

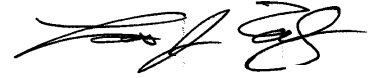
UNDERGRADUATE CURRICULUM CHANGE MEMO

Date: December 4, 2020

From: Louis Everett, Distinguished Professor Mechanical Engineering



Through: Jack Chessa, Chair of Mechanical Engineering



Through: Patricia Nava, Interim Dean College of Engineering

For Jack Chessa

To: Art Duval, Chair of University Curriculum Committee

Proposal Title: Electro-Mechanical Concentration in MECH.

The Mechanical Engineering department has updated their BS degree plan taking effect in Fall 2019. The new degree plan creates more flexibility for students to adjust the education to suit their ambitions. Students are able to take courses in several “track” or emphasis areas. One of these tracks is called Electro-Mechanical. In this track students gain knowledge and practice in applying sensors and actuators to Mechanical Systems allowing them to be controlled.

Advanced autonomous systems such as self-driving cars, drones, cooperative robots will inevitably be part of our daily lives in the near future. In addition, the MECH Department is developing an Aerospace curriculum emphasizing spacecraft. The manufacturing and processes industry is also undergoing its fourth industrial evolution, which demands more interconnectivity, new sensing and automation capabilities. As a result, students now need to be provided with the abilities to understand, design, develop and manipulate this new machinery and spacecraft. In an effort to move affront and have our students ready for the new challenges, the mechanical engineering department is proposing four new courses to prepare the students in the new methods, technology and techniques.

This proposal describes a series of courses designed to provide a sequence of elective courses that will provide a solid and integrated treatment of these important concepts.

CURRICULUM CHANGE PROPOSAL

APPROVAL PAGE

Proposal Title: Electro-Mechanical Concentration in MECH

College: Engineering

Department: Mechanical Engineering

DEPARTMENT CHAIR

I have read the enclosed proposal and approve this proposal on behalf of the department.



For Jack Chessa 12/7/20

Signature

Date

COLLEGE CURRICULUM COMMITTEE CHAIR

I have read the enclosed documents and approve the proposal on behalf of the college curriculum committee.



Louis J. Everett

1/6/2021

Signature

Date

COLLEGE DEAN

I have read the enclosed documents and approve the proposal on behalf of the college. I certify that the necessary funds will be allocated by the college in support of this proposal.

Signature

Date

From: [Granda, Virginia D](#)
To: [Rivera, Julie A](#)
Cc: [Everett, Louis](#); [Love, Norman D](#)
Subject: FW: UG Proposals Approved by COECC
Date: Monday, January 11, 2021 5:31:27 PM
Attachments: [image027.png](#)
[image001.png](#)
[image002.png](#)
[image003.png](#)
[image004.png](#)
[image005.png](#)
[image006.png](#)
[image028.png](#)
[image029.png](#)
[image030.png](#)
[image031.png](#)
[ECE--Proposal-Minor-Comp-Eng.pdf](#)
[ENGR-Curriculum-Change-Proposal--Fall-2021-Catalog.pdf](#)
[ME--Electro-Mechanical-Concentration-in-MECH.PDF](#)
[MME_Senior_Project_Proposalv3.pdf](#)
[MME--BME_3303_Proposal.pdf](#)
[image009.png](#)

Dear Julie,

Please find the UG Proposals that have been approved by our college.

Let us know when they will be discussed by the UGCC.

FYI, Dr. Love will be presenting the ENGR Proposal (the second one on the list).

Best Regards,

Virginia



Virginia Granda-Becker
Coordinator for Academic Affairs and Undergraduate Studies

College of Engineering
The University of Texas at El Paso
500 W. University Ave
El Paso, TX 79968
Office: (915) 747-8011
www.utep.edu/engineering/eec

From: [Nava, Patricia A.](#)
Sent: Monday, January 11, 2021 5:16 PM
To: Love, Norman D <ndlove@utep.edu>
Cc: Granda, Virginia D <granda@utep.edu>
Subject: RE: UG Proposals Approved by COECC

All of these are approved.

PN



Patricia A. Nava, Ph.D.

