

Department of Mechanical Engineering

UNDERGRADUATE COURSES

Curriculum for the Degree of Bachelor of Science in Mechanical Engineering:

General Courses

Course Code	Course Title	Credits	
26-10-105	Islamic Teachings I	2	Two courses from this group must be taken
26-10-011	Islamic Thought I	2	
26-10-014	Political and Civil Rights In Iran	2	
26-10-205	Islamic Teachings II	2	
26-10-012	Islamic Thought II	2	
26-10-013	Human in Islam	2	
15-10-272	Islamic Ethics and Education	2	One course from this group must be taken
15-10-021	Philosophy of Ethics	2	
15-10-022	Islamic Ethics	2	
15-10-023	Lifestyle	2	
15-10-024	Pragmatic Mysticism in Islam	2	
26-10-141	Islamic Revolution Roots	2	One course from this group must be taken
26-10-031	Islamic Revolution of Iran	2	
26-10-032	An Introduction to Constitution	2	
26-10-033	Political Views of Imam Khomeini	2	
26-10-103	History of Islam	2	One course from this group must be taken
26-10-041	Cultural and Civilization History of Islam	2	
26-10-042	Analytical History of Early Islam	2	
26-10-043	Imamat History	2	
26-10-131	Islamic Literature	2	One course from this group must be taken
26-10-051	Thematic Interpretation of Quran	2	
26-10-052	Thematic Interpretation of Nahj al-Balaghah	2	
26-10-101&102	Physical Education I	1	
26-10-103&104	Physical Education II	1	
26-10-252	Persian Language	3	
25-10-111	English for Engineers	3	

Basic Courses

Course Code	Course Title	Credits
19-14-101	Calculus I	4
19-14-102	Calculus II	4
19-14-251	Differential Equations	3
17-30-150	Computer Programming	3
19-14-271	Numerical Methods	2
20-10-115	Physics I	3
20-10-125	Physics II	3
20-10-116	Physics of Heat Lab.	1
20-10-126	Physics of Electricity Lab	1
20-10-103	General Chemistry	3
Total		27

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Core Courses

Course Code	Course Title	Credits
19-14-252	Engineering Mathematics	3
15-10-157	Engineering Drawing I	2
15-12-153	Statics	3
15-12-207	Dynamics I	4
15-12-211	Strength of Materials I	3
15-12-251	Strength of Materials II	3
11-10-308	Materials Science	3
15-14-210	Thermodynamics I	3
15-14-262	Thermodynamics II	3
15-14-250	Fluid Mechanics I	3
15-14-314	Fluid Mechanics II	3
15-12-301	Design of Machine Elements I	3
15-12-377	Design of Machine Elements II	3
15-14-310	Heat Transfer I	3
15-12-309	Dynamics of Machinery	3
15-12-311	Vibrations	3
15-12-353	Automatic Control	3
15-12-423	Fundamentals of Mechatronic Systems	3
15-10-255	Electricity and Electronics Application	3
15-10-477	Research and Documentation Methods in Mechanical Engineering	1
Total		58

Manufacturing Engineering – Major Courses

Course Code	Course Title	Credits
15-16-305	Metrology	2
15-16-307	Metrology Lab	1
15-10-406	Engineering Drawing II	2
15-16-370	Universal Machine Tools	3
15-16-359	Universal Machine Tools Workshop I	1
15-16-409	Machinability	2
15-16-417	Machinability Workshop	1
15-16-363	Fundamentals of Casting	2
15-16-431	Universal Machine Tools Workshop II	1
15-16-369	Welding Technology	2
15-16-419	Heat Treatment	2
15-16-423	CNC Machines	2
15-16-429	CNC Machines Workshop	1
Total		22

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Manufacturing Engineering – Elective Major Courses

Course Code	Course Title	Credits
15-16-461	Advanced Methods of Machining	2
15-10-452	Hydraulics and Pneumatics	3
15-10-355	Hydraulics and Pneumatics Lab	1
15-16-437	Computer Aided Design and Manufacturing	2
15-16-479	Computer Aided Design and Manufacturing Lab	1
15-16-367	Fundamentals of Casting Workshop	2
15-16-439	Welding Technology Workshop	1
15-16-463	Heat Treatment Workshop	1
15-12-401	Fundamentals of Installation & Maintenance	3
15-16-467	Design of Jigs and Fixtures	2
15-16-472	Design of Jigs and Fixtures Workshop	1
15-16-453	Advanced Methods of Machining Lab	3
15-16-403	Die Design	3
15-16-427	Design of Casting and Forging Dies	3
15-16-459	Design of Casting Dies Workshop	1
25-10-315	Technical English	2
11-10-141	Industrial Metals	3
12-10-426	Economics and Industrial Management	2
15-16-477	Automatic Assembly	3
15-14-300	Fluid Mechanics Lab	1
15-14-354	Thermodynamics and Heat Transfer Lab	1
15-12-357	Vibrations and Machinery Dynamics Lab	1
15-12-303	Strength of Materials Lab	1
19-14-171	General Math Lab I	1
19-14-172	General Math Lab II	1
	Free Choice	3

