DO NOT TYPE IN THIS BOX

Bulletin #: _____

Academic Year: _____

FLORIDA INTERNATIONAL UNIVERSITY
UNIVERSITY CURRICULUM COMMITTEE
Proposal for a Course Change

PART I. FILL OUT THIS SECTION COMPLETELY

1. **School/College** Engineering and Computing

   Div./Dept. in Which Taught School of Computing and Information Sciences

2. | COP | 4 | 722 | | 3 |
   |---|---|---|---|---|
   | **Alpha Prefix** | **1st Digit** | **Last 3 Digits** | **"C"-lec-lab "L"-Lab** | **Cr. Hrs.** |

3. **Present Course Title** Survey of Database Systems

PART II. FILL OUT CHANGE INFORMATION ONLY

Change Effective 1 / 11 / 20 21

4a. **New Course Title** Advanced Database Management

b. **New Abbreviated course Title** *(for computer class schedules, transcripts)* Advanced DB Management

LIMITED TO 25 Characters *(including spaces)*

5a.

New Alpha Prefix	**New 1st Digit**	**New Last 3 Digits**	**Change "C"-lec-lab "L"-Lab**

5b. Change Credit Hours: From _____ **To** _____

6. **New Catalog Description/Major Topics** *(not to exceed 200 characters including spaces)*
   College of Medicine and College of Law: Attach description not exceeding 1,000 characters including spaces.

   Design & management of enterprise systems; query optimization, transaction processing; concurrency techniques; web queries; XML interchanges; data warehousing, datamining; OLAP; NOSQL and bigdata.

7. **New Prerequisite(s):** COP-4703 or COP-4710

8. **New Corequisite(s):** None

9. **Explain Reclassification Request:**

   The emergence of new topics in database field requires revision of course contents by replacing OODB, Multimedia and Spatial databases with transaction processing, web queries, NOSQL and bigdata.

10. **Does this proposed change impact the assessment process of a program or certificate? If yes, then send notification to assessment@fiu.edu.**

PROPOSAL REQUESTED BY:

Faculty Contact Nagarajan Prabakar — 3 / 16 / 20 20
(Type name) (Signature)

prabakar@cis.fiu.edu — 305-348-2033
(Email address) (Phone number)

Chairperson (Dept./Div.) S.S. Iyengar — 3 / 16 / 20 20
(Type name) (Signature)

Chairperson (Curr. Comm.) Wei-Chiang Lin — / / 20 20
(Type name) (Signature)

College/School Dean John Volakis — / / 20 20
(Type name) (Signature)

Submit one original form. Attach one copy of the course justification and course syllabus: course description, objectives, learning outcomes, major topics and textbooks.

COP-4722 Survey of Database Systems

Course Change Justification

This advanced database course is an elective for both Computer Science and Information technology majors. Several new topics have evolved in database field over the past decade such as XML, information retrieval, NOSQL, big data, etc. These topics have been augmented in this course to educate students in these emerging technologies. This enables students to acquire competitive skills for the industry needs.

To accommodate these new topics in this course, topics of low significance such as object-oriented, spatial, temporal, and multimedia databases need to be removed. Moreover, the title of the course needs to reflect the new content. Hence, this proposal includes a revised syllabus with new course outcomes and requests for a new course title as “Advanced Database Management”.

This course change is necessary to have appropriate course outcomes relevant to the topics of the syllabus so that students can provide meaningful course assessment.

School of Computing and Information Sciences

Course Title: Advanced Database Management **Date:** 3/5/20

Course Number: COP 4722

Number of Credits: 3

Subject Area: Database	**Subject Area Coordinator:** Nagarajan Prabakar **email:** prabakar@cis.fiu.edu
Catalog Description: Design & management of enterprise systems; query optimization, transaction processing; concurrency techniques; web queries; XML interchanges; data warehousing, datamining; OLAP; NOSQL and bigdata.	
Textbook: Fundamentals of Database Systems, 7th Edition Elmasri and Navathe Addison Wesley (ISBN: 0-13-397077-9)	
References:	
Prerequisites Courses: COP-4703 or COP-4710	
Corequisites Courses: None	

Type: Elective

Prerequisites Topics:

- Database architecture
- Relational algebra
- Design of SQL queries

Course Outcomes:

1. Exposure to enterprise database system
2. Master query optimization
3. Master transaction processing and concurrency techniques
4. Be familiar with web queries
5. Be familiar with XML and XQueries
6. Be familiar with data mining, data warehouse and OLAP
7. Be familiar with information retrieval
8. Be familiar with NOSQL and big data

School of Computing and Information Sciences
COP 4722
Advanced Database Management

Outline

Topic	Number of Lecture Hours	Outcome
• Enterprise database systems o Enterprise server features o Enterprise server organization	2	1
• Query optimization o Translation of SQL query to relational algebra o Efficient implementation of relational algebra operations o General query transformation rules o Query cost estimation, tuning queries o Semantic query optimization	6	2
• Concurrency o Transaction processing, ACID properties o Serializability, equivalence of schedules o Locks, two-phase locking o Deadlock, time stamp ordering	6	3
• Internet databases and web queries o Web databases o PHP database programming	4	4
• XML and XQueries o XML hierarchical tree data model o XML documents, DTD, XSD o Importing/exporting XML documents o XML querying: Xpath, XQuery	4	5
• Data warehousing and data mining o Data modeling for data warehouses o Building data warehouses o Data mining – support and confidence o Association rules algorithms o Classification and clustering	6	6
• Information retrieval and big data o Information retrieval concepts o Web search and analysis o NOSQL systems and CAP theorem o Hadoop and HDFS o MapReduce algorithm	8	7, 8

School of Computing and Information Sciences
COP 4722
Advanced Database Management

Course Outcomes Emphasized in Laboratory Projects / Assignments

	Outcome	Number of Weeks
1	Query optimization Outcome: 2	2
2	Serializability of schedules Outcome: 3	2
3	PHP Queries Outcome: 4	2
4	XQueries Outcome: 5	1
5	Data mining – Frequent Itemsets Outcome: 6	1
6	Big data – MapReduce Outcome: 8	2

Oral and Written Communication: No significant coverage

Number of written reports:

Approximate number of pages for each report:

Number of required oral presentations:

Approximate time for each presentation:

Social and Ethical Implications of Computing Topics

No significant coverage

Topic	Class time	Student performance measures

School of Computing and Information Sciences
COP 4722
Advanced Database Management

Theoretical Contents

Topic	Class time
Relational algebra	0.5

Problem Analysis Experiences

1. Analysis of data mining results to derive data patterns

Solution Design Experiences

1. Design of an extended query processing algorithm
2. Optimization of semantic query trees
3. Construction of precedence graphs for schedules