Implement window types and edit objects |
| | CO4 | Implement Mesh objects using modifiers |
| | CO5 | Develop animation on the given scenario |

| Module No. | Topics | Ref no | Marks |
|---|---|---|---|
| 1 | Study and Installation of Blender software | 2, 3 | 5 |
| 2 | 3D cursor and moving in 3D space | 2,4 | 5 |
| 3 | Camera View setting | 2, 1 | 5 |
| 4 | To change the window types (File Browser info panel, User preference, Outliner) | 3 | 5 |
| 5 | Navigate and import objects. | 3,2 | 5 |
| 6 | Create and edit objects (Moving, Scaling And Rotating Objects) | 3 | 5 |
| 7 | Mesh objects and Modifiers | 3 | 5 |
| 8 | To develop animation on given scenario | 2,3 | 5 |
| | Total Marks | | 40 |

Reference books:


1. Blender Basics ,Classroom tutorial books, 4th Edition, James Chronister,2011.
2. https://docs.blender.org/manual/en/dev/
3. The Beginner's guide to Blender, Jonathan Lampel,2015.
4. An introduction to 3D blender, A Book for Beginners, John M Blain.
5. A Blender Tutorial, Building a Loco © Paul Hobbs 2014-15, Version 1.02

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| Course Code | Course Name | Teaching Scheme (Hrs/week) | | | Credits Assigned | | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | L | T | P | Total |
| MCA P51 | Mini Project-V | -- | -- | 2 | -- | -- | 1 | 01 |
| | | Examination Scheme | | | | | | |
| | | Phase I (ISE –I) | | Phase II (ISE- II) | ESE | | | Total |
| | | 10 | | 15 | 25 | | | 50 |

| Pre-requisite Course Codes : | MCA11, MCA31 , MCA32, MCAL36 | |
|---|---|---|
| | Student will be able to | |
| Course Outcomes | CO1 | Formulate a real world problem and develop its requirements. |
| | CO2 | Develop a design solution for the identified requirements. |
| | CO3 | Test the prototype against identified requirements. |
| | CO4 | Develop effective communication skills for presentation of project related activities. |

Evaluation Scheme

1. Project assessment is done by internal and external examiner. The project carries weightage of 50 marks.
2. The internal assessment is done in two phases. Phase I carry 10 marks, Phase II carries 15 marks. Students will be continuously assessed by the internal examiner in the middle of the semester (phase I) and at the end of the semester (phase II).
3. The external examination is conducted to evaluate the students for 25 marks at the end of the semester.
4. ESE for project shall carry maximum 50 marks in each semester. These 50 marks shall be given by the internal and external examiner together.

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| Course Code | Course Name | Teaching Scheme (Hrs/week) | | | Credits Assigned | | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | L | T | P | Total |
| MCA OE1 | MOOC | -- | -- | -- | -- | -- | -- | 04 |
| | | Examination Scheme | | | | | | |
| | | 40 hrs module with hands on practice | | | | | | |

1.

| Pre-requisite Course Codes : | MCA11, MCA31 , MCA32, MCAL36 | |
|---|---|---|
| | Student will be able to | |
| Course Outcomes | CO1 | Interact user forums to support community. |
| | CO2 | Practice charity more effectively |
| | CO3 | Test the prototype against identified requirements. |
| | CO4 | Analyze with the main components of 3P (presage-process-product) model ofteaching and learning |

- In the TYMCA course, students will focus on subjects like programming , DBMS, Security etc to bridge the gap between intermediate and Technology education.
- Student need to select the online courses from specified website from time to time based on the domain of Programming, Networking, Software management, Database, AI, Graphics, UED and Testing, OS and so on.
- List of the courses will be specified by the dept before the start of the semester
- Students have to select the course get it sanctioned the course before the commencement of the semester.
- Students need to successfully complete the course with all required criteria of submission (Considering attendance, evaluation, submission of assignment, completion of examination) and submit the course completion certificate to the dept.
- Based on the completion certificate in the speculated time, student will be eligible for the credit of 4 points

# Sardar Patel Institute of Technology

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## *MOOC

**1.NPTEL**

**1.1 Computer architecture**
**1.2 Artificial Intelligence Search methods for Problem Solving**
**1.3 Block chain architecture design and Use cases**
**1.4 Embedded system design verification and Test**
**1.5 Social Networks**
**1.6 System design for sustainability**

**2.Coursera**

**2.1 Machine learning with Tensor flow**
https://www.coursera.org/specializations/machine-learning-tensorflow-gcp
**2.2 Responsive Website Basics**
https://www.coursera.org/specializations/website-development

**3 .Udacity**

**3.1 Full stack developer [PHP]**
https://www.udacity.com/course/full-stack-web-developer-nanodegree--nd004
**3.2 IoS Developer**
https://www.udacity.com/course/ios-developer-nanodegree--nd003

