Bioengineering—Major Requirements for BS Degree
Effective Fall 2009
University of California, Merced *Anticipated Graduation Date (ex: May 2010)* _____

Full Name: _____ **ID #:** _____ **Email** _____

Requirement/ Course Dept #	Course Title	Grade	Units or # Required	Term/Year Completed	Substitute Approved
UCM Requirements					
-UC Entry Level Writing			n/a		
-American History/Institutions			n/a		
-CORE 001	World at Home I		1 course		
-WRI 010	College Composition		1 course		
School Requirements					
-CORE 100 (or replacement)	World at Home II		4 units		
-CORE 090x or ENGR 097			1 unit		
-MATH 021	Calculus I		4 units		
-MATH 022	Calculus II		4 units		
-MATH 023	Vector Calculus		4 units		
-MATH 024	Linear Algebra and Differential Equations		4 units		
-MATH 032	Statistics		4 units		
-PHYS 008	Introductory Physics I		4 units		
-PHYS 009	Introductory Physics II		4 units		
-CSE 020	Introduction to Computing I		2 units		
-CSE 021	Introduction to Computing II		2 units		
-BIO 001	Contemporary Biology		5 units		
-CHEM 002	General Chemistry I		4 units		
-Arts/Humanities GE			3-4 units		
-Social Science GE			3-4 units		
Major/Core Requirements					
-ENGR 097 or SSHA GE			2 units		
-ENGR 197 or upper division SSHA GE			3 units		
Engineering Fundamentals					
-ENGR 045	Introduction to Materials		4 units		
-ENGR 057	Dynamics		4 units		
-ENGR 065	Circuit Theory		3 units		
-ENGR 130	Thermodynamics		3 units		
-ENGR 155	Engineering Economics		3 units		
-ENGR 166	Analog and Digital Electronics		3 units		
Bioengineering Core					
-BIOE 030	Introduction to Bioengineering		4 units		
-BIOE 100	Physiology for Engineers		4 units		
-BIOE 103 (or BIOE 102)	Biosensors		4 units		
-BIOE 104	Biotransport		3 units		
-ENGR 120	Fluid Mechanics		4 units		
-BIO 002	Introduction to Molecular Biology		4 units		
-BIO 110	The Cell		4 units		
-BIOE 150 (or service learning with approval)	Bioengineering Design		3 units		
Additional Degree Requirements					
-CHEM 008	Principles of Organic Chemistry		4 units		
-CHEM 010	General Chemistry II		4 units		
-ENGR 191	Professional Seminar		1 unit		
-Choose a minimum of 6 units from Technical Electives			6 units		

Notes/Comments
Advisor Signature/Date:
Student Signature/Date:

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Bioengineering—Major Requirements for BS Degree
Effective Fall 2009
University of California, Merced *Anticipated Graduation Date (ex: May 2010)* _____

Full Name: _____ **ID #:** _____ **Email** _____

Service Learning/Freshman Seminar/SSHA GE

1 unit of either ENGR 097 or CORE 090x is required; remaining 5 units may be ENGR 097, ENGR 197 or SSHA GE (3 units must be upper division).

Term / Course / Team or Title / Units
1.
2.
3.
4.
5.
6.

Technical Elective Courses

BIOE 101
BIOE 110
BIOE 114
BIOE 117
ENGR 170
ENGR 170L
BIO 101
BIO 102
BIO 104
BIO 140
BIO 142
BIO 150
BIO 151
BIO 175
BIO 181
BIO 182
BIO 185
MSE 113
MSE 114
MSE 118
BIO 195 (with approval)

Course Dept. #	Course Title	Grade	Units	Term/Year Completed

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UC MERCED SCHOOL OF ENGINEERING

2009-11 Bioengineering Program Requirements

Name:_____ ID Number:_____

Class level (circle one): Freshman Sophomore Junior Senior

UC Merced Campus Requirements

- **CORE 001 (4)** The World at Home I *AP English, AWPE, or WRI 001
- **CORE 100 (4)** The World at Home II *CORE 001 & Junior Standing
- **WRI 010 (4)** College Reading & Composition *AP English, AWPE, or WRI 001

General Education Requirements

- **MATH 021 (4)** Calculus I *AP, math placement exam, or MATH 005
- **PHYS 008 (4)** Physics I *MATH 021 (co-requisite)
- **MATH 032 (4)** Statistics *MATH 021
- **BIO 001 (5)** Contemporary Biology
- **CSE 020 (2)** Intro to Computing I
- **CSE 021 (2)** Intro to Computing II *CSE 020
- **Arts/Humanities GE (4)**
- **Social Science GE (4)**
- **ENGR 097/197 (3)** Or SSHA GE
- **ENGR 197 (3)** Or upper division SSHA GE

Engineering Major Preparation

- **CHEM 002 (4)** General Chemistry *AP, chemistry placement exam or CHEM 001
- **PHYS 009 (4)** Physics II *PHYS 008, MATH 021, & MATH 022 or MATH 030 (co-requisite)
- **MATH 022 (4)** Calculus II *MATH 021
- **MATH 023 (4)** Vector Calculus *MATH 022
- **MATH 024 (4)** Linear Algebra & Diff. Equations *MATH 022

Bioengineering Core

- **BIOE 030 (4)^** Intro to Bioengineering *MATH 021, BIO 001, CHEM 002 & PHYS 008
- **BIO 002 (4)** Introduction to Molecular Biology
- **ENGR 120 (4)+** Fluid Mechanics *ENGR 057 & MATH 024
- **BIO 110 (4)** The Cell *BIO 002 or BIO 101
- **BIOE 100 (4)** Physiology for Engineers *BIO 002, CHEM 008, MATH 021 & PHYS 008
- **BIOE 150 (3)+** Bioengineering Design *CHEM 008, ENGR 045, ENGR 120, ENGR 130, MATH 021, PHYS 008, BIO 002, ENGR 065, ENGR 166, BIOE 103 & BIO 161
- **BIOE 104 (3)^** Biotransport *BIO 002, CHEM 002, MATH 021, PHYS 008, & ENGR 120

