

School: Computer Sciences & Engineering	Programme: MCA IILP			
Course Code: TPCA101	Year :First Year			Semester - I
Course: No Sql Database	L	T	P	C
	3	1	4	6
Theory: 3 Hrs/Week	Max. University Theory Examination: 50 Marks			
Max. Time for Theory Exam.: 3 Hrs	Continuous Internal Assessment: 50 Marks			

Objectives	
1	Students will understand fundamental concepts of a number of different NOSQL products.
2	Students will also learn various CRUD operations and the querying mechanisms in NOSQL.
3	Students will also comprehend with advanced topics like Google App Engine data store and Amazon Simple DB.

Course Outcomes	
On successful completion of the course students will be able to:	
1	Assimilate fundamental concepts in the context of a number of different NOSQL products.
2	Construct refined logical database model with consideration of data semantics and dependency.
3	Execute various CRUD operations with MongoDB.
4	Build a database system and demonstrate competence with the fundamental tasks involved with its modeling, designing, and implementation.
5	Use the MongoDB tools to develop and deploy your applications.
6	Implement Java/ Python / PHP web application for a real world problem with MongoDB.

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Unit Number	Details	Hours
1	Definition of NOSQL, History of NOSQL and different NOSQL Products, Exploring Mongo DB java, Exploring Mongo DB Ruby/Python, Interfacing and Interacting with NOSQL, Interfacing and Interacting with NOSQL	10
2	Understanding the NOSQL architecture, Understanding the, NOSQL architecture, Understanding the, NOSQL architecture, Performing CRUD, operations, Querying NOSQL stores, Modifying Data Stores and Managing Evolution, Modifying Data Stores and Managing Evolution, Indexing and Ordering Data Sets.	10
3	NOSQL in cloud, Parallel Processing with Map Reduce, Big Data with Hive	9
4	Surveying Database, Migrating from RDBMS to NOSQL, Web Frameworks and NOSQL, Using MYSQL as a NOSQL.	9
5	PHP and Mongoddb, Python and Mongoddb, Creating Blog application with PHP, NOSQL Database Administration	10
Total		48

Resources	
Recommended Books	<ol style="list-style-type: none"> 1. David Hows, “The definitive guide to MongoDB”, 2nd edition, Apress Publication, 2009, 8132230485. 2. Shakuntala Gupta Edward, “Practical Mongo DB ”, Second edition, Apress Publications, 2016, ISBN 1484206487
Reference Books	<ol style="list-style-type: none"> 1. Daniel Perkins, “Mongo DB, Third Edition, CreateSpace Independent Publishing Platform, 2016, ISBN 152396300 2. Steve Hoberman, “Data Modelling for Mongo DB”, First Edition, Technics Publication, 2014, ISBN 9781935504702

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School: Computer Sciences & Engineering	Programme: MCA IILP			
Course Code: TPCA102	Year : First Year		Semester – I	
Course: Research Methodology and IPR	L	T	P	C
	3	1	0	4
Theory: 3 Hrs/Week	Max. University Theory Examination: 50 Marks			
Max. Time for Theory Exam.: 3 Hrs	Continuous Internal Assessment: 50 Marks			

Objectives	
1	Understand research problem formulation.
2	Analyze research related information
3	Follow research ethics

Course Outcomes	
On successful completion of the course students will be able to:	
1	Understand that today's world is controlled by Computer, Information Technology, but tomorrow world will be ruled by ideas, concept, and creativity.
2	Understanding that when IPR would take such important place in growth of individuals & nation, it is needless to emphasize the need of information about Intellectual Property Right to be promoted among students in general & engineering in particular.
3	Understand that IPR protection provides an incentive to inventors for further research work and investment in R & D, which leads to creation of new and better products, and in turn brings about, economic growth and social benefits.