**Sardar Patel Institute of Technology**
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# Semester VI

# Sardar Patel Institute of Technology

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| Course Code | Course Name | Teaching Scheme (Hrs/week) | | | Credits Assigned | | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | L | T | P | Total |
| MCA SP 6.1 | INTERNSHIP – Project | -- | -- | 40 | -- | -- | 20 | 20 |
| | | Examination Scheme | | | | | | |
| | | ISE | | MSE | | ESE | | | Total |
| | | Presentation | Oral | Presentation | Oral | Presentation | Oral | Report | |
| | | 15 | 10 | 15 | 10 | 25 | 25 | 50 | 150 |

| Pre-requisite Course Codes : MCA11, MCA31 , MCA32, MCAL36 | | |
|---|---|---|
| Course Outcomes | Student will be able to | |
| | CO1 | Apply programming concepts to develop software solutions |
| | CO2 | Apply the software engineering principles to solve real life problems using modern tools, used in the organization |
| | CO3 | Apply the software project management processes to carry out the successful completion of project |
| | CO4 | Apply technical communication effectively in the organization |
| | CO5 | Use professional ethics in application development |
| | CO6 | Develop skills for working in the team and for life-long learning |

Guidelines:

1. Student need to select a company for internship, or can work under the guidance the internal mentor. If student is not selected to work in industry for internship project, internal mentor need to organize project in the college itself which may be in accordance with Academic rules of institute. Max. 3 students shall be allotted to one internal mentor in case student not getting industry internship.
2. Every student should submit joining letter along with their project proposal within 4 weeks of joining internship in company. Project proposal should include company information, External mentor information, project abstract and tool (tentatively) working.
3. After submission of project proposals, ISE shall be conducted.
4. MSE shall be conducted as per academic time table.
5. Student need to arrange for meeting between internal and external mentor for feedback and improving the industry interaction before ESE.
6. Every student shall make draft of project report and get it accessed by internal mentor. The Project report should contain an Introduction to Project, which should clearly explain the project scope in detail. Also, Data Dictionary, ERDs, File designs and a list of output reports should be included if required as per the project title and scope. The project Work should be of such a nature that it could prove useful or be relevant from the commercial/management angle. Every student should submit duly signed Project Report.
7. ESE shall be conducted after submission of Project Report

The evaluation of a student shall be based on his/her performance in ISE, MSE and ESE. The mode of evaluation for ISE and MSE is Orals and Presentation. During evaluation faculty must follow the

rubrics prepared for respective evaluation. Performance shall be continuously monitored and record of assessment shall be maintained in the prescribed pro-forma by course faculty and monitored by department Head. The marks and weightage is shown in the following Table.

Table: Marks and Weightage of Evaluation

| Evaluation | Oral | | Presentation | | Report | |
|---|---|---|---|---|---|---|
| | Marks | % weightage | Marks | % weightage | Marks | % weightage |
| ISE | 15 | 100 | 10 | 100 | -- | -- |
| MSE | 15 | 100 | 10 | 100 | -- | -- |
| ESE | 25 | 100 | 25 | 100 | 50 | 100 |

