UCLA Engineering

HENRY SAMUELI SCHOOL OF ENGINEERING AND APPLIED SCIENCE

Computer Science Department

PROPOSAL OF FIELDS OF STUDY FOR THE PH.D. DEGREE

Name: _____ UID: _____

Last First Middle initial

Email: _____ Date: _____

< < < Refer to the following 7 pages for general rules and procedures. > > >

MAJOR FIELD: _____

Course number	Course title	Instructor	(Planned) Term of completion	Grade

FIELD CHAIR : _____

printed name signature date

MINOR FIELD: _____

Course number	Course title	Instructor	(Planned) Term of completion	Grade

FIELD CHAIR : _____

printed name signature date

MINOR FIELD: _____

Course number	Course title	Instructor	(Planned) Term of completion	Grade

FIELD CHAIR : _____

printed name signature date

☐ **APPROVED** ☐ **DENIED** _____

PhD Advisor (printed name and signature) Date

☐ **APPROVED** ☐ **DENIED** _____

Graduate Student Affairs Officer (signature) Date

PROPOSAL OF FIELDS GUIDELINES & PROCEDURES

1. A "Proposal of Fields" form must be submitted to the Graduate Student Affairs Office (4403 Boelter Hall) by the end of the second year in the PhD program. The form can be revised later if necessary.

2. A major field consists of five courses, at least three of which must be graduate courses.

3. A minor field consists of two courses, at least one of which must be a graduate course.

4. Major and minor courses must be taken for a letter grade. The student must earn a minimum GPA of 3.33 in each major and minor field.

5. STANDARD PROPOSALS: The following pages provide guidelines for composing major and minor proposals in established fields. If the courses in a major or a minor field proposal adhere to these guidelines, it will not require the signature of the corresponding field chair. ***Established fields***: Artificial Intelligence, Computational Systems Biology, Computer System Architecture, Computer Science Theory, Information and Data Management, Network Systems, Computer Graphics and Vision, and Software Systems.

6. PROPOSALS WITH ONE OR MORE COURSE SUBSTITUTIONS: A major or a minor field proposal in an established field and that deviates from the standard guidelines by one or more course substitutions must be approved by the corresponding field chair (who may consult with faculty in the field). The list of current field chairs is available at the Graduate Student Affairs Office or online at http://www.cs.ucla.edu/csd/academics/forms/field_chairs.pdf

7. COURSE WORK TAKEN AT OTHER INSTITUTIONS: No more than three equivalent or related *graduate* courses taken at other institutions may be applied towards satisfying the major or minor field requirements, subject to the following:

   - If a course taken at another institution is included in a major or minor field proposal, and falls within an established field, the proposal will be considered a deviation from the standard guidelines and must be approved by the corresponding field chair.

   - The graduate course must be taken while a graduate student.

   - The graduate course cannot have been applied towards an undergraduate degree.

8. AD-HOC PROPOSALS: A major or minor field proposal that does not fall in one of the established fields is considered an ad-hoc field proposal.

   GUIDELINES:

   - All proposals for an ad-hoc field must be approved by the department. Students are strongly encouraged to submit their ad-hoc minor proposal for approval BEFORE taking any of the proposed courses.

- The ad-hoc field should be a coherent set of courses in an identifiable area (body of knowledge) that is not a subfield of the area of the major or the minors. The ad-hoc field should provide a perspective that is different from the other fields. It cannot merely be a collection of three useful classes.

- If the ad-hoc field presents some overlap with topics that are generally associated with the other fields, the justification should carefully explain why this overlap does not impinge on the value of the minor to broadening the student's Ph.D. education. (If the Academic Policy Committee [APC] finds such an overlap, the student may be required to provide more information.)

SUBMISSION & APPROVAL PROCEDURE:

- The proposal for an ad-hoc minor must be included in a completed Proposal of Fields and must be submitted together with a detailed, written justification explaining how the proposed ad-hoc minor meets the requirements above and supports the student's research area. Include details on the three proposed classes for the minor (course description and/or course syllabus for each class).

- Email a scanned copy of the completed Proposal of Fields to the Chair of the Academic Policy Committee (APC). (Refer to list of current field chairs, http://www.cs.ucla.edu/csd/academics/forms/field_chairs.pdf). The subject line should read "Proposal for Ad-Hoc Proposal." Copy Craig Jessen (craig@cs.ucla.edu) in your message to the APC Chair.

- Approval of an ad-hoc proposal requires a majority vote of the Academic Policy Committee (APC). The APC Chair, on behalf of the committee, will inform students by email when a decision is reached.