Mechatronic and Dynamic Systems Engineering – Major Courses

Course Code	Course Title	Credits
15-12-365	Robotics	3
15-12-430	Control Systems Design	3
15-12-	Applied Vibrations	3
15-12-428	Processing of Mechtronic Systems	3
15-10-452	Hydraulics and Pneumatics	3
15-12-427	Mechatronics Lab I	1
15-12-432	Mechatronics Lab II	1
15-12-357	Vibrations and Dynamics of Machinery Lab	1
15-12-303	Strength of Materials Lab	1
15-14-300	Fluid Mechanics Lab	1
Total		20

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Mechatronic and Dynamic Systems Engineering – Elective Major Courses

Course Code	Course Title	Credits
15-10-373	Production Methods & Workshop	3
15-12-401	Fundamentals of Installation & Maintenance	3
24-10-151	Automechanics Workshop	1
24-10-150	Welding and Stamping Workshop	1
15-16-367	Fundamentals of Casting Workshop	1
24-10-160	Universal Machine Tools Workshop	1
15-10-355	Hydraulics and Pneumatics Lab	1
15-14-354	Thermodynamics and Heat Transfer Lab	1
15-16-437	Computer Aided Design and Manufacturing	2
11-16-479	Computer Aided Design and Manufacturing Lab	1
13-10-426	Economics and Industrial Management	2
25-10-315	Technical English	2
15-10-405	Metrology and Control Systems	3
15-12-471	Design of Mechanisms	3
15-16-423	CNC Machines	2
15-16-429	CNC Machines Lab	1
19-14-171	General Math Lab I	1
19-14-172	General Math Lab II	1
	Free Choice	3

Solid Mechanics – Major Courses

Course Code	Course Title	Credits
15-12-457	Applied Plasticity	3
15-12-451	Computer-Aided Design	3
15-10-388	Composite Materials	3
15-10-406	Engineering Drawing II	2
15-10-373	Production Methods & Workshop	3
24-10-102	Universal Machine Tools Workshop	1
24-10-151	Automechanics Workshop	1
15-16-439	Welding and Stamping Workshop	1
15-14-300	Fluid Mechanics Lab	1
15-14-354	Thermodynamics and Heat Transfer Lab	1
15-12-357	Vibrations and Machinery Dynamics Lab	1
15-12-303	Strength of Materials Lab	1
Total		21

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Solid Mechanics Group – Elective Major Courses

Course Code	Course Title	Credits
15-12-407	Strength of Materials III	3
15-16-403	Die Design	3
15-12-401	Fundamentals of Installation & Maintenance	3
11-10-141	Industrial Metals	3
15-10-405	Metrology and Control Systems	2
15-10-487	Bearings & Lubrication	2
15-10-452	Hydraulics and Pneumatics	3
15-10-355	Hydraulics and Pneumatics Lab	1
15-12-471	Design of Mechanisms	3
15-12-421	Engineering Design Methods	3
15-16-367	Casting Lab	1
13-10-426	Economics and Industrial Management	2
25-10-315	Technical English	2
15-16-467	Design of Jigs and Fixtures	2
15-16-477	Automatic Assembly	3
19-14-171	General Math Lab I	1
19-14-172	General Math Lab II	1
15-12-365	Robotics	3
	Free Choice	3

Mechanical Design Engineering – Major Courses

Course Code	Course Title	Credits
15-12-451	Computer-Aided Design	3
15-16-403	Die Design	3
15-12-471	Design of Mechanisms	3
15-10-373	Production Methods & Workshop	3
15-10-406	Engineering Drawing II	2
24-10-102	Universal Machine Tools Workshop	1
24-10-151	Automechanics Workshop	1
15-16-439	Welding and Stamping Workshop	1
15-14-300	Fluid Mechanics Lab	1
15-14-354	Thermodynamics and Heat Transfer Lab	1
15-12-357	Vibrations and Machinery Dynamics Lab	1
15-12-303	Strength of Materials Lab	1
Total		21

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Mechanical Design Engineering – Elective Major Courses