Interim Dean
Professor of Electrical and Computer Engineering
El Paso Electric Professor in Education
UTEP Distinguished Teaching Professor

College of Engineering
The University of Texas at El Paso
500 West University Avenue
El Paso, TX 79968-0521
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From: Love, Norman D
Sent: Monday, January 11, 2021 5:05 PM
To: Nava, Patricia A. <pnav@utep.edu>
Cc: Granda, Virginia D <granda@utep.edu>
Subject: FW: UG Proposals Approved by COECC

Dear Dr. Nava,

I approve of the attached proposals.

I have attached the corrected versions of the proposals to this email for your review.

Norman



Norman Love, Ph.D.

Associate Dean for Academic Affairs and Undergraduate Studies
Professor of Mechanical Engineering
Provost's Faculty Fellow, University Honors Program

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From: "Granda, Virginia D" <granda@utep.edu>
Date: Monday, January 11, 2021 at 11:14 AM
To: Norman Love <ndlove@utep.edu>
Subject: FW: UG Proposals Approved by COECC

Good morning Dr. Love,

Please find attached the UG proposals that were approved by our COECC and its chair.

Can you please reply letting me know if you approve them?

If you would like, can you please forward them to the Dean for her approval?

Best Regards,

Virginia



Virginia Granda-Becker
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From: Everett, Louis
Sent: Monday, January 11, 2021 10:58 AM
To: Granda, Virginia D <granda@utep.edu>
Subject: FW: UG Proposals Approved by COECC

Yes these are approved by the committee. I also approve them

From: Granda, Virginia D <granda@utep.edu>
Sent: Monday, January 11, 2021 10:04 AM
To: Everett, Louis <leverett@utep.edu>
Subject: UG Proposals Approved by COECC

Good morning Dr. Everett,

Attached are the UG proposals that were approved by our COECC in December.

Please reply if you approve these proposals as the COECC chair.

Best Regards,

Virginia



Virginia Granda-Becker

Coordinator for Academic Affairs and Undergraduate Studies

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Mechanical Engineering Dept.

Phone: (915) 747-5450 <http://me.utep.edu/> Email: MEAdvising@Utep.Edu

2019 B.S. in Mechanical Engineering Degree Plan (Revision 4/21/2020)

Year	Semester I			Hrs	Semester II			Hrs
Freshman	MECH	1305	Graphic and Design Fundamentals +	3	MECH	1321	Mechanics I – Statics + (MATH 1411+ PHYS 2420+)	3
	RWS	1301	Rhetoric & Composition I +	3	HIST	1301	History of US to 1865 +	3
	MATH	1411	Calculus I +	4	RWS	1302	Rhetoric & Composition 2 + (RWS 1301+)	3
	PHYS	2420	Physics I (MATH 1411 is CO requisite)	4	MATH	1312	Calculus II + (MATH 1411+)	3
	UNIV	1301 2350	Introduction to Engineering can be taught in a specific section. +	3	CHEM	1305 1105	Chemistry I +	4
	MATH	1508 or 1310	PreCalculus (Designated Core) Trigonometry and Conics					
				17				16
Sophomore	MECH	2322	Mechanics of Materials + (MECH 1321+)	3	MECH	2340	Mechanics II – Dynamics + (MECH 1321+)	3
	MATH	2313	Calculus III + (MATH 1312+)	3	MECH	2311	Introduction to Thermo-Fluid Science + (MATH 1312+)	3
	MECH	2331	Mat'ls and Manufacturing Processes + (CHEM 1305+)	3	MECH	2103	Engineering Computations (MATH 1312+)	1
			Design and Manufacturing Studio + (MECH 1305+) (see NOTE 8)	1	MECH	2342	Electro Mechanical Systems + (MATH 1312+)	3
	HIST	1302	History of US since 1865	3	CE	2326	Engineering Economics + (Designated Core)	3
			Science Elective + (see NOTE 1)	4	MATH	2326	Differential Equations	3
			17				16	
Junior			Laboratory Experience (see NOTE 2)	1			Laboratory Experience (see NOTE 2)	1
	MECH	3352	Engineering Analysis II (MATH 2326+)	3	COMM	1302	Business and Professional Communication +	3
	MECH	3312	Thermodynamics (MECH 2311+)	3	MECH	3345	System Dynamics (MECH 2340+, MECH 2342+)	3
	MECH	3314	Fluid Mechanics (MECH 2311+)	3	MECH	3334	Mechanical Design (MECH 2331+, MECH 2322+)	3
	POLS	2310	Introduction to Politics +	3			Language, Philosophy & Culture +	3
	MATH		Math Elective (see NOTE 3)	3			Science/Math Elective + (see NOTE 4)	3
			16				16	
Senior			Design Elective Solid Mechanics Area (see NOTE 5)	3	MECH	4366	Senior Design (CE 2326 +, see NOTE 7)	3
			Design Elective Thermal Fluid Area (see NOTE 5)	3			Design Elective Any Area (see note 5)	3
	MECH	4315	Heat Transfer (MECH 3314, MECH 3312)	3			Design Elective Any Area (see note 5)	3
			Computational Elective (see note 6)	3	POLS	2311	American Government and Politics	3
			Design Elective Electro-Mechanical (see NOTE 5)	3			Creative Arts +	3
			15				15	
				Total 128 Credit hrs				

