Kadi Sarva Vishwavidyalaya

Faculty of Engineering & Technology

Fourth Year Bachelor of Engineering (Computer)

(To be Proposed For: Academic Year 2020-21)

Subject Code: CE803D-N	**Subject Title: Web Data Management**
Pre-requisite	

Teaching Scheme (Credits and Hours)

Teaching scheme				**Total Credit**	**Evaluation Scheme**					
L	**T**	**P**	**Total**		**Theory**		**Mid Sem Exam**	**CIA**	**Pract.**	**Total**
Hrs	**Hrs**	**Hrs**	**Hrs**		**Hrs**	**Marks**	**Marks**	**Marks**	**Marks**	**Marks**
04	00	02	06	05	03	70	30	20	30	150

Course Objective:

- This course provides an in depth study of the area of web data management covering XML, XLink, and XPointer.
- The course primarily covers the state of the art in designing and building web applications and services, primarily focusing on issues and challenges that revolve around the management and processing of data.
- It also highlights the concepts of Ontology, RDF and OWL.
- It covers Building Web scale applications using web search, web crawlers, Web Graph mining, Map Reduce etc

Outline of the Course:

Sr. No	**Title of the Unit**	**Minimum Hours**
1	Data Model	10
2	XPath and XQuery	8
3	Typing	5
4	XML Query Evaluation	10
5	Ontologies, RDF, and OWL 05 15	10
6	Querying Data through Ontologies	7
7	Data Integration	7
8	Building Web scale applications	7

Total hours (Theory):64
Total hours (Lab): 32
Total hours: 96

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Detailed Syllabus

Sr No	Content	Total Hrs	Weightage (%)
1	**Data Model** Introduction to Modeling Web Data, Semi structured data, XML, Web Data Management with XML, XML Standards, XML and syntax, XML Data Model, XLink, and XPointer.	10	16
2	**XPath and XQuery** Introduction, Basics of XPath and XQuery, XPath: Steps and path expressions, Evaluation of path expressions, Generalities on axes and node tests, Axes, Node tests and abbreviations, Predicates, XPath 2.0; FLWOR expressions in XQuery: Defining variables - the for and let clauses, Filtering - the where clause, The return clause, Advanced features of XQuery; XPath foundations.	8	12
3	**Typing** Motivating Typing, Automata, Schema Languages for XML, Typing Graph Data: Graph Semi structured Data, Graph Bisimulation, Data guides.	5	7
4	**XML Query Evaluation** XML fragmentation, XML identifiers: Region-based identifiers, Dewey-based identifiers, Structural identifiers and updates; XML evaluation techniques: Structural join, Optimizing structural join queries, Holistic twig joins.	10	16
5	**Ontologies, RDF, and OWL** Introduction, Ontologies by example, Web resources, URI, namespaces, RDF, RDFS: RDF Schema, OWL, Ontologies and (Description) Logics.	10	16
6	**Querying Data through Ontologies** Introduction, Querying RDF data: notation and semantics, Querying through RDFS ontologies, Answering queries through DL-LITE ontologies.	7	11
7	**Data Integration** Introduction, Containment of conjunctive queries, Global-as-view mediation, Local-as-view mediation, Ontology-based mediators, Peer-to-Peer Data Management Systems.	7	11
8	**Building Web scale applications** Web search, web crawlers, web information retrieval, Web graph mining and hot topics in web search, Distributed systems, failure management, Required properties of a distributed system, P2P networks, Hash-based structures, distributed indexing, Distributed Computing with Map-Reduce.	7	11
	Total	**64**	**100**

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Instructional Method and Pedagogy:

- At the start of course, the course delivery pattern, prerequisite of the subject will be discussed.
- Lectures will be conducted with the aid of multi-media projector, black board, OHP etc.
- Attendance is compulsory in lecture and laboratory which carries 10 marks in overall evaluation.
- One internal exam will be conducted as a part of internal theory evaluation.
- Assignments based on the course content will be given to the students for each unit and will be evaluated at regular interval evaluation.
- Surprise tests/Quizzes/Seminar/tutorial will be conducted having a share of five marks in the overall internal evaluation.
- The course includes a laboratory, where students have an opportunity to build an appreciation for the concepts being taught in lectures.
- Experiments shall be performed in the laboratory related to course contents.

Learning Outcome:

On successful completion of this course, the student should be able to:

1. To understand the overall vision of the Semantic Web
2. To analyze the current technology stack (URIs, XML, RDF/S, OWL)
3. To understand how one could use these technologies for building something useful
4. To define and test an ontology
5. To define schema mappings
6. To install and use tools for semantic data management

E-Resources:

- http://in.reuters.com/tools/rss
- http://www.altova.com/xmlspy.html
- https://www.w3.org/RDF/

Reference Books:

- Serge Abiteboul, Ioana Manolescu, Philippe Rigaux, Marie-Christine Rousset and Pierre Senellart, “Web Data Management”, Cambridge University Press, 2011
- Bhavani Thuraisingham, “Web Data Management and Electronic Commerce”, CRC Press, 2000
- Bhavani Thuraisingham, “XML Databases and the Semantic Web”, CRC Press, 2002
- Athena Vakali and George Pallis, “Web Data Management Practices: Emerging Techniques and Technologies”, IGI Publishing, 2007, ISBN-10: 1599042282; ISBN-13: 978-1599042282

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List of Experiments:

No	Name of Experiment
1	Create an XML file defining an article in newspaper.
2	Create an XML file containing list of students. Also create style sheet file to display list in an HTML format.
3	Create an XML file containing list of students. Using XPath display following information • Information of a student with ID No : 101 • All the student in the sorted order according to their CGPA
4	Create an XForm to collect information from staff member regarding their publications. Details like Year of Publication, National/International, Title, Conference/Journal etc.
5	From the above gathered information, using XQuery find out the number of publication in a specific year.
6	Demonstrate the use of AJAX.
7	Study of XMLSPY tool.
8	Create an RSS for the events occurring in your institute
9	Write a program to read the articles in RSS created in above practical
10	Study of RDF (Resource Description Framework)