Course Code	Course Title	Credits
15-12-401	Fundamentals of Installation & Maintenance	3
15-12-411	Chassis Design	3
15-16-481	Design of Machine Tools	3
15-10-405	Metrology and Control Systems	2
15-10-487	Bearings & Lubrication	2
15-10-452	Hydraulics and Pneumatics	3
15-10-355	Hydraulics and Pneumatics Lab	1
15-16-467	Design of Jigs and Fixtures	2
15-16-367	Casting Workshop	1
15-12-483	Design of Rotary Machines	3
15-14-	Design of Airplane I	3
15-14-	Design of Airplane II	3
13-10-426	Economics and Industrial Management	2
25-10-315	Technical English	2
15-16-477	Automatic Assembly	2
15-12-421	Engineering Design Methods	3
15-10-388	Composite Materials	3
19-14-171	General Math Lab I	1
19-14-172	General Math Lab II	1
15-12-365	Robotics	3
	Free Choice	3

Automotive Engineering – Major Courses

Course Code	Course Title	Credits
15-14-416	Internal Combustion Engines	3
15-12-413	Design of Internal Combustion Engines	3
15-12-411	Chassis Design	3
15-12-403	Automobile Dynamics	3
15-10-373	Production Methods & Workshop	3
24-10-102	Universal Machine Tools Workshop	1
24-10-151	Automechanics Workshop	1
15-14-300	Fluid Mechanics Lab	1
15-14-354	Thermodynamics and Heat Transfer Lab	1
15-12-357	Vibrations and Machinery Dynamics Lab	1
15-12-303	Strength of Materials Lab	1
Total		21

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Automotive Engineering – Elective Major Courses

Course Code	Course Title	Credits
15-10-478	Bearings & Lubrication	2
15-10-406	Engineering Drawing II	2
15-12-471	Design of Mechanisms	3
15-14-342	Fuel & Combustion	2
15-10-405	Metrology and Control Systems	3
15-12-	Automobile Aerodynamics	2
15-12-451	Computer-Aided Design	3
15-12-401	Installation & Maintenance Engineering	3
15-14-356	Turbomachinery	3
15-12-407	Strength of Materials III	3
15-14-300	Combustion Engines Lab	0.5
15-16-367	Casting Lab	1
13-10-426	Economics & Industrial Management	2
25-10-315	Technical English	2
19-14-171	General Math Lab I	1
19-14-172	General Math Lab II	1
	Free Choice	3

HVAC Engineering – Major Courses

Course Code	Course Title	Credits
15-14-410	Air Conditioning System Design	3
15-14-464	Freezing & Cooling Systems Design	3
15-14-462	HVAC	3
15-14-456	Heat Exchanger Design	3
15-14-356	Turbomachinery	3
15-10-358	HVAC Drawing	1
15-14-300	Fluid Mechanics Lab	1
15-14-354	Thermodynamics and Heat Transfer Lab	1
24-10-150	Welding & Stamping Workshop	1
24-10-102	Universal Machine Tools Workshop *	1
24-10-151	Automechanics Workshop *	1
24-10-171	Electricity Workshop	1
Total		21

* Three workshops must be taken from these four workshops

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HVAC Engineering – Elective Major Courses

Course Code	Course Title	Credits
15-14-494	Heating & Refrigeration	3
15-10-405	Metrology and Control Systems	2
15-10-373	Production Methods & Workshop	3
15-10-258	Engineering Drawing II	2
24-10-160	Heating & Refrigeration Workshop	1
15-14-472	Solar Energy	3
15-14-414	Fuel & Consumption	2
15-14-402	Water Distribution Systems	3
13-10-426	Economics & Industrial Management	2
15-14-350	Heat Transfer II	3
15-14-416	Internal Combustion Engines	3
15-14-454	Numerical Methods in Fluids	3
15-14-404	Gas Dynamics	3
15-12-357	Dynamics of Machinery and Vibration Lab	1
15-16-367	Casting Workshop	1
25-10-315	Technical English	2
15-12-303	Strength of Materials Lab	1
19-14-171	General Math Lab I	1
19-14-172	General Math Lab II	1
	Free Choice	3

Energy Engineering – Major Courses

Course Code	Course Title	Credits
15-14-398	Energy Conversion	3
15-14-410	Air Conditioning System Design	3
15-14-406	Energy Management	2
15-14-414	Fuel & Combustion	2
15-14-420	Thermal Power Plants	3
15-14-456	Heat Exchanger Design	3
15-14-300	Fluid Mechanics Lab	1
15-14-354	Thermodynamics and Heat Transfer Lab	1
24-10-150	Welding and Stamping Workshop	1
24-10-102	Universal Machine Tools Workshop*	1
24-10-151	Automechanics Workshop	1
24-10-171	Electricity Workshop	1
Total		21