Engineering Fundamentals

- **ENGR 045 (4) +** Intro to Materials *CHEM 002, MATH 021 & PHYS 008
- **ENGR 057 (4)** Dynamics *MATH 021 & PHYS 008
- **ENGR 155 (3)** Engineering Economic Analysis #Junior or Senior standing only
- **ENGR 130 (3) ^** Thermodynamics *CHEM 002, MATH 023, MATH 024 & PHYS 009
- **ENGR 065 (3)** Circuit Theory *MATH 024 & PHYS 009
- **ENGR 166 (3)^** Analog & Digital Electronics *ENGR 065
- **BIOE 102 (4)** Biosensors *BIO 001, MATH 021, PHYS 008 **OR** **BIOE 103 (4)+** Biosensors & Bioinstrumentation *BIO 001, MATH 021, PHYS 008 & ENGR 166

Additional Degree Requirements

- **CHEM 010 (4)** General Chemistry II *CHEM 002
- **CHEM 008 (4)** Organic Chemistry *CHEM 002 (A– or better) or CHEM 010

Professional Seminar

- **ENGR 191 (1)** Professional Seminar #Taken Senior year

Students in the Bioengineering program are also required to take a minimum of 6 units of Technical Electives.
For choices of Technical Electives please see the reverse side of this flow chart.

UC Merced School of Engineering, 6/2010

* = Prerequisites
\+ = Offered Spring semester only
^ = Offered Fall semester only
\# = Class restriction

Bioengineering Technical Electives

Choose a minimum of 6 units

BIOE 101 (3) Modeling Nanoscale Processes in Biology *MATH 21, PHYS 8, MATH 23, & BIO 1	**BIOE 110 (3)** Self Assembling Molecular Systems *MATH 21, PHYS 8, & BIO 100	**BIOE 114 (3)** Tissue Engineering *MATH 21, PHYS 8, & BIO 100	**BIOE 117 (4)** Lab on a Chip *MATH 21, PHYS 8, BIO 1, & CHEM 2	**BIOE 195 (1-3)** Research Credit
ENGR 170/L (3/1) Electron Microscopy	**BIO 101 (4)** Biochemistry *CHEM 100	**BIO 102 (4)** Advanced Molecular Biology *BIO 101	**BIO 104 (4)** Biophysics *BIO 100 or BIO 101, and CHEM 10 or ENGR 130	**BIO 140 (4)** Genetics *BIO 1
BIO 142 (4) Genome Biology *BIO 110	**BIO 150 (4)** Embryos, Genes, & Development *BIO 110	**BIO 151 (4)** Molecular Immunology *BIO 110	**BIO 175 (4)** Biostatistics *MATH 18 or MATH 32, and PHYS 8, MATH 22 or MATH 30	**BIO 181 (4)** Introduction to Bio-molecular Simulation *BIO 100, CHEM 8, MATH 21, PHYS 8, & MATH 15 or BIO 180
BIO 182 (4) Bioinformatics *BIO 1, and MATH 18 or MATH 32	**BIO 185 (3)** Biomedical Ethics *BIO 1 or BIO 3	**MSE 113 (3)** + Material Structure & Characterization *MATH 21, PHYS 8 & PHYS 9	**MSE 114 (3)** + Polymeric Materials *CHEM 2, CHEM 8, PHYS 9, ENGR 45, MATH 21, & PHYS 8	**MSE 118 (3)** Intro to Nanotech & Nanoscience *MATH 21 or PHYS 8, & CHEM 2

* = Prerequisites
+ = Offered Spring semester only

Computer Science and Engineering—Major Requirements for BS Degree
Effective Fall 2009
University of California, Merced *Anticipated Graduation Date (ex: May 2010)* _____

Full Name: _____ **ID #:** _____ **Email** _____

Requirement/ Course Dept #	Course Title	Grade	Units or # Required	Term/Year Completed	Substitute Approved
UCM Requirements					
-UC Entry Level Writing			n/a		
-American History/Institutions			n/a		
-CORE 001	World at Home I		1 course		
-WRI 010	College Composition		1 course		
School Requirements					
-CORE 100 (or replacement)	World at Home II		4 units		
-CORE 090x or ENGR 097			1 unit		
-MATH 021	Calculus I		4 units		
-MATH 022	Calculus II		4 units		
-MATH 023	Vector Calculus		4 units		
-MATH 024	Linear Algebra and Differential Equations		4 units		
-MATH 032	Statistics		4 units		
-PHYS 008	Introductory Physics I		4 units		
-PHYS 009	Introductory Physics II		4 units		
-CSE 020	Introduction to Computing I		2 units		
-CSE 021	Introduction to Computing II		2 units		
-BIO 001	Contemporary Biology		4 units		
-CHEM 002	General Chemistry		4 units		
-Arts/Humanities GE			3-4 units		
-Social Science GE			3-4 units		
Major/Core Requirements					
-ENGR 097 or SSHA GE			2 units		
-ENGR 197 or upper division SSHA GE			3 units		
Engineering Fundamentals					
-ENGR 155	Engineering Economics		3 units		
And choose 12 units from the following					
-ENGR 045	Introduction to Materials		4 units		
-ENGR 057	Dynamics		4 units		
-ENGR 065	Circuit Theory		3 units		
-ENGR 120	Fluid Mechanics		4 units		
-ENGR 130	Thermodynamics		3 units		
-ENGR 151	Strength of Materials		4 units		
-ENGR 180	Spatial Analysis		4 units		
CSE Core					
-CSE 030	Intro to Computer Science I		4 units		
-CSE 031	Intro to Computer Science II		4 units		
-ENGR 191	Professional Seminar		1 unit		
And choose 4 courses from the following					
-CSE 100	Algorithm Design and Analysis		4 units		
-CSE 111	Database Systems		4 units		
-CSE 120	Software Engineering		4 units		
-CSE 140	Computer Architecture		4 units		
-CSE 150	Operating Systems		4 units		
-CSE 160	Computer Networks		4 units		
Choose a minimum of 4 courses of Technical Electives	(See reverse)		4 courses		

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Computer Science and Engineering—Major Requirements for BS Degree
Effective Fall 2009
University of California, Merced *Anticipated Graduation Date (ex: May 2010)* _____

Full Name: _____ **ID #:** _____ **Email** _____

Notes/Comments
Advisor Signature/Date:
Student Signature/Date:

Service Learning/Freshman Seminar/SSHA GE

1 unit of either ENGR 097 or CORE 090x is required; remaining 5 units may be ENGR 097, ENGR 197 or SSHA GE (3 units must be upper division).

