

OR		
EGD TEK 122	3-D Computer-Aided Design with CATIA	2
EGD TEK 131	CAD-Advanced Applications 3-D.....	1
IND TEK 103	Technical Writing and Communication.....	2
IND TEK 105	Industrial Print Reading.....	3
IND TEK 106	Applied Math for Technology	2
ENG GEN 212	CADD for Engineers II.....	3
Subtotal.....		29

Restricted Elective Courses

SUBJECT & NO.	COURSE	UNITS
ENG GEN	102	
ENG GEN	221	
MIT	220	
MATH	115	
MATH	120	
Subtotal.....		7

General Education Courses Plan A

SUBJECT & NO.	COURSE	UNITS
Area A	Natural Sciences	3
Area B	Social and Behavioral Sciences.....	3
Area C	Humanities	3
Area D	Language and Rationality	6
Area E	Health and Physical Education.....	3
Subtotal.....		18
FREE ELECTIVES		6
Total.....		49

TRANSFER CURRICULUM

Information regarding lower division major preparation requirements required to transfer to a University of California (UC) or California State University (CSU) campus may be obtained at www.assist.org. For information about independent or out-of-state colleges/universities, please consult with a counselor.

SUBJECTS & COURSE DESCRIPTIONS**Electrical Engineering Technology (EET)****120 DC Circuits** (3) CSU

Prerequisites: Mathematics 125 and General Engineering 102.

LECTURE, 2 HOURS; LABORATORY, 3 HOURS; DISCUSSION, 1 HOUR.

Note: This course is highly recommended for Engineering students planning to take General Engineering 220 and General Engineering 225.

In this introductory course students learn linear circuit analysis and practice its application to areas of importance in electrical engineering such as resistive circuits, Kirchhoff laws, node and loop analysis, Thevenin and Norton theorems, superposition theorem, capacitors and inductors, and AC circuits. Students also perform laboratory exercises to learn how to create circuit designs using electronic components and to use instruments such as millimeters, oscilloscopes, and signal generators.

Electronics (ELECTRN)**120 A+ Certification Training** (9)

LECTURE, 6 HOURS; LABORATORY 9 HOURS.

This course covers all areas, both the essentials and practical application exams, from the national CompTIA A+ certification examination. The areas covered are hardware control and configuration, software control and configuration, hardware and software repair, problem solving, maintenance, networking issues and control along with security protocol policies and practices. The areas of training also cover all six of the essentials examination and four of the practical examination of the national CompTIA A+ certification exam.

185 Directed Study - Electronics (1) CSU**285 Directed Study - Electronics** (2) CSU**385 Directed Study - Electronics** (3) CSU

CONFERENCE 1 HOUR PER WEEK PER UNIT.

The above courses allow student to pursue Directed Study in Electronics on a contract basis under the direction of a supervising instructor.

CREDIT LIMIT: A MAXIMUM OF 6 UNITS IN DIRECTED STUDY MAY BE TAKEN FOR CREDIT.

Engineering Graphics & Design (EGD TEK)**101 Engineering Graphics with Geometric Dimensioning and Tolerancing** (3) UC:CSU

Advisory: Mathematics 120.

LECTURE, 2 HOURS; LABORATORY, 2 HOURS.

This introductory course covers the fundamentals of traditional board drafting, descriptive geometry, orthographic projection, graphical communication of technical engineering information and Computer-Aided Drafting (CAD). Topics include freehand drawing, lettering, and theory of orthographic and multi-view projections. Basic drafting skills, industry standards and technical graphic practices, and engineering scales are presented. The theory of descriptive geometry is taught including the fundamentals of auxiliary views, coordinate systems, sectioning, dimensioning, lines, planes intersections, visibility, and development. Coordinate dimensioning and geometric dimensioning and tolerancing (GD&T) Subjects are covered including location tolerance, datum reference, tolerance symbols and feature control frames. An introduction to both 2-D and 3-D CAD, in two separate software packages is given CAD instruction includes drawing set up and settings, creating templates, title blocks, layers, drawing basic geometric objects, extrusion, dimensioning and creating basic engineering drawings such as part and assembly drawings as well as orthographic multi-view drawings.