ARTIFICIAL INTELLIGENCE

A major field consists of any five of these courses, and a minor field consists of any two courses:

CS 161	Fundamentals of AI
CS 260	Machine Learning Algorithms
CS 261A	Problem Solving and Search
CS 262A	Reasoning with Partial Beliefs
CS 262Z	Seminar in Causal Reasoning
CS 263A	Language and Thought
CS 263B	Connectionist Natural Language Processing
CS 263C	Introduction to Animat Modeling
CS 264A	Automated Reasoning: Theory and Applications
CS 268	Machine Perception
CS M276A	Pattern Recognition and Machine Learning
CS 279	Visual Recognition

COMPUTER SYSTEM ARCHITECTURE

Major field: Five courses, at least three of which must be graduate courses.

Minor field: Two courses, at least one of which must be a graduate course.

Graduate courses: Any CS 25x or CS M25x course, plus CS M213A (Embedded Systems), unless the instructor explicitly wants to exclude the course from the list (since they judge that their course is not appropriate).

Undergraduate courses: CS M151B, CS 151C, CS M152B, EE 115C

COMPUTATIONAL SYSTEMS BIOLOGY

Major field: Three core courses and a year-long seminar series course (one course credit), plus one additional graduate course, selected from the Bioinformatics or Systems Biology option areas based on the student's focus.

Minor Field: Two of the three core courses listed below.

Core Courses:

1. CS M286B – Computational Systems Biology: Modeling and Simulation of Biological Systems
2. CS M221* - (formerly Chemistry 260) Bioinformatics methods
3. A molecular and cellular biology course chosen from the following, depending on the student's background in life sciences:

MCDB 100	Introduction to Cell Biology
MCDB C139	Cell, Developmental & Molecular Neurobiology
MCDB 144	Molecular Biology
MCDB 165A	Biology of Cells

Seminars: Regular CSB series (2-3 quarters each year) to be scheduled. Currently can choose from new Bioinformatics Series or Integrative Systems Biology Series in Biomath/Molecular Pharmacology.

COMPUTATIONAL SYSTEMS BIOLOGY (continued)

Course options in Bioinformatics:

CS 222	Bioinformatics Methods II
CS 223	Statistics for Computational Biology
CS 224	Computational Genetics
CS 229	Current Topics in Bioinformatics
CS 270A	Methods of Computational Science
BIOMATH M271	Statistical Methods in Computational Biology

Course Options in Systems Biology:

COMPUTER SCIENCE:

CS 270A	Methods of Computational Science
CS M286B (Biomath M270)	Optimal Parameter Estimation & Experiment Design for Biomedical Systems
CS M286C	Biomodeling Research and Research Communication Workshop
CS 296D	Computational Cardiology

ELECTRICAL ENGINEERING:

EE 131B	Intro to Stochastic Processes
EE 142	Control Systems: State Space Approach

MATHEMATICS:

MATH 151A	Applied Numerical Methods I
MATH 151B	Applied Numerical Methods II
MATH 153	Numerical Methods for Partial Differential Equations
MATH 269B	Advanced Numerical Analysis

MOLECULAR, CELL, AND DEVELOPMENTAL BIOLOGY:

MCDB 165B	Molecular Biology of the Cell Nucleus

PHYSIOLOGICAL SCIENCE

PHYSCI 166	Animal Physiology

ECOLOGY & EVOLUTIONARY BIOLOGY

EE BIOL 170	Animal Environmental Physiology

BIOMATHEMATICS

BIOMATH 220	Kinetic and Steady State Models in Pharmacology and Physiology
BIOMATH M230	Computed Tomography: Theory and Applications

COMPUTER SCIENCE THEORY

Major field: Any five courses in the CS 28x series, provided at least two are from CS 280A, CS 280G, CS 281, CS 282A – one CS 18x course may be substituted for a CS 28x course.

Minor field: Any two courses in the CS 28x series taught by theory faculty, provided at least one course from CS 280A, CS 280G; CS 281; CS 282A - one CS 18x course may be substituted for a CS 28x course.

INFORMATION AND DATA MANAGEMENT

A major field is five courses, at least three of which are graduate courses. A minor field is two courses, at least one of which must be a graduate course.

