



**PRELIMINARY**  
**M.S. & PhD Coursework Planning Matrix and Record of Study**

Student's Name: \_\_\_\_\_

Option: \_\_\_\_\_ Year entered Caltech: \_\_\_\_\_

**Instructions:**

Use this form to plan out your coursework before registering for courses in your first academic year. List all graduate courses you plan to take as part of your Ph.D. program (including courses to be taken for your possible M.S. Degree). In the Term column, list the course number and units. You must register for a minimum of 36 units per term, including the summer quarter. See other side and the Catalog for details on Areas to be covered and restrictions. THE STUDENT IS RESPONSIBLE FOR OBTAINING INTERIM ADVISOR SIGNATURE AND RETURNING COMPLETED FORM TO THE OPTION SECRETARY (262 Gates-Thomas) BY OCTOBER 15. Any future changes require approval and signature of your Advisor and Opt. Rep.

Prior Degrees:

Bachelor: Institution: \_\_\_\_\_ Year: \_\_\_\_\_  
 Master: Institution: \_\_\_\_\_ Year: \_\_\_\_\_  
 Other: \_\_\_\_\_ Institution: \_\_\_\_\_ Year: \_\_\_\_\_

See backside for coursework suggestions

Masters Categories	PhD Categories	Year 1			Preliminary Year 2 and beyond			Total # of PhD Units
		Fall Term (Course # & Units)	Winter Term (Course # & Units)	Spring Term (Course # & Units)	Fall Term (Course # & Units)	Winter Term (Course # & Units)	Spring Term & beyond (Course # & Units)	
Graduate Level Courses 100 or above	Core Subjects (See back of the form)							
	Elective Courses (See back of the form) Graduate Level Courses 101 or above							(108)
Math / Intro. Math	Math/ Advanced Math (27 units)							Advanced Math (27)
Graduate Eng. Seminar (Min 3 Units)	Graduate Eng. Seminar (Min 6 Units)							(6)
Research	Research			Summer Term			Summer Term	(54)
<b>MASTERS</b> 138 units	<b>PhD</b> 195 units							

**APPROVED BY:**

Interim Advisor's Signature \_\_\_\_\_ Date \_\_\_\_\_

Option Rep.'s Signature \_\_\_\_\_ Date \_\_\_\_\_

The signatories agree that the coursework listed meets the specific course requirements for the Ph.D. in Mechanical Engineering, Civil Engineering or Applied Mechanics, provided that the student takes and passes the courses with a grade of at least C.

Refer to the current Caltech catalog for details

**CIVIL ENGINEERING & APPLIED MECHANICS  
PHD COURSEWORK REQUIREMENTS – 195 Units**

**CE/AM Core Subjects (45 units):** Course work in a minimum of two core civil engineering or applied mechanics subjects, minimum of 18 units each of two subjects, spanning at least two broad areas listed below. Most students prepare for the subject candidacy exam by taking the recommended set of courses listed below in Areas 1-3, plus math. These units may also be used in the student's program for the master's degree. Examples of suitable courses are given in parentheses.

**Area 1:**

Fluid Mechanics (Ae/Aph/CE/ME 101 abc)  
Mechanics of Structures and Solids (Ae/AM/CE/ME 102abc)

**Area 2:**

Dynamics & Vibrations (AM/CE 151ab)

**Area 3:**

Structural & Earthquake Engineering (CE160ab)  
Seismology (CE181ab, Ge162)

The student may petition the mechanical and civil engineering option representative to accept alternate subjects or areas. These changes should retain core civil engineering knowledge, should not be a sub-specialty of one of the listed areas, and should represent sufficient breadth. The approval is not automatic; such petitions are submitted rarely and many have been denied in the past. The petition must be submitted to the option representative and approved before the student registers for the course.

**Elective Courses (63 UNITS):** Additional engineering or science courses, with a course number 101 or above. Pass with a grade of at least C, courses that pertain to the student's specialty and are approved by the thesis advisory committee.