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Unit Number	Details	Hours
1	Meaning of research problem, Sources of research problem, Criteria Characteristics of a good research problem, Errors in selecting a research problem, Scope and objectives of research problem. Approaches of investigation of solutions for research problem, data collection, analysis, interpretation, Necessary instrumentations	10
2	Effective literature studies approaches, analysis Plagiarism, Research ethics, Effective technical writing, how to write report, Paper Developing a Research Proposal, Format of research proposal, a presentation and assessment by a review committee	9
3	Nature of Intellectual Property: Patents, Designs, Trade and Copyright. Process of Patenting and Development: technological research, innovation, patenting, development. International Scenario: International cooperation on Intellectual Property. Procedure for grants of patents, Patenting under PCT.	10
4	Patent Rights: Scope of Patent Rights. Licensing and transfer of technology. Patent information and databases. Geographical Indications.	9
5	New Developments in IPR: Administration of Patent System. New developments in IPR; IPR of Biological Systems, Computer Software etc. Traditional knowledge Case Studies, IPR and IITs.	10
Total		48

Resources	
Recommended Books	1. Stuart Melville and Wayne Goddard, “Research methodology: an introduction for science & engineering students” 2. Wayne Goddard and Stuart Melville, “Research Methodology: An Introduction” 3. Robert P. Merges, Peter S. Menell, Mark A. Lemley, “Intellectual Property in New Technological Age”, 2016.

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Reference Books	1. Ranjit Kumar, 2 nd Edition , “Research Methodology: A Step by Step Guide for beginners” 2. Halbert, “Resisting Intellectual Property”, Taylor & Francis Ltd ,2007. 3. T. Ramappa, “Intellectual Property Rights Under WTO”, S. Chand, 2008
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School: Computer Sciences & Engineering	Programme: MCA IILP			
Course Code: TPCAE01	Year : First Year		Semester - I	
Course: Soft Computing	L	T	P	C
	3	1	4	6
Theory: 3 Hrs/Week	Max. University Theory Examination: 50 Marks			
Max. Time for Theory Exam.: 3 Hrs	Continuous Internal Assessment: 50 Marks			

Objectives	
1	To introduce the techniques of soft computing
2	To explain the hybridization of soft computing systems which differ from conventional AI and computing in terms of its tolerance to imprecision and uncertainty.

Course Outcomes	
On successful completion of the course students will be able to:	
1	Explain the basics of soft computing and their suitable industry related applications
2	Apply neural network principles and algorithms for given problems
3	Apply the principles of fuzzy algorithms for real time applications

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Unit Number	Details	Hours
1	Soft Computing and its Techniques, Soft Computing verses Hard Computing. Applications of Soft Computing in the current industry	9
2	Neural Network (NN), Biological foundation of Neural Network, Neural Model and Network Architectures, Perceptron Learning, Supervised Hebbian Learning, Back-propagation, Associative Learning, Competitive Networks, Hopfield Network, Computing with Neural Nets and applications of Neural Network	10
3	Fuzzy Sets, Operations on Fuzzy sets, Fuzzy Relations, Fuzzy Measures, Applications of Fuzzy Set Theory to different branches of Science and Engineering	9
4	Neuro Fuzzy and Soft Computing, Adaptive Neuro-Fuzzy Inference System Architecture, Hybrid Learning Algorithm, Learning Methods that Cross-fertilize ANFIS and RBFN	10
5	Coactive Neuro Fuzzy Modeling, Framework Neuron Functions for Adaptive Networks, Neuro Fuzzy Spectrum. Hybridization of other techniques	10
Total		48

Resources	
Recommended Books	1. J.S.R.Jang, C.T.Sun and E.Mizutani,Neuro-Fuzzy and Soft Computing, PHI,2004 2. J. Freeman and D. Skapura,Neural Networks: Algorithms, Applications, and Programming Techniques, Addison-Wesley,1991
Reference Books	1. G. J. Klir, and B. Yuan,Fuzzy Sets and Fuzzy Logic: Theory and Applications, PrenticeHall,1995 2. S. Rajasekaran and G.A.V.Pai,Neural Networks, Fuzzy Logic and Genetic Algorithms, PHI,2003

