

CAREER EDUCATION DEPARTMENT

TECHNICAL OCCUPATIONS (FORMERLY KNOWN AS INDUSTRIAL ARTS) - COURSE OFFERINGS

ELECTRICITY/ELECTRONICS

IE-110-S	Video and Computer Game Technology
IE-212	Hobby Electronics
IE-213-S	Robotics Engineering & Design - New course offering (1/2 year course)
IE-215	College Engineering / Electronics 1 & Computer Repair
IE-315	College Engineering / Electronics 2
IE-415	College Engineering / Electronics 3

GRAPHIC DESIGN/COMMERCIAL ART

IE-230	Graphic Design/Commercial Art I
IE-340	Graphic Design/Commercial Art II
IE-420	Graphic Design/Commercial Art III
IE-520	Graphic Design/Commercial Art IV

WOODWORKING

IE-250	Woodworking I
IE-360	Woodworking II
IE-460	Woodworking III
IE-560	Woodworking IV (Carpentry & Construction)

TECHNOLOGY EDUCATION

TE-100 (S)	Technology Education I (1/2 year course)
TE-200	Technology Education II

TECHNICAL DRAFTING AND DESIGN (CAD)

Computer Aided Design

CAD is a four year program that will expose students to the world of architecture and engineering through hand and computer drafting and design. Students will begin with basic hand drafting procedures and move onto the computer to learn valuable techniques associated with the AutoCAD program. Some projects include: single and multi-view drawings, 3-D modeling, and commercial and residential design. At the conclusion of the program, students get the opportunity to become certified drafter through the American Drafting Design Association (ADDA).

TE-150	CAD I – Drafting and Design
TE-250	CAD II – Drafting and Design
TE-350	CAD III – Drafting and Design
TE-450 (A*)	CAD IV – Drafting and Design **

*This course is also offered as a two period class to those who qualify and scheduling permits.

** Students completing the four level course offerings are eligible to take the American Design Drafting

Association (ADDA) Certificate Exams.

Note: The above stated courses will incorporate and stress writing, thinking and studying skills in addition to the course descriptions below.

TECHNICAL OCCUPATIONS - COURSE OFFERINGS

ELECTRICITY - ELECTRONICS

IE-110-S Video and Computer Game Technology

Enrollment: 9,10,11,12

Prerequisite: None

This one semester course presents a historical perspective of the technological advancements in the electronic computer and video games that have become so popular today. Work begins with an investigation of the early use of electricity in electromechanical games and toys. The birth of the electronic age will be explored from the invention of the vacuum tube, through the development of the transistor and the integrated circuit. Computer/video game system components, their operation, and related terminology will be examined. Students will prepare written evaluations as they examine various systems or programs representing the progressive levels of development. Career awareness in the fields of electricity and electronics will also be developed.

IE-212 Hobby Electronics

Enrollment: 9 - 12

Prerequisite: None

This course is intended for the student who is interested in exploring the field of electronics, and would enjoy building electronic projects. Electrical fundamentals, circuit concepts, basic tools and test instruments will be examined through a variety of activities. Electronic symbols and parts identification, soldering and wiring techniques are skills that will be developed. Work will include building and testing various inexpensive electronic kits as purchased by the student.

Fundamental circuit types will be examined, and construction skills including schematic reading, component identification, breadboarding and various wiring methods will be investigated. Student purchased advanced kit construction, and prototype fabrication skills will be developed. Careers in the fields of electricity and electronics will also be explored.

IE-213 (S) Robotics Engineering & Design (1/2 year course)

Enrollment: 10, 11, 12

Prerequisite: IE212 **or** IE215 **or** IE240 or TE100 **or** instructor permission.

This full year course is intended for the student who is interested in learning of the technology and skills used in industrial robotics engineering and design. Machine technology, mechanical construction, and electrical control will be explored using a “hands-on” problem solving approach. Student teams will design devices/vehicles to meet the criteria of various design challenges. Skills in written reports, oral presentations, and engineering log books will be developed.