111 2-D Computer-Aided Drafting with Autocad (2) UC:CSU

Corequisite: Engineering Graphics & Design 101.

LECTURE, 1 HOUR; LABORATORY, 2 HOURS.

This course is an introductory course in Two-Dimensional Computer-Aided Drafting using AutoCAD. Students learn the basic tools to create and edit a simple drawing. Topics include object construction, object properties, layers, orthographic projections, auxiliary views, parametric tools, basic dimensioning, template building, and plotting.

112 2-D Computer-Aided Drafting with Microstation (2) CSU

Corequisite: Engineering Graphics & Design 101.

LECTURE, 1 HOUR; LABORATORY, 2 HOURS.

This course is an introductory course in Two-Dimensional Computer-Aided Drafting using MicroStation. Students learn the basic tools to create and edit a simple drawing. Topics include object construction, object properties, layers, orthographic projections, auxiliary views, parametric tools, basic dimensioning, template building, and plotting.

121 3-D Computer-Aided Design with SolidWorks (2) CSU

Prerequisites: Engineering Graphics & Design 111 or 112.

LECTURE, 1 HOUR; LABORATORY, 2 HOURS.

This is an introductory course in Three-Dimensional Computer-Aided Design and solid modeling. Students learn the concept of creating parts by using features including extrusion, revolve, sweep and loft boss, base, and cut. Other topics covered include creating assemblies and making drawing files out of the solid model or the assembly, utilizing SolidWorks 3-D software.

122 3-D Computer-Aided Design with CATIA (2) CSU

Prerequisites: Engineering Graphics & Design 111 or 112.

LECTURE, 1 HOUR; LABORATORY, 2 HOURS.

This is an introductory course in Three-Dimensional Computer-Aided Design and solid modeling. Students learn the concept of creating parts by using features including extrusion, revolve, sweep and loft boss, base, and cut. Other topics covered include creating assemblies and making drawing files out of the solid model or the assembly, utilizing CATIA 3-D software.

131 CAD-Advanced Applications 3-D (1) CSU

Prerequisites: Engineering Graphics & Design 121 or 122.

LABORATORY, 3 HOURS.

This course builds on skills acquired in 2-D and 3-D CAD applications. The course explores advanced computer-aided design and drafting techniques using AutoCAD or MicroStation and SolidWorks or CATIA software. Assembly part modeling and surface modeling are covered. During these training programs, students acquire advanced skills in using a software and design techniques for 3-D structures in various examples toward design, manufacturing, and mechanical applications.

Engineering Support (ENG SUP)**121 Plane Surveying I** (3) UC:CSU

(Formerly Civil Engineering 121)

Prerequisite: Mathematics 241.

LECTURE, 2 HOURS; LABORATORY, 3 HOURS.

This is a beginning course in plane surveying. Topics include horizontal linear measurements using pacing, steel tape, stadia and electronic distance measurement (EDM); circuit and profile differential leveling; measurement of horizontal and vertical angles; computation of azimuth, bearing, latitude, departure and coordinates and area of a traverse; balancing a closed traverse using the compass rule and rotation adjustments of a closed traverse; and introduction to geographic information system (GIS) and global positioning system (GPS). Technical lectures also include topics pertaining to technical writing and presentations. An introductory topic in terrain modeling using Microstation and/or AutoCAD software is demonstrated and field work is also performed.

221 Plane Surveying II (3) UC:CSU

(Formerly Civil Engineering 221)

Prerequisites: Engineering Support 121 or Civil Engineering 121.

LECTURE, 2 HOURS; LABORATORY, 3 HOURS.

This is an advanced course in plane surveying. Topics include topographic survey, earthmoving quantity take-off, horizontal and vertical curves, construction staking, real property survey using electronic data measurement (EDM), application of global positioning system (GPS) and geographic information systems (GIS), and green surveys. Field work is performed.

224 Land Surveyor-In-Training (LSIT) (2)

Prerequisite: Engineering Support 221 or Civil Engineering 221.

