2020

Mechanical Engineering
Undergraduate Curriculum

2020

We know what we do. We do it well. We can prove it!

1ST YEAR

Course Code	Course Title	Pre and/or Co-Requisites	Cds
QUIM3131	Gen. Chemistry I	**Co-Req:** (MATE 3171 or MATE 3005) & QUIM 3133	3
QUIM3133	Gen. Chemistry Lab I	**Co-Req:** (MATE 3171 or MATE 3005) & QUIM 3131	1
~INGL_____	**Note: There are 3 sequences to complete the English requirements. Read details at the bottom.**		3
^ESPA3101	Basic Spanish I		3
*INGE 3809	Creative Design I **Note:** If you are a transfer student, read details at the bottom regarding this course.		3
**SOHU			3
			16

Course Code	Course Title	Pre and/or Co-Requisites	Cds
MATE3031	Calculus I	MATE 3005 or 3172	4
QUIM3132	Gen. Chemistry II	(QUIM 3131 & 3133) or QUIM 3001 **Co-Req:** QUIM 3134	3
QUIM3134	Gen. Chemistry Lab II	QUIM 3131, QUIM 3133 or QUIM 3001 **Co-Req:** QUIM 3132	1
~INGL_____	**Note: There are 3 sequences to complete the English requirements. Read details at the bottom.**		3
^ESPA3102	Basic Spanish II	ESPA 3101	3
*INME3810	Creative Design II	INGE 3809	2
			16

2ND YEAR

Course Code	Course Title	Pre and/or Co-Requisites	Cds
MATE 3032	Calculus II	MATE 3031	4
FISI 3171	Physics I	MATE 3031	4
FISI 3173	Physics Lab I	**Co-Req:** FISI 3171	1
~INGL_____	**Note: There are 3 sequences to complete the English requirements. Read details at the bottom.**		3
INGE 3031	Eng. Mechanics Statics	MATE 3031	3
EDFI _____			1
			16

Course Code	Course Title	Pre and/or Co-Requisites	Cds
MATE 3063	Calculus III	MATE 3032	3
FISI 3172	Physics II	FISI 3171	4
FISI 3174	Physics Lab II	FISI 3173 **Co-Req:** FISI 3172	1
~INGL_____	**Note: There are 3 sequences to complete the English requirements. Read details at the bottom.**		3
INGE 3032	Eng. Mech. Dynamics	INGE 3031 & FISI 3171	3
EDFI _____			1
			15

3RD YEAR

Course Code	Course Title	Pre and/or Co-Requisites	Cds
MATE 4009	Ordinary Diff. Equations	MATE 3063	3
INME 4107	Material Science & Eng.	QUIM 3132 + 3134 & FISI 3171	4
INME 4001	Thermodynamics I	(QUIM 3131 & 3133) & (FISI 3172 & 3174)	3
INGE 4019	Int. to Mechanics of Materials	INGE 3031 & MATE 3063	4
INME 4005	Mechanism Design	INGE 3032 & INGE 3016	3
			17

Course Code	Course Title	Pre and/or Co-Requisites	Cds
INGE 4015	Fluid Mechanics	INGE 3032 & MATE 3063	3
INME 4011	Design of Machine Elements I	INGE 4019 & INME 4107	3
INME 4002	Thermodynamics II	INME 4001	3
INEL 4075	Fund. of Electrical Eng.	FISI 3172 & MATE 3063	3
INGE 3016	Algorithms & Comp. Prog.	MATE 3005 or MATE 3172	3
			15

4TH YEAR

Course Code	Course Title	Pre and/or Co-Requisites	Cds
INME 4210	System Dynamics	MATE 4009, INEL 4075 or INEL 3105, INGE 3016, INME 4005 & INME 4001	3
INEL 4076	Fundamentals of Electronics	INEL 4075	3
INME 4012	Design of Mach. Elem. II	INME 4011	3
INME 4015	Heat Transfer	MATE 4009, INGE 3016, INME 4001 & (INGE 4010 or 4015)	3
INGE 4016	Fluid Mechanics Lab	**Co-Req:** INGE 4015	1
**SOHU			3
			16

Course Code	Course Title	Pre and/or Co-Requisites	Cds
ININ 4015	Engineering Economic Analysis	MATE 3032	3
INME 4055	Manufacturing Processes	INME 4107	3
ININ 4010	Probability and Stats for Engineers	MATE 3032 & INGE 3016	3
**FILO _____	****Must be an ETHIC course from the list provided at the bottom of this document.****		3
FREE ELECT.			3
			15