**The following courses are included in articulation agreements for advance credit with
Lincoln Tech & DeVry University**

IE-215 College Engineering / Electronics 1 & Computer Repair- DC Electronics

Enrollment: 10,11,12

Prerequisite: MA-100-AB Algebra I

This course is the first in a three year sequential program designed for the student who is planning to attend college or technical school for electronics engineering or technology. It assumes no prior knowledge of electricity or electronics, but enrolled students are expected to have successfully completed MA100AB, Algebra I. Electron theory, electrical units, resistor color code, and the characteristics of conductors and insulators will be covered. The use of resistors, potentiometers, and switches as controlling devices will be examined. Ohm's Law, the Power Law, and properties of series, parallel, and combination DC resistive circuits will be investigated. The use of mathematics to analyze circuits with standard network theorems will be presented. Soldering, wiring and fabrication skills will be developed through related project construction. Hands on lab work is used throughout the semester, as this is an essential component in the training of a competent engineer or technician. Through laboratory experimentation, the student will develop two important skills. These include the ability to use electronic components and test equipment, and the ability to prepare technical written documentation of laboratory efforts.

As semester 2 continues, students are expected to be able to use the concepts, laws, analytical and computational skills learned in IE215A College/Engineering Electronics 1 (DC Electronics). This course begins with an investigation of magnetism, electromagnetism, and the generation, measurement and characteristics of alternating current (AC). Lab work will include AC measurement, inductors, relays, transformer and capacitors. Inductors and capacitors will be examined under both DC and AC operating conditions. Students will learn how to set up and use the oscilloscope, audio frequency (AF) generator, and frequency counter. Soldering, wiring and fabrication skills will be developed through related project construction. Career awareness in the fields of electricity and electronics will also be developed.

IE-315 College Engineering / Electronics 2 - Electronic Devices

Enrollment: 11, 12

Prerequisites: IE-215

This course begins the second of a three year sequential program designed for the student who is planning to attend college or technical school for electronics engineering or technology. Students enrolled in this course must have successfully completed year one, IE215AB College/Engineering Electronics 1. The characteristics of active solid state components are investigated in this course. Semiconductor devices are introduced through an examination of physics and operating theory, electrical behavior, ratings and circuit applications. Lab work will include diode rectification, power supply circuits, bipolar transistor theory and amplifiers, and specialty devices such as silicon controlled rectifiers and junction field effect transistors. An introduction to integrated circuits, including operational amplifiers will be presented. Soldering, wiring and fabrication skills will be developed through related project construction.

As semester two of year two continues, students are expected to be able to use the concepts of integrated circuits learned in IE315A, College/Engineering Electronics 2 (Electronic Devices). This course presents a thorough introduction to digital logic circuits commonly found in computers and computer controlled equipment. Digital and analog systems are compared, and the binary number system is introduced. Basic logic gates, boolean expressions, truth tables, combinational logic circuits and flip-flops will be examined. Digital counters and shift registers will also be investigated. Soldering, wiring and fabrication skills will be developed through related project construction.

GRAPHIC DESIGN/ COMMERCIAL ART

IE-230 Graphic Design/Commercial Art I

This course is designed to help introduce the students into the world of design and communications. The course will help the student understand the role of graphic arts in our daily lives and network industries. This course introduces students into many aspects of the graphic communications fields through immersion in a curriculum which embraces new computer and other technologies while still emphasizing traditional skills. Safe and orderly lab practices and work habits will be emphasized. Students will become familiar with the skills and principles of layout and design, bindery, package design, computer graphics, sublimation printing, three dimensional model making, silks screening. This course will help the student become familiar with the role of graphic arts in their daily lives as well as network industries. This course builds upon the curriculum of Graphic Communications IE-230-Y. Students will continue advanced studies in the areas of layout and design, bindery, package design, sublimation printing, computer graphics, three dimensional model making, air brushing, engraving and thermal silk screening.