LECTURE, 1 HOUR; LABORATORY, 3 HOURS.

Note: This course is offered on a PASS/NO PASS basis only.

This course prepares students for the State of California, Land Surveyor in Training (LSIT) certificate which is the first step required under California law towards becoming licensed as a Professional Land Surveyor.

225 Boundary Control for Surveyors (2) CSU

Prerequisite: Engineering Support 221 or Civil Engineering 221.

LECTURE, 1 HOUR; LABORATORY, 3 HOURS.

This is an advanced course in boundary control surveying. Topics include history and concept of boundary control surveys and the role of the surveyor; creation of boundary lines, description of real property, metes and bounds, and boundary law; Federal and State non-sectionalized land, easements, reversions, riparian, and littoral boundaries; theory of retracing and resurveying of sectionalized lands, locating sequential conveyances, simultaneously created boundaries, and locating combination descriptions.

General Engineering (ENG GEN)**101 Introduction to Science, Engineering and Technology** (2) UC:CSU

LECTURE, 1 HOUR; LABORATORY, 2 HOURS.

Note: This course is open to high school students for concurrent enrollment.

This course provides students with an understanding of the academic and professional behaviors and skills necessary to enhance their chances of success as an engineering major, and ultimately as a professional. The skills include working effectively in teams, goal setting, time management, and developing oral communication skills. Students are introduced to the campus resources available to the engineering majors. Students have an opportunity to work collaboratively with their classmates on most of the assignments and in-class design projects.

102 Engineering Problem Solving (2) CSU

Prerequisite: Mathematics 115.

LECTURE, 1 HOUR; LABORATORY, 3 HOURS.

Note: This course is highly recommended for Engineering students planning to take General Engineering 220 and General Engineering 225.

This is a basic course in engineering design and concepts, professional development skills for engineering, and usage of basic software tools such as Microsoft Office applications in engineering problem solving.

121 Programming for Engineers (3) UC:CSU

Prerequisites: Mathematics 261.

Advisory: General Engineering 102.

LECTURE, 2 HOURS; LABORATORY, 3 HOURS.

Note: This course is highly recommended for Engineering students planning to take General Engineering 220 and General Engineering 225.

This course applies structured programming concepts to engineering problem types such as center of mass, ballistics, column buckling, design, and reduction of experimental data. A structured approach is used with applications to flow charts and computer programming. Mathematical techniques include iterative solutions, bisection, Raphson-Newton, statistics, and matrix operations. Computer techniques include formatted input and output, selection, loops, functions, pointers, arrays, and objects. Concepts and techniques of Object Oriented Programming, structured design and modular construction, use of C++ or other high level languages to demonstrate fundamentals of Object Oriented Programming and structured programming are employed. Students use National Instruments Laboratory Virtual Engineering Workbench (LabVIEW) to demonstrate graphical programming environment.

131 Statics (3) UC:CSU

Prerequisites: Physics 1 and Mathematics 261.

LECTURE, 2 HOURS; DISCUSSION, 3 HOURS.

This is a first course in engineering mechanics. The course considers two- and three-dimensional analysis of force systems on particles and rigid bodies in equilibrium. Topics also include static analysis of trusses, beams and cables, determination of center of gravity, centroids, friction, and moments of inertia of area and mass.

151 Materials of Engineering (3) UC:CSU

Prerequisites: Chemistry 101 and Mathematics 261.

LECTURE, 3 HOURS.

This course is an introduction to materials science and engineering and different types of materials used in engineering design, emphasizing the relationships between structure, properties, and processing. Topics include: Atomic structure and bonding, atomic and ionic arrangements and imperfections, crystalline structures, metals, polymers, ceramics, composites including diffusion or atom and ion movements in materials, and mechanical properties and fracture including strain hardening and annealing. An illustration of the materials' fundamental differences and their application in engineering is also covered.

212 Introduction to Engineering Design (3) UC:CSU

Prerequisite: Engineering Graphics and Design 121 or 122.

Advisory: General Engineering 131.

LECTURE, 1 HOUR; LABORATORY, 4 HOURS.