5TH YEAR

Course Code	Course Title	Pre and/or Co-Requisites	Cds
INME 4235	Mechatronics Lab	INME 4210, INME 4011, INME 4002 & INEL 4076 **Co-Req:** INME 4015 & INME 4012	2
INME 4056	Manuf. Processes Lab	INGE 3809 **Co-Req:** INME 4055	1
**SOHU			3
>INME_____	**Professional DESIGN Elect.** (See list on Page 2)		3
>INME_____	**Professional DESIGN Elect.** (See list on Page 2)		3
FREE ELECT.			3
			15

Course Code	Course Title	Pre and/or Co-Requisites	Cds
INME 4236	Thermal Science Lab	INME 4235	2
INME 4057	Eng. Design	INME 4002, INME 4012 & INME 4015	4
>INME_____	**Prof. Design/Technical Elect.** (See list on Page 2)		3
>INME_____	**Prof. Design/Technical Elect.** (See list on Page 2)		3
FREE ELECT.			3
FREE ELECT.			3
			18

TOTAL CREDITS: 159 CREDITS

~Students admitted to the **Basic English Sequence**, must take: INGL 3101, 3102, 3201, and INGL 3209 (Communication in Science).

~Students admitted to the **Intermediate English Sequence**, must take: INGL 3103, 3104 plus 6 credits in english electives from a list. See the Counselor for details.

~Students that approved the **Advanced** Placement Test known as "Prueba de Nivel Avanzado or PNA" with 4 or higher in the English part, are accredited with 6 credits in English and **MUST** only approve: INGL 3211 & 3212 Students with a score of 3 on the Advanced Placement Examination will be placed in INGL 3103 (Intermediate English).

^For Spanish, students that approved the Advanced Placement Test known as "Prueba de Nivel Avanzado or PNA" with 4 or higher, are accredited with 6 credits in Spanish and DO NOT NEED to approve any more credits in Spanish. Students with a score of 3 on the Advanced Placement Examination or students that did not took that test, will be placed and must approve ESPA 3101 and 3102 (Basic Spanish I & II) to complete the Spanish requirements of this curriculum.

***IMPORTANT INFORMATION FOR TRANSFER STUDENTS:** If you are a transfer student and took INGE 3011 (2 crs.) plus INME 5997 (3 crs.), these courses will be counted for INGE 3809 and INME 3810, respectively. In the other hand, if you are a transfer student **BUT** took INGE 3011 (2 crs.) plus INME 3810 (2 crs.), you will need to enroll in a one-credit INME course to cover a **deficiency** in the number of credits and to develop parametric modeling skills using advanced 3D CAD software. In total, you need to have 5 credits of Creative Design or its equivalents. Always ask your counselor.

Nine (9) of the twelve (12) credits in Socio-Humanistic Electives must be selected from the list of the approved courses provided for engineering students which is available at the College of Engineering's Academic Affairs Office website. Three (3) of the twelve (12) credits in socio-humanistics must be from the following list of ETHIC courses: **ADMI 3009, or **FILO** 3155, 3156, 3185, 4025, 4026, 4027, 4045, 4046,4160 or **SOCI** 3007, 3010, 4027, 4157 & 5015. These courses do not have any prerequisites.

>In order to obtain the BSME, it is required that students take 12 credits in Professional Electives, from which **a MINIMUM of 6 credits should be in Design Electives** and the other 6 credits to be chosen between the Technical Electives or more courses from the Design alternatives.

For more information, please contact ME's Academic Advisors
Mrs. Yolanda Pérez (yolanda.perez4@upr.edu)
Ms. Denisse Negrón (denisse.negron2@upr.edu)

uprm.edu/inme

Department of Mechanical Engineering

I N M E

University of Puerto Rico at Mayagüez

1913-2013: 100 Years of Excellence in Mechanical Engineering Education.

DESIGN ELECTIVE COURSES (Select a MINIMUM OF 6 CREDITS from this list.)

CODE	COURSE TITLE	PRE-REQUISITES	CDS.
INME 4003	Design of Thermal and Fluid Systems	INME 4001 & INME 4015	3
INME 4027	Energy Installation Engineering	INME 4002 & INME 4015	3
INME 4035	Refrigeration and Air Conditioning	INME 4002 & INME 4015	3
INME 4058	Computer Aided Design	INME 4012 & INME 4015	3
INME 4065	Product Design	DIR (and interview with the professor in charge)	3
INME 4709	Aircraft Performance	INGE 3032 OR 3035 & MATE 4009 & INGE 3016	3
INME 4717	Introduction to Aircraft Structural Analysis	INGE 3032 OR 3035 & MATE 4009 & INGE 3016	3
INME 4810	Design and Automation Techniques	INME 4055	3
INME 5010	Design Thinking	30 or more credits approved	3
INME 5510	Introduction to Finite Element Modeling	INGE 3016 & INME 4011	3
INME 5520	Introduction to Computational Fluid Dynamics	INME 4015	3
INME 5530	Introduction to Multibody Dynamics Modeling	INME 4005	3
INME 5707	Gas Turbine System Operation	INME4002 OR 4045, INGE3016 & INME4707	3
INME 5717	Aircraft Structural Analysis and Design	INME 4717 & INGE 4019 or 4012	3
INME 5995	Special Projects Minibaja; Fórmula; RUMAir; Solar Car), Moonbuggy; Dart; PACE; Vex RUMblebots; Human Powered Vehicle (HPV); RoboBoat; RUMarino; UAV's, among others	DIR	1-6
INME 6XXX	*These topics:* BioMEMS; Design of Microfluidic Systems; Principles of Electronic Packaging; Engineering Design, Classical & Computational Dynamics, among other topics	DIR	1-6