IE-340 Graphic Design/Commercial Art II

This course will help the student to further identify the broad role of the graphic arts industry. The student will become acquainted with the principles and practices of various graphic occupations and procedures. Safe and orderly lab routines and practices along with student work habits will be emphasized as the student receives instruction in layout and design, multi color screen printing, offset printing, plate making, computer graphics, digital photography and air brushing techniques.

This course will further help the student become aware of the daily impact that the graphic arts industry has in society. This course builds upon the curriculum of Graphic Communications IE-340-Y. Students will continue advanced studies in the areas of layout and design, multi screen printing, computerized plate making, offset printing, digital photography, computer graphics, digital photography, air brushing and thermal silk screening.

IE-420 Graphic Design/Commercial Art III

The purpose of this course is to help the student to further identify the broad scope of graphic arts industry and to become further acquainted with the skills, knowledge and work ethics associated within the various graphic arts professions. The students will receive instruction in multi color screen printing, computer graphics, digital photography, thermal silk screening and air brushing.

This course will help the student to further identify the broad scope of the graphic arts industry and its relationship to the economy. This course builds on the curriculum of graphic arts IE-420Y. Students will receive advanced instructions in multi silk-screening, computer graphics, digital photography air brushing and thermal silk screening.

IE-520 Graphic Design/Commercial Art IV

This advanced class offers continuing education in the areas of graphic designing, digital photography, computer graphics, silk screening, air brushing and the opportunity to participate in an internship and shadowing program that will provide the student with first hand experience into the graphics industry.

This class is designed to help the student to prepare for careers into the graphic arts industries by giving them the opportunity to work in the graphics industries via an internship or shadowing program. The student will also receive advanced studies in silk screening, air brushing and digital photography.

WOODWORKING

IE-250 Introduction to Woodworking

This course is intended as an introduction for the student who is interested in the field of woodworking technology. Woodworking fundamentals in design, drawing, bills of materials, reading plans, wood identification and lumber processing technology will be covered. Methods in the safe and proper use of basic hand tools and processes such as layout, measuring, boring, drilling, sawing, fastening and planning. Other processes covered will be in the use of abrasives, basic finishing techniques and basic safety in using handtools. Lab work will include the completion of two approved handtool projects. Class participation and laboratory maintenance will be stressed at all times.

This course is designed to introduce students to the basic power woodworking machinery. Fundamentals in the operation, parts, safety and maintenance of the tablesaw, jointer planer, bandsaw, scroll saw, drill press, lathe and disc and belt sanders. Portable power tools covered will be the orbital and belt sanders, routers and drills and their proper use and safety. Other processes covered will include basic wood jointing, edge to edge gluing and clamping, use of a doweling jig and screwmates for wood plugs. Class participation and laboratory maintenance will be stressed at all times.

IE-360 Woodworking II - Advanced Machine Woodworking

Prerequisite: IE-250

This course is intended to develop a deeper understanding of the proper use and safety involved with woodworking stationary and portable power tools in the construction of an advanced wood jointing used in the furniture making industry. Frame construction, door construction, drawer and drawer glides and associated hardware will be covered.

Develop a deeper understanding of wood and wood by-products, technological advancements in the use of wood and the proficiency in the cabinet-making industry.

This course is intended to review and explore more advanced techniques, methods and technologies in the woodworking industry. A deeper understanding of wood identification and the lumber industry, wood veneers, laminating and wood bending, finishing materials and techniques used in the furniture and cabinet making industry. Lab work will include an approved project design, project programming for the computerized lathe and the finishing method of required project.

IE-460 Woodworking III - Woodworking for the Craftsman

Prerequisite: IE-360

This course is intended to require the student to direct his/her energies toward acquiring the maximum amount of skill, craftsmanship and knowledge in the furniture and cabinet-making industry. The latest techniques and construction methods in cabinet and furniture making, design and furniture productions and the latest technological advancements in cabinet and furniture making will be included. The operation, and safe use of the woodworking lathe will also be covered in this course. Lab work will include the construction of one approved project to challenge the craftsmanship of the individual student.