Additional Course Possibilities:

- Ae/CE 165 Mech of Composite Materials & Structures
- Ae 220 Theory of Structures
- Ae/CE 221 Space Structures
- ACM/ESE 118 Methods in Applied Statistics and Data Analysis
- CE/Ae/AM 108ab Computational Mechanics
- CE180 Experimental Methods in EQ Engineering
- Ae/AM/CE/ME 214abc Computational Solid Mechanics
- CDS 110, 112 Control Theory
- EE111 Signals-Processing Systems and Transforms
- GE101 Intro. Geology & Geochemistry
- GE165 Geophysical Data Analysis
- ME/Ge/Ae 266ab Dynamic Fracture and Frictional Faulting

The requirement of a minimum grade of C will be waived for an advanced course which is offered only pass/fail.

**MATHEMATICS (27 UNITS):** Advanced mathematics or applied mathematics. Pass with a grade of at least C, chosen in consultation with the adviser from the following list: ACM/IDS 101ab or higher, CDS 232, CDS 233, Ma 108 or higher, Ph 129. The requirement in mathematics is in addition to the requirements above.

**GRAD. ENGINEERING SEMINARS (6 UNITS):** Pass six terms of AM/CE/ME 150abc, within twelve terms, 3 years, in residence at Caltech.

**RESEARCH (54 UNITS):** Successfully complete at least 54 units of research and demonstrate satisfactory research progress.

**CE/AM MASTERS REQUIREMENTS – 138 Units**

CE/AM core subjects - 45 units  
Math, engineering and research electives (max 27) – 63 units  
Free electives Courses 100 or above (not research) – 27 units  
Grad. engineering seminar – AM/CE/ME150 – 3 units

Refer to the current Caltech catalog for details

**MECHANICAL ENGINEERING  
PHD COURSEWORK REQUIREMENTS – 195 Units**

**ME Core Subjects (54 UNITS):** Course work in three core mechanical engineering subjects, 18 units each of the three subjects, spanning at least two broad areas listed below. Most students prepare for the subject candidacy exam by taking the recommended set of courses listed below in Areas 1-3, plus math. These 54 units may also be used in the student's program for the master's degree. Examples of suitable courses are given in parentheses.

**Area 1:**

Fluid Mechanics (Ae/Aph/CE/ME 101 abc)  
Mechanics of Structures and Solids (Ae/AM/CE/ME 102 abc)  
\*Continuum Mechanics of Solids and Fluids (Ae/Ge/ME 160 ab)

**Area 2:**

\*Thermodynamics and Statistical Mechanics (ME118, APh105, Ch/ChE164, Ch 166)  
Heat and Mass Transfer (ME 119 ab)  
Combustion (AE/ME 120ab)

**Area 3:**

Dynamical Systems (AM/CE 151ab or CDS 232 & CMS107)  
Robotics and Autonomy (ME/CS 133ab, CS/EE/ME 134)  
Controls (CDS 131, CDS 112, CDS231, CDS 233)

\*Not a pre-approved Candidacy Exam Subject /course

The student may petition the mechanical and civil engineering option representative to accept alternate subjects or areas. These changes should retain core mechanical engineering knowledge, should not be a sub-specialty of one of the listed areas, and should represent sufficient breadth. The approval is not automatic; such petitions are submitted rarely and many have been denied in the past. The petition must be submitted to the option representative and approved before the student registers for the course.

**Elective Courses (54 UNITS):** Additional engineering or science courses, with a course number 101 or above. Pass with a grade of at least C, courses that pertain to the student's specialty and are approved by the thesis advisory committee.

The requirement of a minimum grade of C will be waived for an advanced course which is offered only pass/fail.

**MATHEMATICS (27 UNITS):** Advanced mathematics or applied mathematics. Pass with a grade of at least C, chosen in consultation with the adviser from the following list: ACM/IDS 101ab or higher, CDS 232, Ma 108 or higher, Ph 129. The requirement in mathematics is in addition to the requirements above.

**GRAD. ENGINEERING SEMINARS (6 UNITS):** Pass six terms of AM/CE/ME 150abc, within twelve terms, 3 years, in residence at Caltech.

**RESEARCH (54 UNITS):** Successfully complete at least 54 units of research and demonstrate satisfactory research progress.

**ME MASTERS REQUIREMENTS – 138 Units**

ME core subjects - 54 units  
Math, engineering and research electives (max 27) – 54 units  
Free electives Courses 100 or above (not research) – 27 units  
Grad. engineering seminar – ME150 – 3 units