Term / Course / Team or Title / Units
1.
2.
3.
4.
5.
6.

Technical Elective Courses

Choose 4 courses from:

CSE 170 (Intro to Graphics)
CSE 171 (Game Programming)
CSE 175 (Intro to Artificial Intelligence)
CSE 176 (Machine Learning)
CSE 180 (Intro Robotics)
CSE 185 (Intro to Computer Vision)

Course Dept. #	Course Title	Grade	Units	Term/Year Completed

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UC MERCED SCHOOL OF ENGINEERING

2009-10 Computer Science & Engineering Program Requirements

Name:_____ ID Number:_____

Class level (circle one): Freshman Sophomore Junior Senior

UC Merced Campus Requirements

- **CORE 001 (4)** The World at Home I *AP English, AWPE, or WRI 001
- **CORE 100 (4)** The World at Home II
- **WRI 010 (4)** College Reading & Composition *AP English, AWPE, or WRI 001

Engineering Major Preparation

- **CHEM 002 (4)** General Chemistry *AP, chemistry placement exam or CHEM 001
- **PHYS 009 (4)** Physics II *PHYS 008, MATH 021, & MATH 022 or MATH 030 (co-requisite)
- **MATH 022 (4)** Calculus II *MATH 021
- **MATH 023 (4)** Vector Calculus *MATH 022
- **MATH 024 (4)** Linear Algebra & Diff. Equations *MATH 022

Computer Science & Engineering Core

- **CSE 030 (4)** Intro to Computer Science I *CSE 021
- **CSE 031 (4)** Intro to Computer Science II *CSE 030

And choose 4 from the following:

- **CSE 100 (4)** Algorithm Design *CSE 031
- **CSE 111 (4)** Database Systems *CSE 100
- **CSE 120 (4)** + Software Engineering *CSE 111, CSE 150, CSE 160 or CSE 170
- **CSE 140 (4)** + Computer Architecture *CSE 031
- **CSE 150 (4)** + Intro to Operating Systems *CSE 031
- **CSE 160 (4)** ^ Networking *CSE 031

General Education Requirements

- **MATH 021 (4)** Calculus I *AP, math placement exam, or MATH 005
- **PHYS 008 (4)** Physics I *MATH 021 (co-requisite)
- **MATH 032 (4)** Statistics *MATH 021
- **BIO 001 (4)** Contemporary Biology
- **CSE 020 (2)** Intro to Computing I
- **CSE 021 (2)** Intro to Computing II *CSE 021
- **Arts/Humanities GE (4)**
- **Social Science GE (4)**
- **ENGR 097/197 (3)** Or SSHA GE
- **ENGR 197 (3)** Or upper division SSHA GE

Engineering Fundamentals

- **ENGR 155 (3)** Engineering Economic Analysis #Must be Junior standing

And choose 12 units from:

- **ENGR 045 (4)** + Intro to Materials *CHEM 002, MATH 021 & PHYS 008
- **ENGR 057 (4)** Dynamics *MATH 021 & PHYS 008
- **ENGR 065 (3)** Circuit Theory *MATH 024 & PHYS 009
- **ENGR 120 (4)** Fluid Mechanics *ENGR 057 & MATH 024
- **ENGR 130 (3)** ^ Thermodynamics *CHEM 002, MATH 023, MATH 024 & PHYS 009
- **ENGR 151 (4)** ^ Strength of Materials *ENGR 057
- **ENGR 180 (4)** ^ Spatial Analysis *MATH 021

Choose 4 courses from the following Technical Electives

- **CSE 170 (4)** + Intro to Graphics *CSE 031
- **CSE 171 (4)** Game Programming *CSE 170
- **CSE 175 (4)** ^ Intro to Artificial Intelligence *CSE 020 & CSE 021
- **CSE 176 (4)** + Machine Learning *MATH 032 & CSE 175 Alternate years
- **CSE 185 (4)** ^ Intro to Computer Vision *CSE 031
- **CSE 180 (4)** Mobile Robotics *CSE 100

* = Prerequisites
\+ = Offered Spring semester only
^ = Offered Fall semester only
\# = Class restriction

Professional Seminar

- **ENGR 191 (1)** Professional Seminar #Taken Senior year

UC Merced School of Engineering, 2009

Undeclared Engineering Major Requirement Check List
2009-2010

The following courses are required of all engineering students regardless of major. Undeclared students should explore the different majors through freshman seminars, service learning, research experiences and contact with faculty and graduate students.

Requirement	Completed	Units
University Requirements		
University of California Entry Level Writing		n/a
American History and Institutions		n/a
Campus Requirements		
CORE 1 (4)		
WRI 10 (4)		
CORE 100 or equivalent (4)		
School of Engineering Requirements		
Freshman Seminar or Service Learning		
ENGR 90x or 97 (1)		
General Education		
MATH 21 (4) Calculus I		
PHYS 8 (4) Intro to Physics I		
CSE 20 (2) Intro to Computing I		
CSE 21 (2) Intro to Computing II		
MATH 32 (4) Statistics		
BIO 1 (4) Contemporary Biology		
Arts/Humanities GE (4)		
Social Science GE (4)		
ENGR 197 or SHHA GE course (3)		
ENGR 97 or SHHA GE course (3)		
Major Preparation		
MATH 22 (4) Calculus II		
PHYS 9 (4) Physics II		
CHEM 2 (4) General Chemistry		
MATH 23 (4) Vector Calculus		
MATH 24 (4) Linear Algebra and Differential Equations		
Professional Seminar		
ENGR 191 (1)		

Notes/Comments

Environmental Engineering—Major Requirements for BS Degree
Effective Fall 2009
University of California, Merced *Anticipated Graduation Date (ex: May 2010)* _____