This is an introductory course in Engineering Design covering the step-by-step design process. Students achieve basic Engineering Design Core competency through hands-on, team-based, open-ended design projects. The project work is enhanced with lectures and reading on design theory and methods, and introduction to manufacturing techniques-processes and prototype building.

220 Electrical Circuits I (4) UC:CSU

(Formerly Electrical Engineering 220)

Prerequisites: Mathematics 263 and Physics 3.

Corequisite: Mathematics 275.

Advisories: Electrical Engineering Technology 120, General Engineering 102 and General Engineering 121.

LECTURE, 3 HOURS; LABORATORY, 3 HOURS.

This course covers electric circuit analysis in time and frequency domains, transient, and steady state solutions. Topics include linear circuit analysis techniques, Kirchhoff's Laws, Network Theorems, mesh and nodal analysis, OP amps and amplifiers, Thevenin/Norton equivalents circuits, natural-forced-complete response of RLC circuits, AC circuits, phasors, three phase power, and frequency response and resonance. The laboratory includes experimental verification of the laws of AC and DC circuits, Kirchhoff's laws, and Thevenin's theorem using instruments such as multimeter, oscilloscopes, and signal generators.

221 Engineering Probability and Statistics (3) UC:CSU IGETC Area 2A

(UC Credit Limit: General Engineering 221 combined with Mathematics 227, maximum credit one course).

Prerequisite: Mathematics 261.

LECTURE, 3 HOURS.

This is an introductory course for calculations using probabilities and concepts in statistics with a focus on applications to engineering problems. It provides an introduction to fundamental concepts and applications of probability and statistics in engineering, with focus on how these concepts are used in experimental design and sampling, data analysis, risk and reliability analysis, and project design under uncertainty. Topics include basic probability concepts, random variables and analytical probability distributions, functions of random variables, estimating parameters from observational data, regression, hypothesis testing, and Bayesian concepts.

225 Digital Circuit Analysis (4) UC:CSU

(Formerly Electrical Engineering 225)

Prerequisites: Mathematics 262 and Physics 3.

Advisories: General Engineering 102, 121 and Electrical Engineering Technology 120.

LECTURE, 3 HOURS; LABORATORY, 3 HOURS.

This course is an introduction to digital circuit analysis. Topics covered include the following: Number systems, computer arithmetic, and binary codes; binary logic, Boolean algebra, and logic gates; combinational circuits, analysis and design, including adders, MUX's, decodes, etc.; and sequential circuits analysis and design. In the lab students design, implement, and debug a combinational circuit; and perform implementation of combinational circuits using logic gates and programmable logic devices and design sequential logic circuits using gates, ROMs, and PALs.

231 Dynamics (3) UC:CSU

Prerequisite: General Engineering 131.

LECTURE, 2 HOURS; DISCUSSION, 3 HOURS.

This course covers fundamentals of kinematics and kinetics of particles and rigid bodies. Topics include kinematics of particle motion, Newton's second law, work-energy and momentum methods, kinematics of planar and three-dimensional motions of rigid bodies, work-energy and momentum principles for rigid body motion, and an introduction to mechanical vibrations.

241 Strength of Materials (3) UC:CSU*Prerequisite: General Engineering 131.*

LECTURE, 2 HOURS; DISCUSSION, 3 HOURS.

In this course, students learn the application of mechanics to determine the effect of forces and torques on materials. Students apply this knowledge to the design of load bearing components. The course covers the following topics: Stress, strain, axial loading, torsion, flexural stresses, transverse shear stress, horizontal shear stresses, stress transformations, Mohr's circle, pressure vessels, shear and bending moment diagrams, stresses in a beam, methods of superposition, and elastic strain energy.

272 Economic Analysis for Engineers (3) UC:CSU*Prerequisite: Mathematics 261.**Advisory: General Engineering 131.*

LECTURE, 3 HOURS.

This course introduces techniques of engineering economic analysis as they apply to cost analysis in engineering projects. This course covers time value of money, cost optimization, incremental and rate of return analysis, involving probabilistic outcomes, capital depreciation, and the effect of corporate tax analysis in making decisions on engineering projects.