This course is intended for the student who has successfully completed the previous courses of study. Research will be done in the following technological areas: footings and foundations, framing floors, walls and ceilings, roof framing and roofing, windows, exterior doors and trim, interior finish, post-and-beam and prefabricated construction. Lab work will include the construction of one approved sectional or complete scale model of residential house framing incorporating topics covered.

IE-560 Woodworking IV - Carpentry & Construction

Prerequisite: IE-460

This course is intended for students who have successfully completed IE-460. Semester one begins with the reading of survey and blueprint plans. The use of related tools in the layout and construction of footings and foundations will be examined. Students will experience the framing of sill plates, beams or girders, floor joists, subfloor, and wall studs. Headers in windows and doorways will be covered. On site safety will be stressed at all times.

Semester two continues with an investigation of portable equipment used in the carpentry trade. Use of a framing square in the layout of stair stringers, railings and building codes will be presented. This technology will be

incorporated in a model deck construction project. Careers in the carpentry industry will be explored. The role of a sub-contractor will also be covered. On site safety will be stressed at all times.

Technology Education

Technology Education Course Offering *Enrollment: Grades 9-12

*Twelfth grade students will be considered for acceptance in the first year of vocational programs based upon guidance counselor recommendations and teacher interviews.

This is a single period sequential two semester course that is designed for students who are thinking about careers in engineering, designing, and other technical areas.

Students in this program will utilize a problem solving approach to explore topics such as; technological resources, design solutions, processing resources, technological systems, electronics and computers, communication systems, production systems, transportation systems, biotechnical systems, controlling the system, and the impacts and outlooks of technology.

Students will be exposed to hands on technology learning activities as well as resources such as the course text, teacher generated handouts, video presentations, guest lecturers, satellite hook-ups via satellite communication dish, and field trips when possible. Students may also compete in the "Tech Meet" competition which is held annually for students in technology programs.

ENROLLMENT: 9 - 12, 9th grade students will be considered for acceptance based upon review of application and/or teacher interview.

12th grade students will be considered for acceptance into the program based upon space availability.

TE-100 (S) TECHNOLOGY EDUCATION I (1/2 year course)

Enrollment: 9 - 12

Prerequisites: None

This course is intended for the technically oriented student who enjoys utilizing a problem solving approach to explore various areas of technology. Students will be exposed to technology learning activities to enhance their practical experience in the design process.

TE-200 TECHNOLOGY EDUCATION II

Enrollment: 10 - 12

Prerequisites: TE-100

This course is intended for the student considering a career in engineering, architecture, or any other design field. Students must successfully complete T.E. 100. Students will work at their own pace to research and design solutions to technological problems presented in this course. Students will build their solutions using a variety of techniques and materials.

TECHNICAL DRAFTING AND DESIGN (CAD)

TE 150 - DRAFTING AND DESIGN – CAD I

Enrollment: 9 – 12

DRAFTING AND DESIGN – CAD I introduces the student to the equipment, standards and language of the drafting industry. Students will be introduced to basic drawing board procedures and then the computer for drafting and design purposes. The student will become familiar with Windows operating systems, the program itself (AutoCAD), directories, keyboard, disks, menus, files, construction and problem solving. The program is designed to give the students the skills both in drawing board theory and the computer to solve drafting and design related problems and to produce accurate working drawings.

Areas of concentration include: single view drawings, geometric constructions, orthographic projection, dimensioning and pictorial drawings.

COURSE REQUIREMENTS:

DRAFTING AND DESIGN – CAD I is a hands on course offering where class participation plays a major roll in evaluation. After introduction to an area of concentration through lecture and demonstration, the student will enhance the skill by repeat demonstration on the computer using appropriate procedures and techniques. Drawing projects, homework, tests/quizzes and class performance are the rubric for evaluation. A final exam in conjunction with the listed evaluation will determine the student's overall grade.

