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: _____

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** (reason) _____
PhD Advisor (printed name and signature) Date

☐ **APPROVED** ☐ **DENIED** (reason) _____
Graduate Vice Chair (signature) Date

10/9/2020

PROPOSAL OF FIELDS GUIDELINES & PROCEDURES

1. A "Proposal of Fields" form must be submitted to the Graduate Student Affairs Office (291 Engineering VI) 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. Only one ad-hoc minor is allowed.

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 course.

- 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 two 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 of the two proposed classes for the minor (course description and/or course syllabus for each class).

Only one ad-hoc minor is allowed. Follow the checklist below:

1. Proposal of Fields must be completely filled out and signed off by the various field chairs prior to submitting the petition. Check with the Grad Office for field chair confirmation.
2. Provide a memo of support/justification from your advisor.
3. Provide an abstract of the two courses you would like approved for the proposal of fields.
    a. Abstract should address these points.
        i. 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 thus make sure to address this issue.
        ii. Written justification explaining how the proposed ad-hoc minor meets the requirements above and supports your research area.
        iii. 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 your Ph.D. education.
4. Include your transcript and mark do not highlight the course and grade received.
5. Send everything in a single PDF to Joseph Brown at jbrown@cs.ucla.edu. The order of the PDF items should be as follows:
    a. Signed Proposal of Fields
    b. Faculty Support/Justification memo
    c. Student abstract
    d. Unofficial Transcript with courses marked(*) not highlighted.
    e. PDF should be saved with your name.

- The Graduate Office will forward the proposal of fields to the Academic Policy Committee (APC). The subject line should read “Proposal for Ad-Hoc Proposal.”

Approval of an ad-hoc proposal requires a majority vote of the Academic Policy Committee (APC). The APC reviews petitions once a quarter. Petitions are not reviewed in the summer. The Graduate Office, on behalf of the committee, will inform students by email when a decision is reached.

FIELD REQUIREMENTS

ARTIFICIAL INTELLIGENCE

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

CS 161, CS 260, CS 261A, CS 262A, CS 262Z, CS 263A, CS 263B, CS 263C, CS 264A, CS 268, CS M276A, CS 279

Fundamentals of AI
Machine Learning Algorithms
Problem Solving and Search
Reasoning with Partial Beliefs
Seminar in Causal Reasoning
Language and Thought
Connectionist Natural Language Processing Introduction to Animat Modeling
Automated Reasoning: Theory and Applications Machine Perception
Pattern Recognition and Machine Learning 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, MCDB C139, MCDB 144, MCDB 165A

Introduction to Cell Biology
Cell, Developmental & Molecular Neurobiology Molecular Biology
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.

Course options in Bioinformatics:

CS 222, CS 223, CS 224, CS 229, CS 270A, BIOMATH M271

Bioinformatics Methods II
Statistics for Computational Biology Computational Genetics
Current Topics in Bioinformatics
Methods of Computational Science Statistical Methods in Computational Biology

Course Options in Systems Biology:

COMPUTER SCIENCE: CS 270A, CS M286B, (Biomath M270), CS M286C, CS 296D

ELECTRICAL ENGINEERING: EE 131B, EE 142

Methods of Computational Science
Optimal Parameter Estimation & Experiment Design for Biomedical Systems Biomodelling Research and Research Communication Workshop Computational Cardiology

MATHEMATICS: MATH 151A, MATH 151B, MATH 153, MATH 269B

Intro to Stochastic Processes
Control Systems: State Space Approach
Applied Numerical Methods I
Applied Numerical Methods II
Numerical Methods for Partial Differential Equations 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, BIOMATH M230:
Kinetic and Steady State Models in Pharmacology and Physiology 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.

DATA SCIENCE COMPUTING

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:

CORE IDM :
CS141, CS143, CS144, CS145, CS245, CS246, CS247, CS249

Data Science Fundamentals
Database Systems
Web Applications
Introduction to Data Mining
Big Data Analytics
Web Information Systems
Advanced Data Mining
Advanced Topics in Data Structure

For a major field, at most two 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 161, CS 205, CM 221, CM226, CS 230, CS 260, CS263, CS 264A, CS 267A

Fundamentals of AI
Health Analytics
Introduction to Bioinformatics
Machine Learning in Bioinformatics
Problem Solving and Search
Machine Learning Algorithms
Natural Language Processing
Automated Reasoning: Theory and Applications
Probabilistic Programming and Relational Learning

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 SYSTEMS

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, CS 212, CS 213A/B, CS 214, CS 215, CS 216, CS 217A/B, CS 218, CS 219*, CS 236, CS 246

Network Protocols and Systems Software design for the mobile Internet Queuing Systems Theory Embedded Systems
Data Transmission in Computer Communications

Computer Communications and networks Distributed Multiaccess Control in Networks Advanced topics in Internet Research Advanced Computer Networks

Current Topics in Network Systems Computer Security
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, CS 112, CS 113, CS 117, CS 118

Operating Systems Principles
Computer Systems Modeling Fundamentals Software Engineering Introduction to Distributed Embedded systems
Computer Networks – Physical Layer
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

L2: CS 174C/274C CS 268

CS M276A (Cross listed as STATS 231)

Computer Animation
Machine Vision
Pattern Recognition and Machine Learning

L3: CS 174B CS 269 CS 275 CS 279

Image-based Modeling and Rendering
Humanoid Character Simulation
Artificial Life for Computer Graphics and Vision
Current Topics in Computer Science Methodology: Advanced Topics in Visual Recognition

STATS 232A (to be cross listed as a CS course) STATS 232B (to be cross listed as a CS course) STATS 238

Statistical Modeling and Learning for Image Science Statistical Computing and Inference for Image Science Vision as Bayesian Inference

L4: MATH 266A/B/C MATH 273 MATH 285J

MATH 269A/B/C

Applied Ordinary and Partial Differential Equations Optimization, Calculus of Variations and Control Theory Scientific Computing for the Visual Effects Industry 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, CS 231, CS 232, CS 233A, CS 233B, CS 234, CS 235, CS 236, CS 239*

Software Engineering
Types and Programming Languages Static Program Analysis
Parallel Programming
Verification of Concurrent Programs Computer-Aided Verification Advanced Operating Systems
Computer Security

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, CS 130, CS 131, CS 132, CS 133, CS 136

Operating Systems Principles Software Engineering Programming Languages
Compiler Construction
Parallel and Distributed Computing Security

FIELD CHAIRS

AREA	FACULTY	ROOM	EMAIL	PHONE
Artificial Intelligence	Richard Korf	Eng VI 377	korf@cs.ucla.edu	206-5383
Architecture	Glenn Reinman	Eng VI 371	reinman@cs.ucla.edu	794-9755
Computational Systems Biology	Eleazar Eskin	Eng VI 286A	eeskin@cs.ucla.edu	206-4490
Data Science Computing	John Cho	3531H Boelter	cho@cs.ucla.edu	825-6735
Network Systems	Songwu Lu	Eng VI 396A	slu@cs.ucla.edu	825-4033
Software & Operating Systems	Jens Palsberg	Eng VI 86A	palsberg@cs.ucla.edu	825-4033
Theory	Alexander Sherstov	Eng VI 465	rafail@cs.ucla.edu	825-0866
Vision/Graphics	Demetri Terzopoulos	Eng VI 491A	sherstov@cs.ucl.edu	206-6946