Deleted: Humanities Electives +

Deleted: Visual and Performing Art Elective

Design and Manufacturing Studio			
MECH	2131	Manufacturing Laboratory (MECH 1305 +)	1
MECH	2132	Additive Manufacturing Laboratory (MECH 1305 +)	1
MECH	2133	Metal Casting Laboratory (MECH 1305 +)	1
MECH	2134	Intelligent Manufacturing (MECH 1305 +)	
Laboratory Experience			
MECH	3123	Solid Mechanics Lab (MECH 2322+)	1
MECH	3113	Thermo-fluid Lab (MECH 2311+)	1
MECH	3103	Mechatronics Lab (MECH 2342+)	1

Deleted: CHEM

Deleted: CHEM

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Design Elective Solid Mechanics Area			
MECH	4336	Principles of Engineering Design (MECH 3334)	3
MECH	4395	Special Topics in Solid Mechanics Area	3

Design Elective Thermal Fluid Area			
MECH	4316	Thermal System Design (MECH 4315)	3
MECH	4394	Special Topics in Thermal Fluid Area	3

Design Elective Electro-Mechanical Area			
MECH	4346	Mechatronics (MECH 3345)	3
MECH	4332	Mechanical System Computations (MECH 3345)	
MECH	4334	Mechanical System Control (MECH 3345)	
MECH	4345	Mechanical System Communication and Sensing (MECH 3345)	
MECH	4393	Special Topics in Electro-Mechanical	3

Computational Elective			
MECH	4326	Finite Element Analysis (MECH 2351+, MECH 3334)	3
MECH	4330	Dynamic Systems Simulation (MECH 3345)	3
MECH	4392	Special Topics in Computation	3

Notes: Prerequisites listed in parentheses, +Grade of C or better required

1. Must be either CHEM 1306 with CHEM 1106, BIOL 1107 with 1305 or PHYS 2421 or by permission of advisor.
2. From the department approved list of Design and Project Experience I and II courses.
3. Selected from MATH 3323, 3335, 4326, 4329, 4336, STAT 3320. By completing 3 of these electives you may be eligible for a Mathematics minor, interested students should consult the Department of Mathematics.
4. Approved courses are: BIOL 1306, PHYS 2325, PHYS 3351, PHYS 4348 or any course listed in NOTE 3 (not already taken). Also, as per the UTEP core curriculum requirements two of your science classes must be in the same area (either BIOL, PHYS, OR CHEM).
5. From the department approved list of Design Electives.
6. From the department approved list of Computational Electives.
7. Must be in the last full semester and have a 2.0 GPA or better in major.
8. From the department approved list of Design and Manufacturing Studio courses.

COURSE ADD

All fields below are required

College : Engineering

Department : Mechanical Engineering

Rationale for adding the course:

To provide support for the Machine Intelligence emphasis in Mechanical Engineering

All fields below are required

Subject Prefix and # MECH 2134

Title (29 characters or fewer): Intelligent Manufacturing Lab

Dept. Administrative Code : 1920

[CIP Code](#) 14

Departmental Approval Required Yes No

Course Level UG GR DR SP

Course will be taught: Face-to-Face Online Hybrid

How many times may the course be taken for credit? (Please indicate 1-9 times): 1

Should the course be exempt from the "Three Repeat Rule?" Yes No

Grading Mode: Standard Pass/Fail Audit

Description (600 characters maximum):

Practice in the use of sensors during a manufacturing process to enable information enabled manufacturing decisions to provide new information about the process, improve quality or enable the manufacture of otherwise impossible devices.

