

Course Description

- 01211211 Introduction to CAD/CAM 3(2–3–6)
CAD/CAM systems for production engineering, hardwares and softwares for CAD/CAM systems, wireframe, surface and solid design, three dimension CAD functions: protrusion, sweep, blend, revolve, cut, copy, pattern, shell and relation, assembly design and detail drawing, dimensioning, section view and bill of material.
- 01211231 Conventional and Computer-Controlled Machines 3(3–0–6)
Conventional machine for turning, drilling, tapping, milling, grinding, cutting, punching, boring and bending; cutting speed, feed and depth of cut, safety precaution, machine installation and site preparation, lubrication and maintenance, cutting tool application and technology; computer numerical control machines and programming, introduction to computer-controlled machine.
- 01211281 Electrical–Mechanical Manufacturing Engineering Laboratory I 1(0–3–2)
Laboratory in Electrical-Mechanical Manufacturing Engineering, practice by using basic hand tools for making workpieces from plastic and metal, electrical and electronics devices, construction of electromechanical devices, electrical wiring in machinery, motor control and standard installation.
- 01211321 Kinematics and Dynamics of Robots 3(3–0–6)
Acceleration and position analysis, velocity kinematics, force/torque relationships, homogeneous coordinates for kinematics and dynamics, forces and moment balance, dynamic modeling of joints and linkages; Euler-Lagrange and Newton-Euler formations, dynamics algorithms, robotics joint, cartesian and force controls, performance analysis of robotics.

ponents for mold and die, standard mold bases, injection mold and die design, finishing processes, selection of materials and their properties, metal forming processes, forging, extrusion, drawing and power metallurgy, machine and tooling for forming processes.

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| 01211399 | Internship
Internship for Electrical–Mechanical Manufacturing Engineering in private enterprises, government agencies, government enterprises or academic places at least 240 hours and at least 30 workdays in order to get experiences from the assignment for Electrical–Mechanical Manufacturing Engineering. | 1 |
| 01211411 | Computer-Aided Design Application
Advanced CAD functions: advanced sweep and non-parallel blends, surface design and application in complex consumer product design, advanced assembly and sheet metal design, CAD file conversion. | 3(2–3–6) |
| 01211412 | Computer-Aided Manufacturing Application
Applications of CAM for turning, drilling, milling, mill-turn, four and five axis milling, two and four axis wire cutting and sheet metal working, machining sequences, CAM pre and post processing for application, CAM and CNC machine interfacing. | 3(2–3–6) |
| 01211413 | Computer-Aided Engineering Application
Type and application of computer-aided engineering for product development; basic principle and calculation of finite element analysis; type and property of elements, material property; finite element modeling; load conditions; analysis for strength, heat, vibration, flow of fluid, mechanism motion and dynamics; manufacturing process analysis. | 3(2–3–6) |
| 01211421 | Embedded Systems for Industrial Control | 3(3–0–6) |

sion, control language and commands, development of robot for the future.

- 01211434 Machine Retrofitting and Controller Design 3(3–0–6)
CNC controllers fundamentals, functions and operations of CNC machines, electrical components, feedback control stability and performance analysis, frequency domain methods, state-space representations, PID controllers, modern control design, system identification, robustness analysis, control design using software tools, digital control and digital signal processing, multi-axis motion control.
- 01211435 Refrigeration and Air Conditioning for Electrical- Mechanical Manufacturing Engineering 3(3–0–6)
Basic principle of refrigeration and performances, modified vapor compression, refrigeration cycles, system components analysis, type of refrigerants, evaporative cooling and cooling towers, absorption refrigeration, cooling load calculation of refrigeration system, fundamental of air condition, cooling load estimation of air conditioning system, design of air distribution and duct system, applications and selection of refrigeration and air conditioning systems for manufacturing system and factory.
- 01211441 Introduction to Flexible Manufacturing Systems 3(3–0–6)
Components in Flexible Manufacturing Systems, automated systems, cell, Flexible Manufacturing Systems and Computer Integrated Manufacturing, work piece management and scheduling, communication systems and interface between computer and machines.
- 01211442 Principles of Operation and Production 3(3–0–6)
Procedure of operation and production, general management, statistics procedure and quantity measurement, production planning and operation, materials management, production management, stock management, quality control and productivity improvement.

- 01211443 Fabrication Technology for Thermoplastic Product 3(3-0-6)
 Type and property of thermoplastic; thermoplastic fabrication process by injection, blowing, extrusion and vacuum; design criterion for thermoplastic products; mold and machine for fabrication; mold design and material selection; industrial standard testing; rapid tooling technology.
- 01211444 Fabrication Technology for Thermoset Product 3(3-0-6)
 Type and property of thermoset, rubber, polyurethane and silicone rubber; thermoset fabrication process by injection and compression; resin casting; design criterion for thermoset products; mold and machine for fabrication; design and material selection for reaction injection mold.
- 01211445 Fabrication Technology for Metal Product 3(3-0-6)
 Type and property of metal; metal fabrication process by machining, casting, extrusion, forging and welding; sheet metal fabrication by cutting, punching, rolling, pressing and bending; machines for sheet metal production; design criterion for metal products; mold and die design for metal fabrication processes.
- 01211457 Industrial Materials 3(3-0-6)
 Metallic and plastic materials and their processing, composite material, engineering ceramics and plastics, steel, alloy steel and cast irons, steel and its heat treatment, material for different kinds of manufacturing processes, material properties and measurements, material failures, non-destructive testing, property changes for post processing.
- 01211461 Power System for Industries 3(3-0-6) ()
 Energy conversion principles and availability concept, fuels and combustion analysis and component study of steam, gas turbine and internal combustion engine power plants, combined cycle

and cogeneration, hydro power plant, nuclear power plant, control and instrumentation, power plant economics and environmental impacts, emergency system and backup power system for industries and building, application of power plant in electrical generation systems, installation and maintenance of the system.

- 01211471 Products Design 3(3–0–6)
 Procedure of product and process design, artistic design, design communication, mechanical and industrial considerations, quality control, industrial processes to meet user needs, human factors, design for manufacturability and packaging design, use of CAD and rapid prototyping machine for visualization and function testing, choice of material and design characteristics of each material, investment cost estimation.
- 01211481 Electrical-Mechanical Manufacturing Engineering Laboratory II 1(0–3–2)
 Laboratory in Electrical-Mechanical Manufacturing Engineering by practicing on computer- controlled machines and equipments.
- 01211490 Co-operative Education 9
 On the job training as a temporary employee in order to get experiences from the assignment for Electrical–Mechanical Manufacturing Engineering.
- 01211495 Electrical–Mechanical Manufacturing Engineering Projects Preparation 1(0–3–2)
 Research methods in Electrical-Mechanical Manufacturing Engineering, project proposal writing, literature review, Research report writing, utilization of instrumentation for research, application of software in instrumental control and data analysis, media creation for research presentation.
- 01211496 Selected Topics in Electrical-Mechanical Manufacturing

Engineering 1-3
Selected topics in electrical-mechanical manufacturing engineering at the bachelor's degree level. Topics are subject to change each semester.

01211497 Seminar 1
Presentation and discussion on current interesting topics in Electrical- Mechanical Manufacturing engineering at the bachelor's degree level.

01211498 Special Problems 1-3
Study and research in electrical-mechanical manufacturing engineering at the bachelor's degree level and compiled into a written report.

01211499 Electrical-Mechanical Manufacturing Engineering Project 2(0-6-3)
Project of practical interest in various fields of electrical-mechanical manufacturing engineering.