* Three workshops must be taken from these four workshops

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Energy Engineering – Elective Major Courses

Course Code	Course Title	Credits
15-14-356	Turbomachinery	3
15-10-405	Metrology and Control Systems	2
15-14-472	Solar Energy	3
15-10-315	Environmental Pollution	2
13-10-426	Economics & Industrial Management	2
15-14-454	Numerical Methods in Fluids	3
15-14-350	Heat Transfer II	3
15-14-416	Internal Combustion Engines	3
15-14-404	Gas Dynamics	3
15-14-488	Water Power Plants	3
15-14-464	Freezing & Cooling Systems Design	3
15-14-402	Water Distribution Systems	3
15-10-258	Engineering Drawing II	2
15-10-373	Production Methods & Workshop	3
15-14-412	Gas Turbines & Jet Engines	2
15-12-357	Dynamics of Machinery and Vibration Lab	1
15-16-367	Fundamentals of Casting Workshop	1
25-10-315	Technical English	1
15-12-303	Strength of Materials Lab	1
19-14-171	General Math Lab I	1
19-14-172	General Math Lab II	1
	Free Choice	3

Aerospace Engineering – Major Courses

Course Code	Course Title	Credits
15-14-430	Hydro- & Aero-Dynamics	3
15-14-	Mechanics of Flight I	3
15-14-	Design of Airplane I	3
15-14-458	Propulsion Systems	3
15-14-	Aero-Dynamics Lab	1
15-14-	Aero-Dynamics II	3
15-14-300	Fluid Mechanics II	1
15-14-354	Thermodynamics and Heat Transfer Lab	1
15-12-357	Dynamics of Machinery and Vibration Lab	1
15-12-303	Strength of Materials Lab	1
Total		20

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Aerospace Engineering – Elective Major Courses

Course Code	Course Title	Credits
15-14-	Design of Airplane II	3
15-14-	Mechanics of Flight II	3
15-14-	Design of Space Structures	3
15-14-356	Turbomachinery	3
15-14-454	Numerical Methods in Fluids	3
15-10-373	Production Methods & Workshop	3
15-14-414	Fuel & Combustion	2
15-14-416	Internal Combustion Engines	3
15-10-452	Hydraulics and Pneumatics	3
15-10-355	Hydraulics and Pneumatics Lab	1
15-14-	Fundamentals of Rockets	2
15-14-	Aero-elasticity	3
15-14-	Mechanics of Spatial Orbits	3
15-14-	Aero-helicopters	3
15-10-	Engine Workshop	1
24-10-102	Universal Machine Tools Workshop	1
24-10-151	Automechanics Workshop	1
253-10-315	Technical English	2
19-14-171	General Math Lab I	1
19-14-172	General Math Lab II	1
	Free Choice	3

Recommended Courses for the First Four Semesters:

All undergraduate students are encouraged to take their courses according to the following tables:

The recommended courses for the first semester

Course Code	Course Title	Credits	
19-14-101	Calculus I	4	-
20-10-115	Physics I	3	(Calculus I)
20-10-103	General Chemistry	3	-
25-10-111	English for Engineers	3	Pre-university English
26-10-101	Physical Education I	1	-
15-10-157	Engineering Drawing I	2	-

The recommended courses for the second semester

Course Code	Course Title	Credits	
19-14-102	Calculus II	4	Calculus I
15-12-153	Statics	3	Calculus I – Physics I
20-10-125	Physics II	3	Physics I – (Calculus II)
20-10-116	Physics of Heat Lab.	1	Physics I
26-10-252	Persian Language	3	-
26-10-103	Physical Education II	1	Physical Education I
17-30-150	Computer Programming	3	-

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The recommended courses for the third semester

Course Code	Course Title	Credits	
19-14-251	Differential Equations	3	(Calculus II)
15-12-207	Dynamics I	4	Statics- (Differential Equations)
15-14-210	Thermodynamics I	3	Calculus II – Physics I
15-12-211	Strength of Materials I	3	Statics
19-14-271	Numerical Methods	2	Calculus II - Computer Programming
20-10-126	Physics of Electricity Lab	1	(Physics II)
26-	A general course	2	-

The recommended courses for the fourth semester

Course Code	Course Title	Credits	
19-14-252	Engineering Mathematics	3	Differential Equations - Calculus II
15-12-251	Strength of Materials II	3	Strength of Materials I
15-14-250	Fluid Mechanics I	3	Statics- (Differential Equations)
15-14-262	Thermodynamics II	3	Thermodynamics I – (Fluid Mechanics I)
11-10-308	Materials Science	3	General Chemistry
15-10-255	Electricity and Electronics Application	3	Physics II
26-	A general course	2	-