TE 250 – FULL YEAR COURSE OFFERING

COURSE: DRAFTING AND DESIGN – CAD II

GRADES 10 - 12

PRE-REQUISITE: DRAFTING AND DESIGN I – CAD I

COURSE DESCRIPTION:

DRAFTING AND DESIGN – CAD II enhances the skills learned during the first level offering and continues the study in the use of the computer with attention to more challenging projects and the fine points of drafting standards. Instruction in: advanced orthographic projection and dimensioning, sectional views, auxiliary views, revolutions, threads and fasteners, developments and intersections, advanced pictorials and an introduction to architectural drafting will be explored.

COURSE REQUIREMENTS

DRAFTING AND DESIGN – CAD II is a hands on course offering where class participation plays a major roll in evaluation. After introduction to an area of concentration through lecture and demonstration, the student will enhance the skill by repeat demonstration on the computer using appropriate procedures and techniques. Drawing projects, homework, tests/quizzes and class performance are the matrix for evaluation. A final exam in conjunction with the listed evaluation will determine the student's overall grade.

TE 350 – FULL YEAR COURSE OFFERING

COURSE: DRAFTING AND DESIGN – CAD III

GRADES 11 – 12

PRE-REQUISITE: DRAFTING & DESIGN – CAD I & DRAFTING & DESIGN – CAD II

COURSE DESCRIPTION:

After a brief introduction to architecture in the second level course, the student will enhance skills required to develop and produce a set of working drawings for a single family residential structure. The student will be introduced to the construction industry, building techniques and blue print reading.

Development of a set of plans that include: sectional plans, foundation and floor plans, elevations, dimensioning and electrical plans, a plot plan, window and door schedules, perspective rendering and a variety of detail drawings will be completed. The experience will culminate in the construction of a scale model of the students design.

COURSE REQUIREMENTS

DRAFTING AND DESIGN – CAD III ARCHITECTURE AND ADVANCED TECHNICAL DESIGN is hands on course offering where class participation plays a major roll in evaluation. After introduction to an area of

concentration through lecture and demonstration, the student will enhance the skill by repeat demonstration on the computer using appropriate procedures and techniques. Drawing projects, homework, tests/quizzes and class performance are the matrix for evaluation. A final exam in conjunction with the listed evaluation will determine the student's overall grade.

TE 450 – FULL YEAR COURSE OFFERING

COURSE: DRAFTING AND DESIGN – CAD IV

PRE-REQUISITE: DRAFTING AND DESIGN – CAD I
DRAFTING AND DESIGN – CAD II
DRAFTING AND DESIGN – CAD III

COURSE DESCRIPTION:

Students will develop and enhance their drawing and computer skills under supervised independent study in three major areas: machine drafting, architecture and/or design and problem solving. Students will work independently to design, research, and complete assigned projects individually or in groups.

COURSE REQUIREMENTS

DRAFTING AND DESIGN – CAD IV is a hands on course offering where class participation plays a major roll in evaluation. After introduction to an area of concentration through lecture and demonstration, the student will enhance the skill by repeat demonstration on the computer using appropriate procedures and techniques. Drawing projects, homework, tests/quizzes and class performance are the matrix for evaluation. A final exam in conjunction with the listed evaluation will determine the student's overall grade.

Students completing the four level course offerings are eligible to take the two American Design Drafting Association (ADDA) Drafter Certification Exams, Mechanical Drafting and Architecture.

DRAFTER CERTIFICATION is an international program that allows drafters to show their knowledge in drafting concepts and internationally recognized standards and practices. ADDA developed the tests to evaluate the professions standards. Certification enables drafters to demonstrate professional capabilities and helps employers in identifying quality employees.

****This course offering will be offered as a two period class to those who qualify and scheduling permits.