185 Directed Study - General Engineering (1) CSU**285 Directed Study - General Engineering** (2) CSU**385 Directed Study - General Engineering** (3) CSU

CONFERENCE 1 HOUR PER WEEK PER UNIT.

The above courses allow students to pursue Directed Study in General Engineering on a contract basis under the direction of a supervising instructor.

CREDIT LIMIT: A MAXIMUM OF 6 UNITS IN DIRECTED STUDY MAY BE TAKEN FOR CREDIT.

Note: UC Credit for variable topics courses in this discipline is given only after a review of the scope and content of the course by the enrolling UC campus. This usually occurs after transfer and may require recommendations from faculty. Information about internships may also be presented for review, but credit for internships rarely transfers to UC.

931 Cooperative Education – General Engineering (3) CSU

Note: Requires 15 to 19 hours per week; paid employment related to the occupational major and enrollment in at least 7 units (which include Co-op Ed).

This course offers advanced supervised training in an employment area that will enhance the student's educational goals.

941 Cooperative Education – General Engineering (4) CSU

Note: Requires 20 hours per week; paid employment related to the occupational major and enrollment in at least 7 units (which include Co-op Ed).

This course offers advanced supervised training in an employment area that will enhance the student's educational goals.

Industrial Technology (IND TEK)**103 Technical Writing and Communication** (2) CSU

LECTURE, 1 HOUR; LABORATORY, 2 HOURS.

This course introduces the principles and practices of writing a range of technical documents including emails, letters, technical evaluations and reports, and academic and scientific papers used in the engineering, science, and technology fields. The use of graphical information such as tables and charts are covered as well as technical resumes, letters, and instruction and operation manuals.

105 Industrial Print Reading (3) CSU*Prerequisite: General Engineering 212.*

LECTURE, 2 HOURS; LABORATORY, 2 HOURS.

This course covers the principles and practices of visualizing and interpreting engineering print drawings, by going over actual prints from various industries. The study of drawing types, symbology, drawing management and industry standards are taught. The course also covers the ASME Y14.5 standard for geometric dimensioning and tolerancing.

106 Applied Math for Technology (2)*Prerequisite: Mathematics 115.*

LECTURE, 1 HOUR; LABORATORY, 2 HOURS.

This course covers a practical application of basic math/algebra skills to typical industrial applications and problems. Topics include units of measure and conversions, reading tools of measurement, error analysis and error propagation, statistics and standard deviation, graphing techniques, including pie and bar charts, Pareto diagrams, statistical process control charts, and Venn diagrams, perimeter/area/volume analysis using plane and solid geometry, trigonometry, including right and oblique triangles, algebra, and arithmetic. Technical applications and problem-solving skills including the appropriate use of technology are emphasized.

Manufacturing and Industrial Technology (MIT)**201 Fundamentals of Manufacturing and Processes** (3) CSU*Prerequisite: Engineering Graphics and Design 121 or 122.**Advisory: General Engineering 151.*

LECTURE, 2.5 HOURS; LABORATORY, 2.5 HOURS.

This is an introductory course in manufacturing and manufacturing processes. This course exposes students with the fundamentals of manufacturing such as materials, mechanical properties, and processes involved in the industrial sector. Emphasis is given to processes which are more common in the industry such as, reverse engineering, rapid prototyping, plastics and composites, metal forming and generating tool paths, and casting. In addition to verbal understanding of the issues, mathematical models describing the processes of manufacturing are covered briefly in order for students to understand the relations between the parameters involved in the processes. In addition to theoretical knowledge, students are expected to gain practical experience by manufacturing sample parts in the lab.

220 Introduction to Robotics (3) CSU

LECTURE, 2 HOURS; LABORATORY, 2 HOURS.

This introductory course in robotics emphasizes hands-on experience to build a basic functional robot. Students learn about electric motors, servos, sensors, switches, actuators and their application in a robot. Students learn Basic Stamp computer programming and its integration into a working robotic unit. The course also includes mechanical assembly, connecting electronic components, wiring and soldering, and testing.