Contact Hours (per week): Lecture Hours 3 Lab Hours Other

Types of Instruction (Schedule Type): Select all that apply

- | | | | |
|---------------------------------------|-------------------|----------------------------|-------------------------------------|
| <input type="checkbox"/> A | Lecture | <input type="checkbox"/> H | Thesis |
| <input checked="" type="checkbox"/> B | Laboratory | <input type="checkbox"/> I | Dissertation |
| <input type="checkbox"/> C | Practicum | <input type="checkbox"/> K | Lecture/Lab Combined |
| <input type="checkbox"/> D | Seminar | <input type="checkbox"/> O | Discussion or Review (Study Skills) |
| <input checked="" type="checkbox"/> E | Independent Study | <input type="checkbox"/> P | Specialized Instruction |
| <input type="checkbox"/> F | Private Lesson | <input type="checkbox"/> Q | Student Teaching |

Fields below if applicable

If course is taught during a part of term in addition to a full 16-week term please indicate the length of the course (ex., 8 weeks):

TCCN (Use for lower division courses) :

Prerequisite(s):		
Course Number/ Placement Test	Minimum Grade Required/ Test Scores	Concurrent Enrollment Permitted? (Y/N)
MECH 1305	C	

Corequisite Course(s):

Equivalent Course(s):

Restrictions:	
Classification	
Major	

**The University of Texas at El Paso
College of Engineering
Department of Mechanical Engineering
Syllabus**

Course Prefix and Number: MECH 2134

Course Title: Intelligent Manufacturing Lab

Credit Hours: 1

Prerequisite Courses: MECH 1305 with a C or better

Course Description:

Practice in the use of sensors during a manufacturing process to enable information enabled manufacturing decisions to provide new information about the process, improve quality or enable the manufacture of otherwise impossible devices.

Learning Outcomes: (Describe the measurable learning outcomes for the course.)

- A. Students will have an appreciation of how sensors can be used during a manufacturing process to increase quality, reduce cost or gather information that is otherwise unavailable.
- B. Students will learn to handle sensor driven manufacturing processes.

Required Materials: (List any required or recommended readings and any materials that are considered required or essential for a course or program requirement.)

“Intelligent Manufacturing [Book].” <https://www.oreilly.com/library/view/intelligent-manufacturing/9781466564053/> (accessed Dec. 03, 2020).

[1]

Course Policies: (Grading, attendance, academic integrity, etc.)

Lab Assignments 5 at 100 Points Each

Final Examination 200 points

COURSE ADD

All fields below are required

College : Engineering

Department : Mechanical Engineering

Rationale for adding the course:

To provide support for the Machine Intelligence emphasis in Mechanical Engineering

All fields below are required

Subject Prefix and # MECH 4332

Title (29 characters or fewer): MECH Comp App Vision Robotics

Dept. Administrative Code : 1920

[CIP Code](#) 14

Departmental Approval Required Yes No

Course Level UG GR DR SP

Course will be taught: Face-to-Face Online Hybrid

How many times may the course be taken for credit? (Please indicate 1-9 times): 1

Should the course be exempt from the "Three Repeat Rule?" Yes No

Grading Mode: Standard Pass/Fail Audit

Description (600 characters maximum):

Computational methods applicable to Mechanical Engineering problems. Vision processing, robotics, autonomous systems, drones, machine intelligence and control.

Contact Hours (per week): 3 Lecture Hours Lab Hours Other

Types of Instruction (Schedule Type): Select all that apply

- | | |
|---|--|
| <input checked="" type="checkbox"/> A Lecture | <input type="checkbox"/> H Thesis |
| <input type="checkbox"/> B Laboratory | <input type="checkbox"/> I Dissertation |
| <input type="checkbox"/> C Practicum | <input type="checkbox"/> K Lecture/Lab Combined |
| <input type="checkbox"/> D Seminar | <input type="checkbox"/> O Discussion or Review (Study Skills) |
| <input checked="" type="checkbox"/> E Independent Study | <input type="checkbox"/> P Specialized Instruction |
| <input type="checkbox"/> F Private Lesson | <input type="checkbox"/> Q Student Teaching |

