

NEW COURSE PROPOSAL

PROGRAM AREA _____

1. Catalog Description of the Course.

BINF 510 DATABASE SYSTEMS FOR BIOINFORMATICS (3)

Three hours lecture per week.

Prerequisite COMP 420, BINF 501, or permission of instructor.

This course is an applied, hands-on sequel to BINF 501, designed for students with interests in careers as professional programmers, analysts, designers, and managers involved in design or implementation of large bioinformatic systems. Covers concepts and methods for the design, creation, query and management of large enterprise databases, functions and characteristics of the leading database management systems. Topics include: object oriented database systems, distributed database systems, advanced database management topics, web application design and development, data warehouse systems, database mining.

2. Mode of Instruction.

	Units	Hours per Unit	Benchmark Enrollment
Lecture	3	1	15
Seminar			
Laboratory			
Activity			

3. Justification and Learning Objectives for the Course. (Indicate whether required or elective, and whether it meets University Writing, and/or Language requirements) *[Use as much space as necessary]*

This course is a required element of the bioinformatics emphasis for the proposed Professional Science Masters degree in Bioinformatics

Upon completion of this course, students will be able to:

- describe the science of storing, extracting, organizing, analyzing, interpreting, and utilizing biological information
- create programs to discover hidden patterns and relationships in genomic data
- analyze and implement SQL queries
- to explain and employ the techniques of data storage and data extraction with relational, object-oriented, and distributed database systems

4. Is this a General Education Course NO

If Yes, indicate GE category:

A (English Language, Communication, Critical Thinking)	
B (Mathematics & Sciences)	
C (Fine Arts, Literature, Languages & Cultures)	
D (Social Perspectives)	
E (Human Psychological and Physiological Perspectives)	

5. Course Content in Outline Form. *[Be as brief as possible, but use as much space as necessary]*

Query languages such as SQL, forms, embedded SQL, and application development tools.

Database design, integrity, normalization, access methods, query optimization, transaction management, and concurrency control and recovery.

Distributed databases, client-server and heterogeneous systems, query processing, transaction processing.

Effects of data models: object-oriented and deductive databases; architectures: main-memory and parallel repositories.

Basic data management for emerging areas: internet applications, online analytical processing (OLAP), data mining.

6. References. *[Provide 3 - 5 references on which this course is based and/or support it.]*

Ramakrishnan, R. and J. Gehrke. 2002. Database Management Systems, 3rd ed., McGraw-Hill, ISBN 0071151109.

Altschul, S., T. Madden, A. Schaffer, J. Zhang, Z. Zhang, W. Miller, and D. Lipman. 1997. Gapped BLAST and PSI-BLAST: a new generation of protein database search programs. Nucleic Acids Research 25:3389-3402.

Gibas, C., and P. Jambeck. 2001. Developing Bioinformatics Computer Skills. O'Reilly & Associates, ISBN: 1565926641

Reese, G. 2000. Database Programming with JDBC and Java, 2nd ed., O'Reilly & Associates, ISBN 1565926161

Waterman, M. Introduction to Computational Biology: Maps, Sequences and Genomes. 1995. CRC Press, ISBN: 0412993910

Durbin, R., Eddy, S., Krogh, A., and Mitchison, G. 1998. Biological Sequence Analysis: Probabilistic Models of Proteins and Nucleic Acids, Cambridge University Press, ISBN 0521629713

7. List Faculty Qualified to Teach This Course.

Computer science faculty and/or computer science professionals

8. Frequency.

a. Projected semesters to be offered: Fall X Spring Summer

9. New Resources Required.

- a. Computer (data processing), audio visual, broadcasting needs, other equipment
- b. Library needs
- c. Facility/space needs

None.

10. Consultation.

Dr. Peter Smith, Professor of Computer Science, has been consulted regarding the content and requirements of this course.

11. If this new course will alter any degree, credential, certificate, or minor in your program, attach a program modification.

Amy Denton
William Wolfe

31 October 2003

Proposer of Course

Date