# 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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<thead>
<tr>
<th>Course number</th>
<th>Course title</th>
<th>Instructor</th>
<th>(Planned) Term of completion</th>
<th>Grade</th>
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FIELD CHAIR: __________________________

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☐ 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:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
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<tbody>
<tr>
<td>CS 222</td>
<td>Bioinformatics Methods II</td>
</tr>
<tr>
<td>CS 223</td>
<td>Statistics for Computational Biology</td>
</tr>
<tr>
<td>CS 224</td>
<td>Computational Genetics</td>
</tr>
<tr>
<td>CS 229</td>
<td>Current Topics in Bioinformatics</td>
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<tr>
<td>CS 270A</td>
<td>Methods of Computational Science</td>
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<tr>
<td>BIOMATH M271</td>
<td>Statistical Methods in Computational Biology</td>
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Course Options in Systems Biology:

**COMPUTER SCIENCE:**

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<tr>
<th>Course Code</th>
<th>Course Name</th>
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<tbody>
<tr>
<td>CS 270A</td>
<td>Methods of Computational Science</td>
</tr>
<tr>
<td>CS M286B (Biomath M270)</td>
<td>Optimal Parameter Estimation &amp; Experiment Design for Biomedical Systems</td>
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<tr>
<td>CS M286C</td>
<td>Biomodeling Research and Research Communication Workshop</td>
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<tr>
<td>CS 296D</td>
<td>Computational Cardiology</td>
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**ELECTRICAL ENGINEERING:**

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<th>Course Code</th>
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<tr>
<td>EE 131B</td>
<td>Intro to Stochastic Processes</td>
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<tr>
<td>EE 142</td>
<td>Control Systems: State Space Approach</td>
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**MATHEMATICS:**

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<th>Course Code</th>
<th>Course Name</th>
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<tr>
<td>MATH 151A</td>
<td>Applied Numerical Methods I</td>
</tr>
<tr>
<td>MATH 151B</td>
<td>Applied Numerical Methods II</td>
</tr>
<tr>
<td>MATH 153</td>
<td>Numerical Methods for Partial Differential Equations</td>
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<tr>
<td>MATH 269B</td>
<td>Advanced Numerical Analysis</td>
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**MOLECULAR, CELL, AND DEVELOPMENTAL BIOLOGY:**

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<tr>
<th>Course Code</th>
<th>Course Name</th>
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<tr>
<td>MCDB 165B</td>
<td>Molecular Biology of the Cell Nucleus</td>
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**PHYSIOLOGICAL SCIENCE**

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<tr>
<th>Course Code</th>
<th>Course Name</th>
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<tbody>
<tr>
<td>PHYSCI 166</td>
<td>Animal Physiology</td>
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**ECOLOGY & EVOLUTIONARY BIOLOGY**

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<tr>
<th>Course Code</th>
<th>Course Name</th>
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<tr>
<td>EE BIOL 170</td>
<td>Animal Environmental Physiology</td>
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**BIOMATHEMATICS**

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<th>Course Code</th>
<th>Course Name</th>
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<tbody>
<tr>
<td>BIOMATH 220</td>
<td>Kinetic and Steady State Models in Pharmacology and Physiology</td>
</tr>
<tr>
<td>BIOMATH M230</td>
<td>Computed Tomography: Theory and Applications</td>
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**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
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 Rajve 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