Full Name: _____ **ID #:** _____ **Email** _____

Requirement	Course Title	Grade	Units or # Required	Term/Year Completed	Substitute Approved
UCM Requirements					
-UC Entry Level Writing			n/a		
-American History/Institutions			n/a		
-CORE 001	World at Home I		1 course		
-WRI 010	College Composition		1 course		
School Requirements					
-CORE 100 (or replacement)	World at Home II		4 units		
-CORE 090x or ENGR 097			1 unit		
-MATH 021	Calculus I		4 units		
-MATH 022	Calculus II		4 units		
-MATH 023	Vector Calculus		4 units		
-MATH 024	Linear Algebra and Differential Equations		4 units		
-MATH 032	Statistics		4 units		
-PHYS 008	Introductory Physics I		4 units		
-PHYS 009	Introductory Physics II		4 units		
-CSE 020	Introduction to Computing I		2 units		
-CSE 021	Introduction to Computing II		2 units		
-BIO 001	Contemporary Biology		4 units		
-CHEM 002	General Chemistry		4 units		
-Arts/Humanities GE			3-4 units		
-Social Science GE			3-4 units		
Major/Core Requirements					
-ENGR 097 or SSHA GE			2 units		
-ENGR 197 or Upper Division SSHA GE			3 units		
Engineering Fundamentals			3 units		
-ENGR 155	Engineering Economics		3 units		
Choose 16 units from the following:					
-ENGR 045	Intro to Materials		4 units		
-ENGR 057	Dynamics		4 units		
-ENGR 065	Circuit Theory		3 units		
-ENGR 120	Fluid Mechanics		4 units		
-ENGR 130	Thermodynamics		3 units		
-ENGR 151	Strength of Materials		4 units		
-ENGR 180	Spatial Analysis & Modeling		4 units		
Environmental Engineering Core					
-ENVE 020	Intro to Env Sci & Tech		4 units		
-ENVE 100	Environmental Chemistry		4 units		
-ENVE 110	Hydrology & Climate		4 units		
-ENVE 130	Meteorology & Air Pollution		4 units		
-ENVE 160	Sustainable Energy		4 units		
-ENGR 191	Professional Seminar		1 unit		
Additional Degree Requirements					
-CHEM 010	General Chemistry II		4 units		
Choose a minimum of 14 units from Technical Electives			14 units		

Notes/Comments
Advisor Signature/Date:
Student Signature/Date:

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Environmental Engineering—Major Requirements for BS Degree
Effective Fall 2009
University of California, Merced *Anticipated Graduation Date (ex: May 2010)* _____

Full Name: _____ **ID #:** _____ **Email** _____

Service Learning/Freshman Seminar/SSHA GE

1 unit of either ENGR 097 or CORE 090x is required; remaining 5 units may be ENGR 097, ENGR 197 or SSHA GE (3 units must be upper division).

Term / Course / Team or Title / Units
1.
2.
3.
4.
5.
6.

Technical Elective Courses

-Choose a minimum of 14 units
-At least one field methods (F) course is required
-A max of 4 units of Service Learning* and/or Undergraduate Research may be used
*Service Learning units counted as technical electives may not be counted as GE

ENVE 105
ENVE 112
ENVE 114
ENVE 116
ENVE 118
ENVE 121
ENVE 140
ENVE 152
ENVE 155
ENVE 162
ENVE 170
ENVE 171
ENVE 176
ENVE 181 (F)
ENVE 182 (F)
ENVE 183 (F)
ENVE 184 (F)
ESS 105
ENVE 132
ENGR 135

Course Dept. #	Course Title	Grade	Units	Term/Year Completed

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UC MERCED SCHOOL OF ENGINEERING

2009-10 Environmental Engineering Program Requirements

Name:_____ ID Number:_____

Class level (circle one): Freshman Sophomore Junior Senior

UC Merced Campus Requirements

- **CORE 001 (4)** The World at Home I *AP English, AWPE, or WRI 001
- **CORE 100 (4)** The World at Home II *CORE 001 & Junior Standing
- **WRI 010 (4)** College Reading & Composition *AP English, AWPE, or WRI 001

General Education Requirements

- **MATH 021 (4)** Calculus I *AP, math placement exam, or MATH 005
- **PHYS 008 (4)** Physics I *MATH 021 (co-requisite)
- **MATH 032 (4)** Statistics *MATH 021
- **BIO 001 (4)** Contemporary Biology
- **CSE 020 (2)** Intro to Computing I
- **CSE 021 (2)** Intro to Computing II *CSE 021
- **Arts/Humanities GE (4)**
- **Social Science GE (4)**
- **ENGR 097/197 (3)** Or SSHA GE
- **ENGR 197 (3)** Or upper division SSHA GE

Engineering Major Preparation

- **CHEM 002 (4)** General Chemistry *AP, chemistry placement exam or CHEM 001
- **PHYS 009 (4)** Physics II *PHYS 008, MATH 021, & MATH 022 or MATH 030 (co-requisite)
- **MATH 022 (4)** Calculus II *MATH 021
- **MATH 023 (4)** Vector Calculus *MATH 022
- **MATH 024 (4)** Linear Algebra & Diff. Equations *MATH 022

Engineering Fundamentals

- **ENGR 155 (3)** Engineering Economic Analysis #At least Junior Standing

And choose 16 units from:

- **ENGR 045 (4) +** Intro to Materials *CHEM 002, MATH 021 & PHYS 008
- **ENGR 057 (4) +** Dynamics *MATH 021 & PHYS 008
- **ENGR 065 (4)** Circuit Theory *MATH 024 & PHYS 009
- **ENGR 120 (4)** Fluid Mechanics *ENGR 057 & MATH 024
- **ENGR 130 (3) ^** Thermodynamics *CHEM 002, MATH 023, MATH 024 & PHYS 009
- **ENGR 151 (4) ^** Strength of Materials *ENGR 057
- **ENGR 180 (4) ^** Spatial Analysis *MATH 021

Environmental Engineering Core

- **ENVE 020 (4)** Intro to Environmental Sci & Tech *CSE 021, CHEM 002 & MATH 032
- **ENVE 100 (4)** Environmental Chemistry *CHEM 010 & MATH 022 or PHYS 008
- **ENVE 110 (4)** Hydrology & Climate *ENVE 020 or ESS 020
- **ENVE 130 (4)** Meteorology & Air Pollution *ENVE 020 or ESS 020
- **ENVE 160 (4)^** Sustainable Energy *ENVE 020 or ESS 020

Students in the Environmental Engineering program are also required to take a minimum of 14 units of Technical Electives.
For choices of Technical Electives please see the reverse side of this worksheet.