TECHNICAL ELECTIVE COURSES (Select a MAXIMUM OF 6 CREDITS from this list.)

CODE	COURSE TITLE	PRE-REQUISITES	CDS.
INME 4006	Machinery Dynamics	MATE 4009 & INME 4005	3
INME 4018	Energy Conversion	INME 4002, INME 4015 & INEL 4076	3
INME 4019	Energy Management and Audit	INME 4001 OR INQU 4011	3
INME 4037	Internal Combustion Engines	INME 4015	3
INME 4705	Applied Aerodynamics	INGE 4010 (or 4015 + 4016), INGE3016 & MATE 4009	3
INME 4707	Gas Turbine Thermodynamics and Propulsion	INME4002 OR 4045, INGE 4010 (or 4015 + 4016), INGE3016 & MATE 4009 **Co-Req:** INME4002	3
INME 4850	Introduction to Robotics	INME4011	3
INME 5005	Lubrication	DIR	3
INME 5007	Solar Energy Application	INME4015 or INQU4001	3
INME 5008	Corrosion	INME4107	3
INME 5018	Materials Failure Analysis	INME4012 & INME4107	3
INME 5025	Metals Fatigue	INME4107	3
INME 5996	Special Projects Minibaja; Fórmula; RUMAir; Solar Car), Moonbuggy; Dart; PACE; Vex RUMblebots; Human Powered Vehicle (HPV); RoboBoat; RUMarino; UAV's, among others	DIR	1-6
INME 6XXX	*These topics:* Biomaterials; Biomedical Engineering; Nuclear Engineering; Fracture Mechanics; Continuum Mechanics; Finite Element Analysis, among other topics	DIR	1-6

OTHER ELECTIVE COURSES (The type of elective will depend on the topic of your work and duties.)

COOPS, INTERNSHIPS & UNDERGRADUATE RESEARCH					
INME 4039	Mechanical Eng. Practice (Mostly Technical/Free)	3	INME 4998	Undergraduate Research (Mostly Technical/Free)	1-6
INME 4995	Eng. Practice for Coop Students (Mostly Free)	0-9	INME 5015	Selected Topics (Depends on topic)	1-6

****In order to obtain the BSME, it is required that students take 12 credits in Professional Electives, from which a **MINIMUM** of 6 credits should be in Design Electives and the other 6 credits to be chosen between the Technical Electives or more courses from the Design alternatives.

MINOR IN AEROSPACE ENGINEERING

The Minor in Aerospace Engineering provides a competitive and multidisciplinary education that aims to provide knowledge in space, aeronautic, and astronautics fields engaging students through theoretical, computational and/or experimental aerospace engineering problems. You complete this minor along with your engineering degree.

			*TENTATIVE COURSE OFFERING SEASON	
Warning: If you are planning to complete the minor, these courses can be used as Professional Electives. If you are interested in certain courses only, you can use them as Professional Electives, as well.	Course Code	Course	Fall	Spring
	INME 4705	**Applied Aerodynamics** Pre-reqs: INGE 4010 (or 4015 + 4016), INGE 3016 & MATE 4009	X	
	INME 4709	**Aircraft Performance** Pre-reqs: INGE 3032, INGE 3016 & MATE 4009		X
	INME 4717	**Introduction to Aircraft Structural Analysis** Pre-reqs: INGE 3032, INGE 3016 & MATE 4009	X	
	INME 5717	**Aircraft Structural Analysis and Desing** Pre-reqs: INME 4717, INGE 4019 or 4012		X
	*INME 5707	**Gas Turbine System Operation** Pre-reqs: INME 4002 or 4045, INGE 3016 & INME 4707	X	
👉👉👉**Students MUST TAKE INME 4707 before INME 5707, since it is a prerequisite of INME 5707.**				
The offer of the courses in this table is subject to demand and availability of resources, therefore changes can ocurr in the course offering season.				

**********This curriculum has been updated on April 2022 since there were changes in the prerequisites of INME 4005, 4011, 4055, 4056, and 4210. **********

For more information, please contact ME's Academic Advisors
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