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School: Computer Sciences and Engineering	Programme: MCA IILP			
Course Code: TPCAE02	Year : First Year		Semester - I	
Course: Data Science	L	T	P	C
	3	1	4	6
Theory: 3 Hrs/Week	Max. University Theory Examination: 50 Marks			
Max. Time for Theory Exam.: 3 Hrs	Continuous Internal Assessment: 50 Marks			

Objectives	
1	Provide with the knowledge and expertise to become a proficient data scientist.
2	Demonstrate an understanding of statistics and machine learning concepts that are vital for data science
3	Critically evaluate data visualizations based on their design and use for communicating stories from data

Course Outcomes	
On successful completion of the course students will be able to:	
1	Explain how data is collected, managed and stored for data science.
2	Understand the key concepts in data science, including their real-world applications and the toolkit used by data scientists.
3	Implement data collection and management scripts.

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Unit Number	Details	Hours
1	Introduction to core concepts and technologies: Introduction, Terminology, data science process, data science toolkit, Types of data, Example applications.	9
2	Data collection and management: Introduction, Sources of data, Data collection and APIs, Exploring and fixing data, Data storage and management, Using multiple data sources	10
3	Data analysis: Introduction, Terminology and concepts, Introduction to statistics, Central tendencies and distributions, Variance, Distribution properties and arithmetic, Samples/CLT, Basic machine learning algorithms, Linear regression, SVM, Naive Bayes.	10
4	Data visualization: Introduction, Types of data visualization, Data for visualization: Data types, Data encodings, Retinal variables, Mapping variables to encodings, Visual encodings.	9
5	Applications of Data Science, Technologies for visualization. Recent trends in various data collection and analysis techniques, various visualization techniques, application development methods of used in data science.	10
Total		48

Resources	
Recommended Books	1. Cathy O’Neil and Rachel Schutt. Doing Data Science, Straight Talk From The Frontline. O’Reilly. 2. Jure Leskovek, AnandRajaraman and Jeffrey Ullman. Mining of Massive Datasets. v2.1, Cambridge University Press.
	1. Field Cady, The Data Science Handbook, Wiley Publications

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School: Computer Sciences & Engineering	Programme: MCA IILP			
Course Code: TPCA103	Year : First Year		Semester - I	
Course: Software Engineering	L	T	P	C
	3	1	0	4
Theory: 3 Hrs/Week	Max. University Theory Examination: 50 Marks			
Max. Time for Theory Exam.: 3 Hrs	Continuous Internal Assessment: 50 Marks			

Objectives	
1	To outline the need for Software Project Management
2	To highlight different techniques for software cost estimation.
3	To highlight different techniques for activity planning.
4	To understand the Project Cycle.
5	To understand project planning and risk management.

Course Outcomes	
On successful completion of the course students will be able to:	
1	Understand Evaluation and Planning of Project
2	Calculate Project Estimation by using various models
3	Understand Project management and Control
4	Implement best methods for staff selection and communication

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Unit Number	Details	Hours
1	Project Evaluation and Project Planning: Importance of Software Project Management, Activities Methodologies, Categorization of Software Projects ,Setting objectives ,Management Principles, Management Control, Project portfolio Management, Cost-benefit evaluation technology, Risk evaluation, Strategic program Management, Stepwise Project Planning.	10
2	Project Cycle and Effort Estimation: Software process and Process Models, Choice of Process models, mental delivery , Rapid Application development, Agile methods, Extreme Programming, SCRUM, Managing interactive processes, Basics of Software estimation, Effort and Cost estimation techniques, COSMIC Full function points, COCOMO II A Parametric Productivity Model, Staffing Pattern.	10
3	Activity Planning and Risk Management: Objectives of Activity planning, Project schedules, Activities, Sequencing and scheduling, Network Planning models, Forward Pass & Backward Pass techniques, Critical path (CRM) method, Risk identification, Assessment, Monitoring, PERT technique, Monte Carlo simulation, Resource Allocation, Creation of critical patterns, Cost schedules.	10
4	Project Management and Control: Framework for Management and control, Collection of data Project termination, Visualizing progress, Cost monitoring, Earned Value Analysis- Project tracking, Change control- Software Configuration Management, Managing contracts, Contract Management.	9
5	Staffing in Software Projects: Managing people, Organizational behavior, Best methods of staff selection, Motivation, The Oldham-Hackman job characteristic model, Ethical and Programmed concerns , Working in teams, Decision making, Team structures, Virtual teams, Communications genres, Communication plans.	9