Execution of Internship – Project

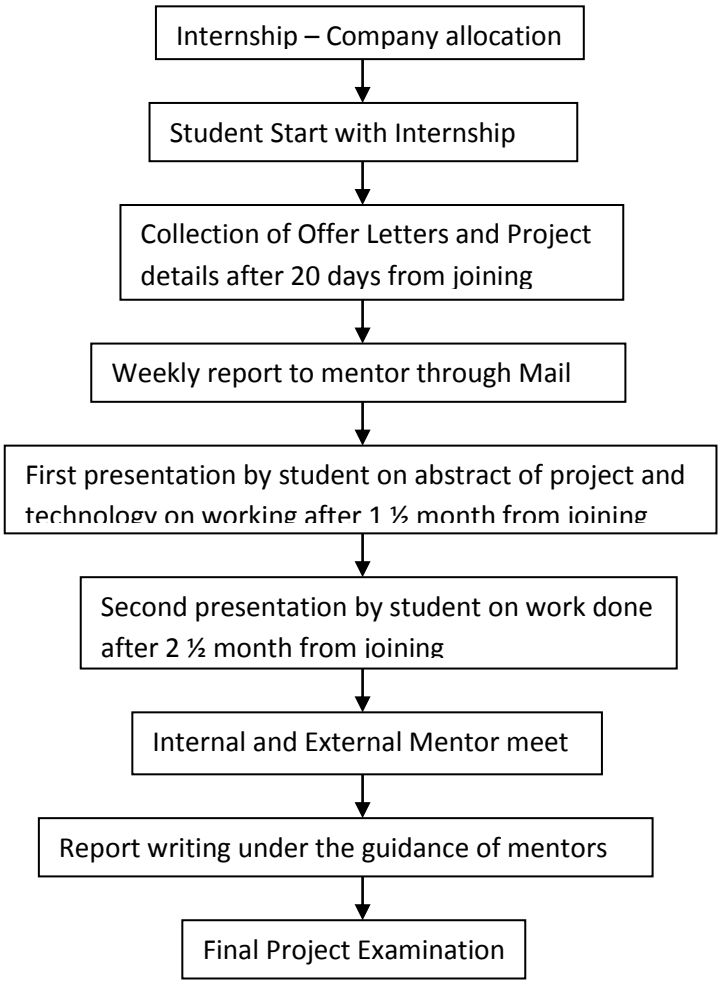


Figure: Process of Internship

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| Course Code | Course Name | Teaching Scheme (Hrs/week) | | | Credits Assigned | | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | L | T | P | Total |
| MCA SP 6.2 | Internship-Seminar | -- | -- | -- | -- | -- | 02 | 02 |
| | | Examination Scheme | | | | | | |
| | | Presentation | | Paper writing | | | | Total |
| | | 25 | | 25 | | | | 50 |

| Pre-requisite Course Codes : Programming language, DBMS, UML | | |
|---|---|---|
| Course Outcomes | Student will be able to | |
| | CO1 | Analyze a topic in the area of research |
| | CO2 | Identify problem to carry out research |
| | CO3 | Explore and enhance research potential |
| | CO4 | Compile research content for presentation of literature review |
| | CO5 | Understand structure of research papers |

Guidelines of Internship - Seminar

Step 1: Review Process

1. Student shall submit list of papers and patents selected for review
2. Students shall submit review of literature which include content based on survey, comparison etc

Step 2 : Define problem and state proposed solution

1. Based on the literature review, students shall define problem he identified and wants to work on it.
2. Students should be able to define solution for the problems identified. Propose the Solution

Step 3: Submission of the INTORDUCTION AND BODY of the technical paper

1. Based on the above content students should be able to write introduction and body of technical paper

Step 4: Submission of conclusion

1. Students should submit conclusion on the above analysis

Step 5: Submission of complete paper

1. Students should conclude all the information in IEEE format
2. Students should submit the technical paper

Step 6: Submission of Final Drafted Paper

1. Students should include list of the conferences where the paper can be submitted
2. Final paper should be submitted in hard copy

The evaluation of a student shall be based on his/her performance in ESE. During evaluation faculty must follow the rubrics prepared for respective evaluation. Performance shall be continuously

monitored and record of assessment shall be maintained in the prescribed pro-forma by course faculty and monitored by department Head.

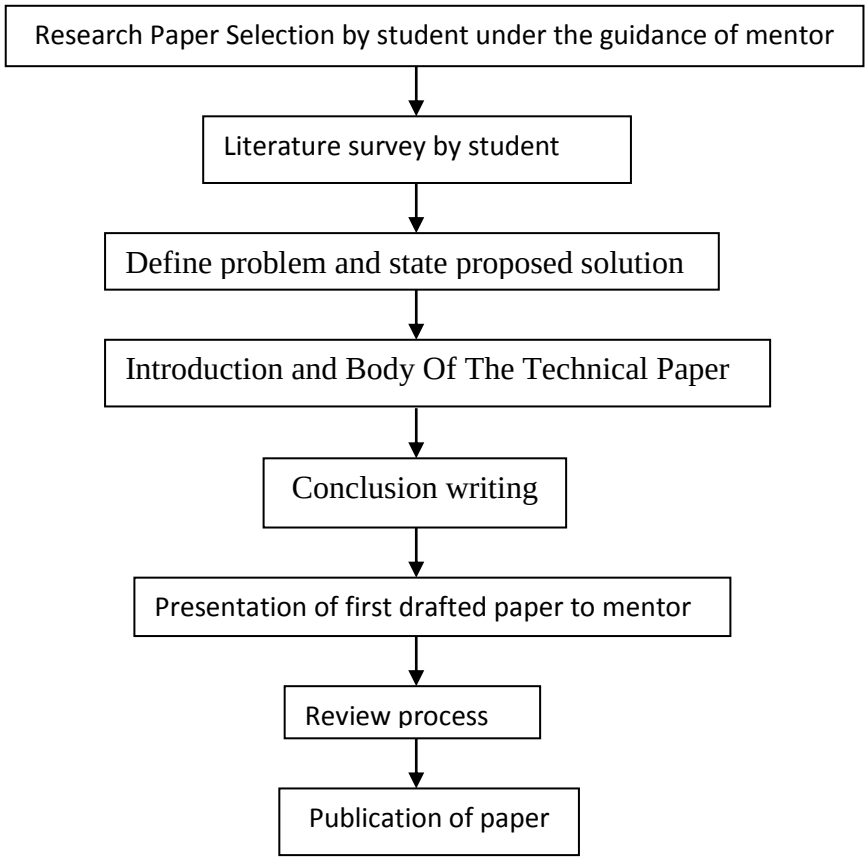


Figure: Process of writing Research Paper