Fields below if applicable

If course is taught during a part of term in addition to a full 16-week term please indicate the length of the course (ex., 8 weeks):

TCCN (Use for lower division courses) :

Prerequisite(s):		
Course Number/ Placement Test	Minimum Grade Required/ Test Scores	Concurrent Enrollment Permitted? (Y/N)
MECH 3345	D	N

Corequisite Course(s):

Equivalent Course(s):

Restrictions:	
Classification	
Major	

The University of Texas at El Paso
College of Engineering
Department of Mechanical Engineering
Syllabus

Course Prefix and Number: MECH 4332

Course Title: Mechanical Computational Applications in Vision and Robotics

Credit Hours: 3

Prerequisite Courses: MECH 3345 with a D or better

Course Description:

Computational methods applicable to Mechanical Engineering problems. Vision processing, robotics, autonomous systems, drones, machine intelligence and control.

Learning Outcomes: (Describe the measurable learning outcomes for the course.)

- A. Students will develop code to demonstrate an understanding of how Vision, Lidar, INS, GPS are used in the control of Mechanical Systems.
- B. Students will learn to use ROS and Gazebo to simulate Mechanical Systems.

Required Materials: (List any required or recommended readings and any materials that are considered required or essential for a course or program requirement.)

M. Quigley, B. Gerkey, and W. D. Smart, *Programming Robots with ROS: A Practical Introduction to the Robot Operating System*, 1st edition. O'Reilly Media, 2015.

<https://www.oreilly.com/library/view/ros-robotics-by/9781782175193/ch02s04.html>

O. Pelz, *Fundamentals of Linux: Explore the essentials of the Linux command line*. Packt Publishing Ltd, 2018.

Course Policies: (Grading, attendance, academic integrity, etc.)

Assignments* 200 Points

3 Exams 200 Points each

Programs 200 points

Final Examination 200 points

COURSE ADD

All fields below are required

College : Engineering

Department : Mechanical Engineering

Rationale for adding the course:

To provide support for the Machine Intelligence emphasis in Mechanical Engineering

All fields below are required

Subject Prefix and # MECH 4334

Title (29 characters or fewer): Mechanical Systems Control

Dept. Administrative Code : 1920

[CIP Code](#) 14

Departmental Approval Required Yes No

Course Level UG GR DR SP

Course will be taught: Face-to-Face Online Hybrid

How many times may the course be taken for credit? (Please indicate 1-9 times): 1

Should the course be exempt from the "Three Repeat Rule?" Yes No

Grading Mode: Standard Pass/Fail Audit

Description (600 characters maximum):

Theory and application of control to Mechanical Systems. Feedback, feedforward, PID and other controls used in Mechanical Engineering. Applications to drones, aircraft, missiles, robots and autonomous vehicles.

Contact Hours (per week): 3 Lecture Hours Lab Hours Other

Types of Instruction (Schedule Type): Select all that apply

- | | |
|---|--|
| <input checked="" type="checkbox"/> A Lecture | <input type="checkbox"/> H Thesis |
| <input type="checkbox"/> B Laboratory | <input type="checkbox"/> I Dissertation |
| <input type="checkbox"/> C Practicum | <input type="checkbox"/> K Lecture/Lab Combined |
| <input type="checkbox"/> D Seminar | <input type="checkbox"/> O Discussion or Review (Study Skills) |
| <input checked="" type="checkbox"/> E Independent Study | <input type="checkbox"/> P Specialized Instruction |
| <input type="checkbox"/> F Private Lesson | <input type="checkbox"/> Q Student Teaching |

Fields below if applicable

If course is taught during a part of term in addition to a full 16-week term please indicate the length of the course (ex., 8 weeks):

TCCN (Use for lower division courses) :

Prerequisite(s):		
Course Number/ Placement Test	Minimum Grade Required/ Test Scores	Concurrent Enrollment Permitted? (Y/N)
MECH 3345	D	N

Corequisite Course(s):

Equivalent Course(s):

Restrictions:	
Classification	
Major	

The University of Texas at El Paso
College of Engineering
Department of Mechanical Engineering
Syllabus

Course Prefix and Number: MECH 4334

Course Title: Mechanical Systems Control

Credit Hours: 3

Prerequisite Courses: MECH 3345 with a D or better.