Professional Seminar

- **ENGR 191 (1)** Professional Seminar #Taken Senior year

Additional Requirement

- **CHEM 010 (4)** General Chemistry II *CHEM 002

* = Prerequisites
\+ = Offered Spring semester only
^ = Offered Fall semester only
\# = Class restriction

UC MERCED SCHOOL OF ENGINEERING

Environmental Engineering Technical Electives

Students must choose at least 14 units of Technical Electives. One course must contain a Field (F) component. A maximum of 4 Service Learning[#] and/or Undergraduate Research may be used.

[#] Service learning units counted as technical electives may **not** be counted as GE

ENVE 105 (3)+
Environmental Data Analysis
*MATH 021 & PHYS 008

ENVE 112 (4)+
Subsurface Hydrology
*ENVE 110 or ESS 110

ENVE 114 (4)+
Mountain Hydrology of the Western States
*ENVE 110 or ESS 110

ENVE 116 (3)
Applied Climatology
*ENVE 110 or ESS 110

ENVE 118 (4)
Global Change
*CHEM 002

ENVE 121 (4)
Environmental Microbiology
*BIO 001 & ENVE 020

ENVE 132 (3)+
Air Pollution Control
*ENVE 130

ENVE 140 (3)
Water Resources & Management
*ENVE 020 & ENGR 155

ENVE 152 (4)
Remote Sensing of the Environment
*MATH 021 & PHYS 008

ENVE 155 (4)
Decision Analysis in Management
*ECON 100 or MGMT 100 & ECON 010 or POLI 010

ENVE 162 (3)+
Modeling & Design of Energy Systems
*ENVE 135, ENGR 160 & ENVE 160

ENVE 170 (3)^
Contaminant Fate & Transport
*ENVE 100 or ESS 100

ENVE 171 (3)^
Environmental Organic Chemistry
*ENVE 100 or ESS 100

ENVE 176 (3)
Water & Wastewater Treatment
*ENVE 020 or ESS 020, ENVE 200 or ESS 100, & ENGR 120

ENVE 181 (F)+
Field Methods in Snow Hydrology
*ENVE 110 or ESS 110

ENVE 182 (F)
Field Methods in Surface Hydrology
*ENVE 110 or ESS 110

ENVE 183 (F) ^
Field Methods in Subsurface Hydrology
*ENVE 112

ENVE 184 (F)
Field Methods in Environmental Chemistry
*ENVE 100

ENGR 180 (4)^
Spatial Analysis and Modeling
*MATH 021

ESS 105 (3)
Watershed Biogeochemistry
*ENVE 100 or ESS 100, & ENVE 110 or ESS 110

ENGR/ENVE 199 (1-5)
Individual Study

Water Quality Emphasis Suggestions

ENVE 105 (3)+
Environmental Data Analysis
*MATH 021 & PHYS 008

ENVE 112 (4)+
Subsurface Hydrology
*ENVE 110 or ESS 110

ENVE 121 (4)
Environmental Microbiology
*BIO 001 & ENVE 020

ENVE 140 (3)
Water Resources & Management
*ENVE 020 & ENGR 155

ENVE 155 (4)
Decision Analysis in Management
*ECON 100 or MGMT 100 & ECON 010 or POLI 010

ENVE 170 (3)^
Contaminant Fate & Transport
*ENVE 100 or ESS 100

ENVE 171 (3)^
Environmental Organic Chemistry
*ENVE 100 or ESS 100

ENVE 176 (3)
Water & Wastewater Treatment
*ENVE 020 or ESS 020, ENVE 200 or ESS 100, & ENGR 120

ENVE 182 (F)
Field Methods in Surface Hydrology
*ENVE 110 or ESS 110

ENVE 183 (F) ^
Field Methods in Subsurface Hydrology
*ENVE 112

ENVE 184 (F)
Field Methods in Environmental Chemistry
*ENVE 100

Hydrology Emphasis Suggestions

ENVE 105 (3)+
Environmental Data Analysis
*MATH 021 & PHYS 008

ENVE 112 (4)+
Subsurface Hydrology
*ENVE 110 or ESS 110

ENVE 114 (3)+
Mountain Hydrology of the Western States
*ENVE 110 or ESS 110

ENVE 152 (4)
Remote Sensing of the Environment
*MATH 021 & PHYS 008

ENVE 155 (4)
Decision Analysis in Management
*ECON 100 or MGMT 100 & ECON 010 or POLI 010

ENVE 181 (F)+
Field Methods in Snow Hydrology
*ENVE 110 or ESS 110

ENVE 182 (F)
Field Methods in Surface Hydrology
*ENVE 110 or ESS 110

ENVE 183 (F) ^
Field Methods in Subsurface Hydrology
*ENVE 112

ESS 105 (3)
Watershed Biogeochemistry
*ENVE 100 or ESS 100, & ENVE 110 or ESS 110

Air Pollution & Sustainable Energy Emphasis Suggestions

ENVE 116 (3)
Applied Climatology
*ENVE 110 or ESS 110

ENVE 132 (3)+
Air Pollution Control
*ENVE 130

ENVE 152 (4)
Remote Sensing of the Environment
*MATH 021 & PHYS 008

ENVE 155 (4)
Decision Analysis in Management
*ECON 100 or MGMT 100 & ECON 010 or POLI 010

ENVE 162 (3)+
Modeling & Design of Energy Systems
*ENVE 135, ENGR 160 & ENVE 160

ENGR 135 (4)^
Heat Transfer
*ENGR 120

* = Prerequisites
\+ = Offered Spring semester only
^ = Offered Fall semester only

UC Merced School of Engineering, 2009

Mechanical Engineering—Major Requirements for BS Degree
Effective Fall 2009
University of California, Merced *Anticipated Graduation Date (ex: May 2010)* _____