For both major and minor fields, the courses must be from the following **"CORE IDM"** list:

CS 143	Database Systems
CS 144	Web Applications
CS 170A	Mathematical Models & Methods for Computer Science
CS 240A	Databases and Knowledge Bases
CS 240B	Advanced Data and Knowledge Bases
CS 241A	Object-Oriented and Semantic Database Systems
CS 241B	Pictorial and Multimedia Database Systems
CS 244A	Distributed Database Systems
CS 245A	Intelligent Informative Systems
CS 246	Web Information Systems
CS 249	Advanced topics in Data Mining

For a major field, at most one undergraduate course and two graduate courses from the above core IDM list can be replaced by any of the courses from the following **"ANCILLARY IDM"** list. For a minor field only one of the core courses can be replaced by a course from the **ANCILLARY LIST**:

COMPUTER SCIENCE:

CS 130	Software Engineering
CS 132	Compiler Construction
CS 136	Security
CS 161	Fundamentals of AI
CS 230	Software Engineering
CS 261A	Problem Solving and Search
CS 262A	Reasoning with Partial Beliefs
CS 264A	Automated Reasoning: Theory and Applications

BIO-MEDICAL PHYSICS:

BMEDPHY 210	Principles of Medical Image Processing
BMEDPHY 214	Medical Image Processing Systems

MANAGEMENT INFORMATION SYSTEMS (AGSM):

MGMT 272A	Methods and tools for information systems design, development, and maintenance
MGMT 273A	Managing the enterprise's information systems

COMPUTER NETWORKS

A major field is five courses, at least three of which are graduate courses. A minor field is two courses, at least one of which must be a graduate course. For both major and minor fields, the courses must be from the following lists:

GRADUATE:

CS 211	Network Protocols and Systems Software design for the mobile Internet
CS 212	Queuing Systems Theory
CS 213A/B	Embedded Systems
CS 214	Data Transmission in Computer Communications
CS 215	Computer Communications and networks
CS 216	Distributed Multiaccess Control in Networks
CS 217A/B	Advanced topics in Internet Research
CS 218	Advanced Computer Networks
CS 219*	Current Topics in Network Systems
CS 236	Computer Security
CS 246	Web Information management

*For a major field, at most two of the courses can be CS 219. If a major field proposal has two CS 219's, then they must be given by different professors.

UNDERGRADUATE:

CS 111	Operating Systems Principles
CS 112	Computer Systems Modeling Fundamentals Software Engineering
CS 113	Introduction to Distributed Embedded systems
CS 117	Computer Networks – Physical Layer
CS 118	Computer Networks Fundamentals

COMPUTER GRAPHICS AND VISION

The requirements for a major field are five courses from the above lists, at least three of which are graduate courses, subject to the following:

At least one course from L2, and
Two courses from L3, or
At least one course from L4

The requirements for a minor field are two courses from the above lists, both of which are graduate courses:

One course from L2, and
One course from L3

Given the following lists:

L1:	CS 161	Introduction to Artificial Intelligence
	CS 174A	Introduction to Computer Graphics

COMPUTER GRAPHICS AND VISION (CON'T)

L2:	CS 174C/274C	Computer Animation
	CS 268	Machine Vision
	CS M276A (Cross listed as STATS 231)	Pattern Recognition and Machine Learning

L3:	CS 174B	Image-based Modeling and Rendering
	CS 269	Humanoid Character Simulation
	CS 275	Artificial Life for Computer Graphics and Vision
	CS 279	Current Topics in Computer Science Methodology: Advanced Topics in Visual Recognition
	STATS 232A (to be cross listed as a CS course)	Statistical Modeling and Learning for Image Science
	STATS 232B (to be cross listed as a CS course)	Statistical Computing and Inference for Image Science
	STATS 238	Vision as Bayesian Inference

L4:	MATH 266A/B/C	Applied Ordinary and Partial Differential Equations
	MATH 273	Optimization, Calculus of Variations and Control Theory
	MATH 285J	Scientific Computing for the Visual Effects Industry
	MATH 269A/B/C	Numerical Methods for ODEs and PDEs

SOFTWARE SYSTEMS

A major field is five courses, at least three of which are graduate courses. A minor field is two courses, at least one must be a graduate course.

For both major and minor fields, the courses must be from the following list:

GRADUATE:

CS 230	Software Engineering
CS 231	Types and Programming Languages
CS 232	Static Program Analysis
CS 233A	Parallel Programming
CS 233B	Verification of Concurrent Programs
CS 234	Computer-Aided Verification
CS 235	Advanced Operating Systems
CS 236	Computer Security
CS 239*	Current Topics in Computer Science: Programming Languages and Systems (Offered by Rajive Bagrodia, Paul Eggert, Eddie Kohler, Rupak Majumdar, Todd Millstein, Jens Palsberg, Peter Reiher.)

*For a major field, at most two of the courses can be CS 239; and if a major field proposal has two CS 239's, they must be taken from different professors. For a minor field, at most one of the courses can be 239.

UNDERGRADUATE:

CS 111	Operating Systems Principles
CS 130	Software Engineering
CS 131	Programming Languages
CS 132	Compiler Construction
CS 133	Parallel and Distributed Computing
CS 136	Security