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

Name: ___________________________ UID: _______________________

Email: ___________________________ Date: _______________________

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

## MAJOR FIELD:

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<th>Course title</th>
<th>Instructor</th>
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FIELD CHAIR: ____________________________________________

printed name  signature  date

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FIELD CHAIR: ____________________________________________

printed name  signature  date

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FIELD CHAIR: ____________________________________________

printed name  signature  date

☐ APPROVED  ☐ DENIED  ________________________________  Date

PhD Advisor (printed name and signature)

☐ APPROVED  ☐ DENIED  ________________________________  Date

Graduate Vice Chair (signature)
PROPOSAL OF FIELDS GUIDELINES & PROCEDURES

1. A “Proposal of Fields” form must be submitted to the Graduate Student Affairs Office by the end of the third year in the PhD program. The form can be revised later if necessary.

2. A major field consists of six courses, at least four of which must be graduate courses.

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

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](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 six of these courses, and a minor field consists of any three courses:

- CS 161 Fundamentals of AI
- CS 260 Machine Learning Theory
- 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: Six courses, at least four of which must be graduate courses.

Minor field: Three courses, at least two of which must be graduate courses.

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 a minimum of two additional courses, at least one of which is a graduate course, selected from the Bioinformatics or Systems Biology option areas based on the student’s focus.

Minor Field: 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

- PHSCI 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 six 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 three 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 six courses, at least four of which are graduate courses. A minor field is three courses, at least two of which are graduate courses.

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 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 six courses, at least four of which are graduate courses. A minor field is three courses, at least two of which are graduate courses. 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 six courses from the above lists, at least four of which are graduate courses, subject to the following:

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

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

At least one course from L2, and
At least 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 six courses, at least four of which are graduate courses. A minor field is three courses, at least two of which are graduate courses.

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

Graduate:

- 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