Full Name: _____ **ID #:** _____ **Email** _____

Requirement/ Course Dept #	Course Title	Grade	Units or # Required	Term/Year Completed	Substitute Approved
UCM Requirements					
-UC Entry Level Writing			n/a		
-American History/Institutions			n/a		
-CORE 001	World at Home I		1 course		
-WRI 010	College Composition		1 course		
School Requirements					
-CORE 100 (or replacement)	World at Home II		4 units		
-CORE 090x or ENGR 097			1 unit		
-MATH 021	Calculus I		4 units		
-MATH 022	Calculus II		4 units		
-MATH 023	Vector Calculus		4 units		
-MATH 024	Linear Algebra and Differential Equations		4 units		
-MATH 032	Probability and Statistics		4 units		
-PHYS 008	Introductory Physics I		4 units		
-PHYS 009	Introductory Physics II		4 units		
-CSE 020	Introduction to Computing I		2 units		
-CSE 021	Introduction to Computing II		2 units		
-BIO 001	Contemporary Biology		4 units		
-CHEM 002	General Chemistry I		4 units		
-Arts/Humanities GE			3-4 units		
-Social Science GE			3-4 units		
Major/Core Requirements					
-ENGR 097	Service Learning		2 units		
-ENGR 197	Service Learning		3 units		
Engineering Fundamentals					
-ENGR 045	Introduction to Materials		4 units		
-ENGR 057	Dynamics		4 units		
-ENGR 130	Thermodynamics		3 units		
-ENGR 151	Strength of Materials		4 units		
-ENGR 155	Engineering Economics Analysis		3 units		
Mechanical Engineering Core					
-ENGR 120	Fluid Mechanics		4 units		
-ENGR 135	Heat Transfer		4 units		
-MATH 131	Numerical Analysis I		4 units		
-ME 120	Component Design		3 units		
-ME 135	Finite Element Analysis		3 units		
-ME 137	Computer Aided Engineering		4 units		
-ME 140	Vibration and Control		3 units		
-ME 170	Capstone Design		4 units		
-ENGR 191	Professional Seminar		1 unit		
-Choose a minimum of 7 units from Technical Electives			7 units		

Notes/Comments
Advisor Signature/Date:
Student Signature/Date:

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Mechanical Engineering—Major Requirements for BS Degree
Effective Fall 2009
University of California, Merced *Anticipated Graduation Date (ex: May 2010)* _____

Full Name: _____ **ID #:** _____ **Email** _____

Service Learning and Freshman Seminar

(ENGR 097/197 and CORE 090x)
6 units required; up to 2 units may be Freshman Seminar (CORE 090x)

Term / Course (097, 197, 090x) / Team or Topic / Units
1.
2.
3.
4.
5.
6.

Technical Elective Courses

ENGR 065
ME 142
ENVE 130
ENVE 132
ENVE 160
ENVE 162
MSE 118

Course Dept. #	Course Title	Grade	Units	Term/Year Completed

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UC MERCED SCHOOL OF ENGINEERING

2009-10 Mechanical Engineering Program Requirements

Name:_____ ID Number:_____

Class level (circle one): Freshman Sophomore Junior Senior

UC Merced Campus Requirements

- ☐**CORE 001 (4)** The World at Home I *AP English, AWPE, or WRI 001
- ☐**CORE 100 (4)** The World at Home II *CORE 001 & Junior Standing
- ☐**WRI 010 (4)** College Reading & Composition *AP English, AWPE, or WRI 001

General Education Requirements

- ☐**MATH 021 (4)** Calculus I *AP, math placement exam, or MATH 005
- ☐**PHYS 008 (4)** Physics I *MATH 021 (co-requisite)
- ☐**MATH 032 (4)** Statistics *MATH 021
- ☐**BIO 001 (4)** Contemporary Biology
- ☐**CSE 020 (2)** Intro to Computing I
- ☐**CSE 021 (2)** Intro to Computing II *CSE 021
- ☐**Arts/Humanities GE (4)**
- ☐**Social Science GE (4)**
- ☐**ENGR 097/197 (3)** Service Learning
- ☐**ENGR 197 (3)** Service Learning

Engineering Major Preparation

- ☐**CHEM 002 (4)** General Chemistry *AP, chemistry placement exam or CHEM 001
- ☐**PHYS 009 (4)** Physics II *PHYS 008, MATH 021, & MATH 022 or MATH 030 (co-requisite)
- ☐**MATH 022 (4)** Calculus II *MATH 021
- ☐**MATH 023 (4)** Vector Calculus *MATH 022
- ☐**MATH 024 (4)** Linear Algebra & Diff. Equations *MATH 022

Mechanical Engineering Sequences

Includes some Engineering Fundamentals courses and Mechanical Engineering core courses. Courses must be completed in sequence. All courses are offered in one term only (Fall or Spring).

Professional Seminar

- ☐**ENGR 191 (1)** Professional Seminar #Taken final semester of senior year

Engineering Fundamentals

- ☐**ENGR 045 (4)** + Intro to Materials *CHEM 002, MATH 021 & PHYS 008
- ☐**ENGR 155 (3)** Engineering Economic Analysis #Junior or Senior standing only

☐**ENGR 057 (4)**+ Dynamics *MATH 021 & PHYS 008

☐**MATH 131 (4)**^ Numerical Methods I * MATH 024

☐**ENGR 120 (4)** Fluid Mechanics *ENGR 057 & MATH 024

☐**ENGR 151 (4)**^ Strength of Materials *ENGR 057

☐**ME 135 (3)**+ Finite Element Analysis *MATH 131

☐**ENGR 135 (4)**^ Heat Transfer *ENGR 120

☐**ME 120 (3)**+ Component Design *ENGR 151

☐**ME 137 (4)**^ Computer Aided Engineering *ME 135

☐**ME 170 (4)**+ Capstone Design *ME 120, ME 137 & ENGR 135 #Senior Standing

ME Core

- ☐**ME 140 (3)**+ Vibration & Control *MATH 024 & ENGR 057
- ☐**ENGR 130 (3)** ^ Thermodynamics *CHEM 002, MATH 023, MATH 024 & PHYS 009

Select Technical Electives from the following:

- **ENGR 065 (3)** Circuit Theory *MATH 024 & PHYS 009
- **ME 142 (4)** Mechatronics *ENGR 057 & ENGR 065
- **ENVE 130 (4)** Meteorology & Air Pollution *ENVE 020 or ESS 020
- **ENVE 132 (3)** Air Pollution Control *ENVE 130
- **ENVE 160 (4)** Sustainable Energy *ENVE 020 or ESS 020
- **ENVE 162 (3)** Modeling & Design of Energy Systems *ENGR 135, ENGR 160, & ENVE 160
- **MSE 118 (3)** Intro to Nanotech & Nanoscience *MATH 021 or PHYS 008, & CHEM 002

* = Prerequisites
\+ = Offered Spring semester only
^ = Offered Fall semester only
\# = Class restriction

Materials Science and Engineering—Major Requirements for BS Degree
Effective Fall 2009
University of California, Merced *Anticipated Graduation Date (ex: May 2010)* _____

Full Name: _____ **ID #:** _____ **Email** _____

Requirement/ Course Dept #	Course Title	Grade	Units or # Required	Term/Year Completed	Substitute Approved
UCM Requirements					
-UC Entry Level Writing			n/a		
-American History/Institutions			n/a		
-CORE 001	World at Home I		1 course		
-WRI 010	College Composition		1 course		
School Requirements					
-CORE 100 (or replacement)	World at Home II		4 units		
-CORE 090x or ENGR 097			1 unit		
-MATH 021	Calculus I		4 units		
-MATH 022	Calculus II		4 units		
-MATH 023	Vector Calculus		4 units		
-MATH 024	Linear Algebra and Differential Equations		4 units		
-MATH 032	Statistics		4 units		
-PHYS 008	Introductory Physics I		4 units		
-PHYS 009	Introductory Physics II		4 units		
-CSE 020	Introduction to Computing I		2 units		
-CSE 021	Introduction to Computing II		2 units		
-BIO 001	Contemporary Biology		4 units		
-CHEM 002	General Chemistry		4 units		
-Arts/Humanities GE			3-4 units		
-Social Science GE			3-4 units		
Major/Core Requirements					
-ENGR 097	Service Learning		2 units		
-ENGR 197	Service Learning		3 units		
Engineering Fundamentals					
-ENGR 057	Dynamics		4 units		
-ENGR 120	Fluid Mechanics		4 units		
-ENGR 130	Thermodynamics		3 units		
-ENGR 151	Strength of Materials		3 units		
-ENGR 155	Engineering Economics		3 units		
MSE Core					
-ENGR 45	Introduction to Materials		4 units		
-MSE 110	Solid State Materials Properties		4 units		
-MSE 111	Materials Processing		4 units		
-MSE 112	Materials Selection and Performance		3 units		
-MSE 113	Materials Characterization		4 units		
-MSE 120	Materials Capstone Design		3 units		
-ENGR 191	Professional Seminar		1 unit		
-Choose a minimum of 12 units from Technical Electives			12 units		

Notes/Comments
Advisor Signature/Date:
Student Signature/Date:

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Materials Science and Engineering—Major Requirements for BS Degree
Effective Fall 2009
University of California, Merced *Anticipated Graduation Date (ex: May 2010)* _____

Full Name: _____ **ID #:** _____ **Email** _____

Service Learning and Freshman Seminar

(ENGR 097/197 and CORE 090x)
6 units required; up to 2 units may be Freshman Seminar (CORE 090x)

Term / Course (097, 197, 090x) / Team or Topic / Units
1.
2.
3.
4.
5.
6.

Technical Elective Courses

Choose a minimum of 12 units from:

MSE 114
MSE 115
MSE 116
MSE 117
MSE 118
MSE 119
MSE 126
ENGR 170
BIOE 110
BIOE 111
BIOE 112
CHEM 112

Course Dept. #	Course Title	Grade	Units	Term/Year Completed

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UC MERCED SCHOOL OF ENGINEERING

2009-10 Materials Science and Engineering Program Requirements

Name:_____ ID Number:_____

Class level (circle one): Freshman Sophomore Junior Senior

UC Merced Campus Requirements

- ☐ **CORE 001 (4)** The World at Home I *AP English, AWPE, or WRI 001
- ☐ **CORE 100 (4)** The World at Home II *CORE 001 & Junior Standing
- ☐ **WRI 010 (4)** College Reading & Composition *AP English, AWPE, or WRI 001

General Education Requirements

- ☐ **MATH 021 (4)** Calculus I *AP, math placement exam, or MATH 005
- ☐ **PHYS 008 (4)** Physics I *MATH 021 (co-requisite)
- ☐ **MATH 032 (4)** Statistics *MATH 021
- ☐ **BIO 001 (4)** Contemporary Biology
- ☐ **CSE 020 (2)** Intro to Computing I
- ☐ **CSE 021 (2)** Intro to Computing II *CSE 021
- ☐ **Arts/Humanities GE (4)**
- ☐ **Social Science GE (4)**
- ☐ **ENGR 097/197 (3)** Service Learning
- ☐ **ENGR 197 (3)** Service Learning

Engineering Major Preparation

- ☐ **CHEM 002 (4)** General Chemistry *AP, chemistry placement exam or CHEM 001
- ☐ **PHYS 009 (4)** Physics II *PHYS 008, MATH 021, & MATH 022 or MATH 030 (co-requisite)
- ☐ **MATH 022 (4)** Calculus II *MATH 021
- ☐ **MATH 023 (4)** Vector Calculus *MATH 022
- ☐ **MATH 024 (4)** Linear Algebra & Diff. Equations *MATH 022

Materials Science & Engineering Core

- ☐ **ENGR 045 (4)** + Intro to Materials *CHEM 002, MATH 021 & PHYS 008
- ☐ **MSE 110 (4)** Solid State Materials Properties *CHEM 002, ENGR 045, MATH 021 & PHYS 008
- ☐ **MSE 111 (4)** Materials Processing *CHEM 002, ENGR 045, MATH 021 & PHYS 008
- ☐ **MSE 112 (3)** Materials Selection & Performance *MSE 110 and MSE 111
- ☐ **MSE 113 (4)** Materials Characterization *MATH 021, PHYS 008 & PHYS 009
- ☐ **MSE 120 (3)** Materials Capstone Design *MSE 112 & MSE 113

Engineering Fundamentals

- ☐ **ENGR 057 (4)** Dynamics *MATH 021 & PHYS 008
- ☐ **ENGR 151 (4)** ^ Strength of Materials *ENGR 057
- ☐ **ENGR 120 (4)** Fluid Mechanics *ENGR 057 & MATH 024
- ☐ **ENGR 130 (3)** ^ Thermodynamics *CHEM 002, MATH 023, MATH 024 & PHYS 009
- ☐ **ENGR 155 (3)** Engineering Economic Analysis #At least Junior Standing

Professional Seminar

- ☐ **ENGR 191 (1)** Professional Seminar #Taken Senior year

Students in the Materials Science & Engineering program are also required to take a minimum of 12 units of Technical Electives. For choices of Technical Electives please see the reverse side of this worksheet.