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Total	48
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Resources	
Recommended Books	1. Robert K. Wysocki “Effective Software Project Management” – Wiley Publication, 2011. 2. Walker Royce: “Software Project Management”- Addison-Wesley, 1998. 3. Gopalaswamy Ramesh, “Managing Global Software Projects” – McGraw Hill Education (India), Fourteenth Reprint 2013.
Reference Books	1. Bob Hughes, Mike Cotterell and Rajib Mall: Software Project Management – Fifth Edition, Tata McGraw Hill, New Delhi, 2012.

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School: Computer Sciences and Engineering	Programme: MCA IILP			
Course Code: TPCA101	Year: First Year		Semester : I	
Course: :- Lab Course based on No SQL Database	L	T	P	C
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Practical: UG - 4 Hrs/Batch (20 Students)	Practical Examination: 25 Marks			
	Formative CIA/Term Work: 25 Marks			

Practical Objective	
1	This will give hands on practice to student about programming language C.
2	Understand the basic concept of C Programming, and its different modules that includes conditional and looping expressions, Arrays, Strings, Functions, Pointers, Structures and File programming
3	Acquire knowledge about the basic concept of writing a program
4	Role of Functions involving the idea of modularity

Set of Suggested assignment list is provided in 3 groups – A, B, C.

Instructor is suggested to design assignment list by selecting/ designing at least 10 suitable assignments as a study assignments.

1. At least 6 assignments from group A.
2. At least 3 assignments from group B.
3. At least 1 assignments from group C.

Sr. No.	Description
	Group A: Computer Networks (Any SIX Assignments)
1	<ul style="list-style-type: none"> Write a MongoDB query to display all the documents in the collection restaurants. Write a MongoDB query to display the fields restaurant_id, name, borough

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	and cuisine for all the documents in the collection restaurant.
2	<ul style="list-style-type: none"> Write a MongoDB query to display the fields restaurant_id, name, borough and cuisine, but exclude the field _id for all the documents in the collection restaurant. Write a MongoDB query to display the fields restaurant_id, name, borough and zipcode, but exclude the field _id for all the documents in the collection restaurant.
3	<ul style="list-style-type: none"> Write a MongoDB query to display the entire restaurant which is in the borough Bronx. Write a MongoDB query to display the first 5 restaurant which is in the borough Bronx.
4	<ul style="list-style-type: none"> Write a MongoDB query to display the next 5 restaurants after skipping first 5 which are in the borough Bronx. Write a MongoDB query to find the restaurants who achieved a score more than 9
5	<ul style="list-style-type: none"> Write a MongoDB query to find the restaurants that achieved a score, more than 80 but less than 100. Write a MongoDB query to find the restaurants which locate in latitude value less than -95.754168.
6	<ul style="list-style-type: none"> Write a MongoDB query to find the restaurants that do not prepare any cuisine of 'American' and their grade score more than 70 and latitude less than -65.754168. Write a MongoDB query to find the restaurants which do not prepare any cuisine of 'American' and achieved a score more than 70 and not located in the longitude less than -65.754168.
7	<ul style="list-style-type: none"> Write a MongoDB query to find the restaurants which do not prepare any cuisine of 'American ' and achieved a grade point 'A' not belongs to the borough Brooklyn. The document must be displayed according to the cuisine in descending order. Write a MongoDB query to find the restaurant Id, name, borough and cuisine for those restaurants which contain 'Wil' as first three letters for its name.
8	<ul style="list-style-type: none"> Write a MongoDB query to find the restaurant Id, name, borough and cuisine for those restaurants which contain 'ces' as last three letters for its name. Write a MongoDB query to find the restaurant Id, name, borough and cuisine for those restaurants which contain 'Reg' as three letters somewhere in its name.
9	<ul style="list-style-type: none"> Write a MongoDB query to find the restaurants which belong to the borough Bronx and prepared either American or Chinese dish. Write a MongoDB query to find the restaurant Id, name, borough and cuisine for those restaurants which belong to the borough Staten Island or Queens or Bronx or Brooklyn.