Course Description:

Theory and application of control to Mechanical Systems. Feedback, feedforward, PID and other controls used in Mechanical Engineering. Applications to drones, aircraft, missiles, robots and autonomous vehicles.

Learning Outcomes: (Describe the measurable learning outcomes for the course.)

- A. Students will learn the theory for controlling Mechanical Systems. This will include multi-degree of freedom systems, drones, robots and autonomous vehicles.
- B. Students will use computer simulation to model and analyze various controls and learn to evaluate the control performance.
- C. Students will learn how to filter sensor data and use it in control systems.

Required Materials: (List any required or recommended readings and any materials that are considered required or essential for a course or program requirement.)

J.-N. Juang and M. Q. Phan, *Identification and Control of Mechanical Systems*. Cambridge University Press, 2001.

Course Policies: (Grading, attendance, academic integrity, etc.)

Assignments* 200 Points

3 Exams 200 Points each

Programs 200 points

Final Examination 200 points

COURSE ADD

All fields below are required

College : Engineering

Department : Mechanical Engineering

Rationale for adding the course:

To provide support for the Machine Intelligence emphasis in Mechanical Engineering

All fields below are required

Subject Prefix and # MECH 4345

Title (29 characters or fewer): Comm & Mech Sensor Protocols

Dept. Administrative Code : 1920

[CIP Code](#) 14

Departmental Approval Required Yes No

Course Level UG GR DR SP

Course will be taught: Face-to-Face Online Hybrid

How many times may the course be taken for credit? (Please indicate 1-9 times): 1

Should the course be exempt from the "Three Repeat Rule?" Yes No

Grading Mode: Standard Pass/Fail Audit

Description (600 characters maximum):

Theory of standard communication protocols and the sensors/actuators that use them for the control of Mechanical Systems. The course will enable the selection and operation of devices used in autonomous mechanical systems.

Contact Hours (per week): 3 Lecture Hours Lab Hours Other

Types of Instruction (Schedule Type): Select all that apply

- | | |
|---|--|
| <input checked="" type="checkbox"/> A Lecture | <input type="checkbox"/> H Thesis |
| <input type="checkbox"/> B Laboratory | <input type="checkbox"/> I Dissertation |
| <input type="checkbox"/> C Practicum | <input type="checkbox"/> K Lecture/Lab Combined |
| <input type="checkbox"/> D Seminar | <input type="checkbox"/> O Discussion or Review (Study Skills) |
| <input checked="" type="checkbox"/> E Independent Study | <input type="checkbox"/> P Specialized Instruction |
| <input type="checkbox"/> F Private Lesson | <input type="checkbox"/> Q Student Teaching |

Fields below if applicable

If course is taught during a part of term in addition to a full 16-week term please indicate the length of the course (ex., 8 weeks):

TCCN (Use for lower division courses) :

Prerequisite(s):		
Course Number/ Placement Test	Minimum Grade Required/ Test Scores	Concurrent Enrollment Permitted? (Y/N)
MECH 3345	D	N

Corequisite Course(s):

Equivalent Course(s):

Restrictions:	
Classification	
Major	

The University of Texas at El Paso
College of Engineering
Department of Mechanical Engineering
Syllabus

Course Prefix and Number: MECH 4345

Course Title: Communications and Mechanical Sensor Protocols

Credit Hours: 3

Prerequisite Courses: MECH 3345 with a D or better

Course Description:

Theory of standard communication protocols and the sensors/actuators that use them for the control of Mechanical Systems. The course will enable the selection and operation of devices used in autonomous mechanical systems.

Learning Outcomes: (Describe the measurable learning outcomes for the course.)

- A. Students will be able to identify the different types of communications devices and protocols in common use in Mechanical Systems.
- B. Students will be able to write code to use sensors used in Mechanical systems.

Required Materials: (List any required or recommended readings and any materials that are considered required or essential for a course or program requirement.)

Materials will consist of supplier data sheets describing the interface for various sensors. Web materials explaining the basics of common communications protocols will also be used.

Course Policies: (Grading, attendance, academic integrity, etc.)