* = Prerequisites
\+ = Offered Spring semester only
^ = Offered Fall semester only
\# = Class restriction

UC MERCED SCHOOL OF ENGINEERING

Materials Science & Engineering
Technical Electives

Choose a minimum of 12 units

MSE 114 (3)
Polymeric Materials
*CHEM 002, CHEM 008, PHYS 009, ENGR 045, MATH 021 & PHYS 008

MSE 115 (3)
Ceramic Materials
*PHYS 008, ENGR 045, MATH 021 & PHYS 009

MSE 116 (3)
Composites
*PHYS 009 & ENGR 045

MSE 117 (3)
New Materials
*PHYS 009, ENGR 045, MATH 021, & PHYS 008

MSE 118 (3)
Intro to Nanotech & Nanoscience
*MATH 021 or PHYS 008, & CHEM 002

MSE 119 (3)
Materials Modeling
*MATH 023, MATH 024, MATH 021 & PHYS 008

MSE 126 (3)
Nanodevice Fabrication
*CHEM 002, PHYS 009, & ENGR 165

ENGR 170 (3)
Intro to Electron Microscopy

BIOE 110 (3)
Self-Assembling Molecular Systems
*MATH 021, PHYS 008, & BIO 100

BIOE 111 (3)
Biomembranes
*MATH 021, PHYS 008, & BIO 100

BIOE 112 (3)
Biomolecule-substrate Interactions
*MATH 021, PHYS 008, BIO 100, & ENGR 045

CHEM 112 (3)
Quantum Chemistry & Spectroscopy
*CHEM 010, MATH 024, & PHYS 009

Students wishing to receive an emphasis in **Nanotechnology** must take the following:

MSE 126 (3)
Nanodevice Fabrication
*CHEM 002, PHYS 009, & ENGR 165

MSE 118 (3)
Intro to Nanotech & Nanoscience
*MATH 021 or PHYS 008, & CHEM 002

And at least one of the following:

MSE 114 (3)
Polymeric Materials
*CHEM 002, CHEM 008, PHYS 009, ENGR 045, MATH 021 & PHYS 008

MSE 117 (3)
New Materials
*PHYS 009, ENGR 045, MATH 021, & PHYS 008

MSE 119 (3)
Materials Modeling
*MATH 023, MATH 024, MATH 021 & PHYS 008

BIOE 110 (3)
Self-Assembling Molecular Systems
*MATH 021, PHYS 008, & BIO 100

ENGR 170 (3)
Intro to Electron Microscopy

CHEM 140 (3)
Nanoscale Materials Chemistry
*CHEM 100, CHEM 113 & CHEM 120 (all co-requisites)

* = Prerequisites
+ = Offered Spring semester only

NS Advising

- NS Advising Responsibilities
- Spring 2011 Registration
- News/Updates
- General Education
- NS Advising Policies
- NS Academic Policies
- Majors
- Minors
- Pre-Health Advising
- Forms
- Schedule an Appointment
- Useful Resources
- Contact Us
- NS Homepage
- UC Merced Home

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Joy

Ngozi

Alisha

Wail

Facebook social plugin

Planning Guides

http://ns-advising.ucmerced.edu/pub/advisor_docs/majors_main.html

Below, you'll find planning guides for each major within Natural Sciences. Students should choose the planning guide that corresponds to the catalog year in which they entered UC Merced. For more information on catalog rights, please click here.

2010-2011

Applied Mathematics
- Physics Emphasis
- Computational Biology Emphasis
- Computer Science Emphasis
- Economics Emphasis
- Engineering Emphasis

Biological Sciences
- Molecular & Cell Biology
- Human Biology
- Ecology & Evolutionary Biology
- Developmental Biology
- Microbiology & Immunology

Chemistry
- Chemistry Emphasis
- Material Chemistry Emphasis
- Biological Chemistry Emphasis
- Environmental Chemistry Emphasis

Earth System Sciences
- Earth System Sciences

Physics
- Atomic/Molecular/Optical (AMO) Emphasis
- Biophysics Emphasis
- Condensed Matter and Materials (CMMP) Emphasis
- Mathematical Emphasis

2009-2010

Applied Mathematics
- Physics Emphasis
- Computational Biology Emphasis
- Computer Science Emphasis
- Economics Emphasis
- Engineering Emphasis

Biological Sciences
- Molecular & Cell Biology
- Human Biology
- Ecology & Evolutionary Biology
- Developmental Biology
- Microbiology & Immunology

Chemistry
- Chemistry Emphasis
- Material Chemistry Emphasis
- Biological Chemistry Emphasis
- Environmental Chemistry Emphasis

Earth System Sciences
- Earth System Sciences

Physics
- Atomic/Molecular/Optical (AMO) Emphasis
- Biophysics Emphasis
- Condensed Matter and Materials (CMMP) Emphasis
- Mathematical Emphasis

About the Majors

The School of Natural Sciences offers 5 majors. Below you will find additional in-depth information regarding these majors.

Applied Mathematics
Biological Sciences
Chemical Sciences
Earth System Sciences
Physics

http://ssha.ucmerced.edu/2.asp?uc=1&lvl2=39&contentid=177

Academic Planning Guides

Majors	Minors
2009 - 2010	2009 - 2010
2008 - 2009	2008 - 2009