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10	<ul style="list-style-type: none"> Write a MongoDB query to find the restaurant Id, name, borough and cuisine those restaurants which are not belonging to the borough Staten Island or Queens or Bronx or Brooklyn. Write a MongoDB query to find the restaurant Id, name, borough and cuisine for those restaurants which achieved a score which is not more than 10.
	Group B: (Any Three Assignments)
11	<ul style="list-style-type: none"> Write a MongoDB query to find the restaurant Id, name, borough and cuisine for those restaurants which prepared dish except 'American' and 'Chinees' or restaurant's name begins with letter 'Wil'. Write a MongoDB query to find the restaurant Id, name, and grades for those Restaurants which achieved a grade of "A" and scored 11 on an ISO Date "2014-08-11T00:00:00Z" among many of survey dates.
12	<ul style="list-style-type: none"> Write a MongoDB query to find the restaurant Id, name and grades for those restaurants where the 2nd element of grades array contains a grade of "A" and score 9 on an ISODate "2014-08-11T00:00:00Z". Write a MongoDB query to find the restaurant Id, name, address and geographical location for those restaurants where 2nd element of co-ord array contains a value which is more than 42 and upto 52.
13	<ul style="list-style-type: none"> Write a MongoDB query to arrange the name of the restaurants in ascending order along with all the columns. Write a MongoDB query to arrange the name of the restaurants in descending order along with all the columns.
14	<ul style="list-style-type: none"> Write a MongoDB query to arrange the name of the cuisine in ascending order and for that same cuisine borough should be in descending order. Write a MongoDB query to know whether all the addresses contain the street or not.
	Group C: (Any One Assignments)
15	<ul style="list-style-type: none"> Write a MongoDB query which will select all documents in the restaurants collection where the coord field value is Double. Write a MongoDB query which will select the restaurant Id, name and grades for those restaurants which returns 0 as a remainder after dividing the score by 7.
16	<ul style="list-style-type: none"> Write a MongoDB query to find the restaurant name, borough, longitude and attitude and cuisine for those restaurants which contains 'mon' as three letters somewhere in its name. Write a MongoDB query to find the restaurant name, borough, longitude and latitude and cuisine for those restaurants which contain 'Mad' as first three letters of its name

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Term Work:

Term Work assessment shall be conducted for the Project, Tutorials and Seminar. Term work is continuous assessment based on work done, submission of work in the form of report/journal, timely completion, attendance, and understanding. It should be assessed by subject teacher of the institute. At the end of the semester, the final grade for a Term Work shall be assigned based on the performance of the student and is to be submitted to the University.

Notes:

1	The experiments from the regular practical syllabus will be performed (30 Marks).
2	The regular attendance of students during the syllabus practical course will be monitored and marks will be given accordingly (10 Marks).
3	Good Laboratory Practices (10 Marks)

Practical/Oral/Presentation:

Practical shall be conducted and assessed jointly by internal and external examiners. The performance in the Practical examination shall be assessed by at least a pair of examiners appointed as examiners by the University. The examiners will prepare the mark/grade sheet in the format as specified by the University, authenticate and seal it. Sealed envelope shall be submitted to the head of the department or authorized person.

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