Assignments* 200 Points

3 Exams 200 Points each

Programs 200 points

Final Examination 200 points

Degree Plan

Required Credits: 128

Code	Title	Hours
University Core Curriculum		
Complete the University Core Curriculum requirements.		42
Mechanical Engineering Designated Core (All courses require a grade of C or better.)		
CE 2326 Econ for Engrs & Scientists is a designated core course. It is required for graduation even if other course is used to fulfill the core. All Mechanical Engineering majors are encouraged to take CE 2326 to fulfill the core.		
Required Courses:		
CE 2326	Econ for Engrs & Scientists	3
CHEM 1305 & CHEM 1105	General Chemistry and Laboratory for CHEM 1305	4
MATH 1508 or MATH 1310	Precalculus ((Listed if completed, but not required)) Trigonometry and Conics	3-5
PHYS 2420	Introductory Mechanics	4
Mechanical Engineering (Other Requirements) (All courses require a grade of C or better.)		
Required Courses:		
MATH 1411	Calculus I	4
MATH 1312	Calculus II	3
MATH 2313	Calculus III	3

Code	Title	Hours
MATH 2326	Differential Equations	3
Science Elective		
Select one of the following options:		4
BIOL 1305 & BIOL 1107	General Biology and Topics in Study of Life I ^c	
CHEM 1306 & CHEM 1106	General Chemistry and Laboratory for CHEM 1306 ^c	
PHYS 2421	Introductory Electromagnetism	
MATH/Science Elective		
Select one of the following:		
BIOL 1306	Organismal Biology	
MATH 3323	Matrix Algebra	
MATH 3335	Applied Analysis I	
MATH 4329	Numerical Analysis	
MATH 4336	Applied Analysis II	
PHYS 2325	Survey of Modern Physics	
PHYS 3351	Analytical Mechanics I	
STAT 3320	Probability and Statistics	

Code	Title	Hours
MATH Elective		
Select one of the following:		
MATH 3323	Matrix Algebra	
MATH 3335	Applied Analysis I	
MATH 4329	Numerical Analysis	
MATH 4336	Applied Analysis II	
STAT 3320	Probability and Statistics	
Mechanical Engineering Major		
Required Courses: ¹		
MECH 1305	Graphic & Design Fundamentals ^c	3
MECH 1321	Mechanics I- Statics ^c	3
MECH 2103	Engineering Computations ³	1
MECH 2311	Intro to Thermal-fluid Sci ^c	3
MECH 2322	Mechanics of Materials ^c	3
MECH 2331	Matl & Manufacturing Processes ^c	3
MECH 2340	Mechanics II - Dynamics ^c	3

Code	Title	Hours
MECH 2342	Electro Mechanical Systems ^c	3
MECH 3312	Thermodynamics ³	3
MECH 3314	Fluid Mechanics ³	3
MECH 3334	Mechanical Design ³	3
MECH 3345	System Dynamics ³	3
MECH 3352	Engineering Analysis II ³	3
MECH 4315	Heat Transfer ³	3
MECH 4366	Senior Design Project ^{2,3}	3
Select one of the following:		
MECH 2131	Manufacturing Engineering Lab ^c	
MECH 2132	Additive Manufacturing Lab ^c	
MECH 2133	Metal Casting Lab ^c	
MECH 2134	Intelligent Manufacturing	
Select two of the following:		
MECH 3103	Mechatronics Lab ³	
MECH 3113	Thermo-fluid Lab ³	

Code	Title	Hours
MECH 3123	Solid Mechanics Lab ³	
Select one of the following:		
MECH 4326	Finite Element Analysis ³	
MECH 4330	Dynamic Systems Simulation ³	
MECH 4392	Special Topics in Computation ³	
Select five of the following (minimum of one from each area):		
Solid Mechanics Area		
MECH 4336	Principles of Engr Design ³	
MECH 4395	Special Topics in Mech. Engr. ³	
Thermal Fluid Area		
MECH 4316	Thermal System Design ³	
MECH 4394	Special Topics in Therm Fluid ³	
Electro-Mechanical Area		
MECH 4346	Mechatronics ³	
MECH 4332	Mechanical Sys Computations	
MECH 4334	Mechanical Sys Control	
MECH 4345	Mechanical Sys Comm and Sensing	

Code	Title	Hours
MECH 4393	Special Topics in Elect-Mech ³	
Total Hours		128

Course List

C Course require a grade of C or better.

¹ All institutional courses appearing in this area count towards the major GPA with a minimum of 2.0

² Must be in the last full semester and have a 2.0 GPA or better in major.

³ Course requires grade of D or better