

Information Technology

ADMISSION REQUIREMENTS:

The Department Computer Science has formally adopted the following standards for admission to all options of the Information Technology major:

1. Minimum cumulative GPA of 2.5 at the time of admission to the major.
2. At least 13 credits of TECH courses with a grade of "C" or better in each and these credits must have been taken at Kean University.

B.S. DEGREE INFORMATION TECHNOLOGY

Information technology majors are prepared to think critically and creatively to succeed in challenging careers in information technology or pursue graduate degrees by using current technical concepts to analyze users needs and integrate IT-based solutions for the changing technological and social environments in a global economy. Curriculum objectives include the design, development, implementation, support and management of computer-based information technology, including network design, development, and management; interactive multimedia, new media, digital media application development; computer and video game development; net-centric computing and security; and Web system management.

For information regarding College/program mission and student learning outcomes please see <http://www.kean.edu/KU/CNAHS-Mission-and-SLOs>

GENERAL EDUCATION 35

FOUNDATIONS REQUIREMENTS 13

GE 1000	Transition to Kean ¹	1
OR		
GE 3000	Transfer Transitions ¹	1
ENG 1030	College Composition	3
MATH 1000	Algebra for College Students #	3
COMM 1402	Speech Communication	3
GE 2024	Research and Technology	3

DISCIPLINARY/INTERDISCIPLINARY DISTRIBUTION REQUIREMENTS

Humanities		6
*ENG 2403	World Literature (Select one course from below)	3
Fine Arts or Art History		3
Philosophy or Religion		3
Foreign Languages		3
Music or Theatre		3
Interdisciplinary Social Sciences		6
*HIST 1062	Worlds of History (Select one course from below)	3
Psychology		3
Economics or Geography		3
Political Science		3
Sociology or Anthropology		3

Interdisciplinary Science & Mathematics		3
*MATH 1054	Precalculus ##	3
Lab Science I (Bio/Chem/Phy)		4

G.E. AND MAJOR CAPSTONE

TECH 4513	Senior Project Seminar in Technology	3
-----------	--------------------------------------	---

ADDITIONAL REQUIREMENTS*** 26

MATH 2110	Discrete Structures	3
MATH 2526	Applied Statistics	3
CPS 1231	Fund. of Computer Science**	4
CPS 2231	Comp Org. & Prog.	4
CPS 2240	IT Data Structures	3
CPS 3498	Computer Security	3
MGS 3030	Human Resource Mgmt	3
COMM 2405	Public Speaking	3

INFORMATION TECHNOLOGY MAJOR*** 44

MAJOR CORE REQUIREMENTS 13

TECH 1010	Information Technology Foundations	3
TECH 1500	Data Comm. Technology	4
TECH 2900	Preparation Tech Docs (WE)	3
TECH 2920	Computers in Tech	3

MAJOR CONCENTRATION REQUIREMENTS 9

TECH 2504	Digital Circuits & Systems	4
TECH 2740	Database Concepts and Applications	3
TECH 2925	Web Client-Side Programming	3
TECH 3520	Networking Essentials	3
TECH 3525	Unix/Linux OS	3
TECH 3910	IT Project Mgmt	3

MAJOR ELECTIVES 12

12 credits in technology at the 3000 level or above selected with approval of departmental advisor.

FREE ELECTIVES 19

(50% of free electives must be taken at the 3000-4000 level)
(ID 1400 Computing in Modern Society for 3 credits is recommended if Math 1000 is needed)
*MGS 2020 is a pre-req for MGS 3030

TOTAL 124

Note on Free Electives
Tech Cooperative Education may be counted as a free elective (no more than 6 S.H.).
¹ University Requirement for Graduation for all undergraduate students that must be satisfied in one of two ways: Complete GE 1000 (all freshmen and transfers entering with 0-29 credits) OR GE 3000 (transfers entering with 30 credits or more).
Students eligible to take MATH 1054 Precalculus based on their placement test may take that course in place of MATH 1000 and

take an additional three credits in Free Electives to total 124 S.H.

Students eligible to take MATH 2415 Calculus I based on their placement test may take that course in place of Math 1054. In that case, MATH 2415 will fulfill the Distribution requirement and the student may take an additional three credits in Free Electives to total 124 S.H.

* General Education Required

** Students who have had prior programming experience may enter CPS 2231 directly. In this case, CPS 2231 will be counted as the general education requirement and the student may take another 4 credits in Major Electives to total 124 S.H.

***All major courses, additional requirements and concentration courses, including the capstone, require a grade of C or better.

MINOR IN INFORMATION TECHNOLOGY†

TOTAL CREDITS IN INFORMATION TECHNOLOGY 18

MINOR REQUIRED COURSES 6

TECH 1010	Information Technology Foundations	3
TECH 2925	Web Client-Side Programming	3

INFORMATION TECHNOLOGY ELECTIVES 12

2 technology courses at the 2000 level or above.
2 technology courses at the 3000 level or above.

SUPPORTING COURSES 14

CPS 1231	Fundamentals of Computer Science	4
CPS 2231	Computer Organization and Programming	4
*MATH 1000	College Algebra	3
*MATH 1054	Precalculus	3

*Waived for students who have completed the equivalent of this course in high school.

*ID1400 accepted for Math Education Majors
†All minor required courses, TECH electives and supporting courses, require a grade of C or better.

TECHNOLOGY COURSES

TECH 1010 Information Technology Foundations (3)

Fundamental concepts, skills, and capabilities of information technology; human-computer interface; the basics of networking; the world wide web; digitizing information and multimedia; principles of computer operation; privacy and digital security; database fundamentals; computational thinking fundamentals. (E)
Prerequisite: None.
Co-requisite: Math 1000 or equivalent.

- TECH 1100 Technology Systems (3)**
Explores the systems approach to Technology using the input, process, output, feedback and control model. Problem analysis and solution activities will investigate materials, processes, resources, organizations, and products as they apply to the subsystems of construction, manufacturing, communication, and energy/power/ transportation. (AN)
- TECH 1500 Data Communications Technology (4)**
This course will cover a broad range of technical topics from the nature of data and data transmission systems to protocols and data networks. Hands-on laboratory experiences will be a major component of this course. (E)
Prerequisite: Math 1000 or equivalent.
- TECH 2410 Computer Animation (3)**
The detailed study of complex solids modeling, parametric design, animation of objects and mechanisms in virtual space. (AN)
Prerequisite: TECH 1010 or CPS 1231.
- TECH 2504 Digital Circuits and Systems (4)**
A study of digital circuits and systems. Introduces number system and Boolean Algebra topics. Digital circuits and systems are designed and analyzed. Topics covered are: logic gates, Flip-Flops, registers, counters, memories, synchronous and asynchronous sequential networks, state machines. The design of combinational logic networks sequential machines will be the primary focus of this course. Special emphasis will be placed on techniques essential to the design of state machines. (E)
Prerequisite: TECH 1500.
- TECH 2740 Database Concepts and Applications (3)**
Fundamental concepts and standards for database management systems; database design; database implementation; storage and performance considerations; application of database management systems. (SP)
Prerequisite: CPS 2231.
- TECH 2900 Preparation of Technical Documents (3)**
Writing experience for technical/business related fields. Content will include instruction and experience in writing resumes, frequently used communications, technical reports and specifications. (FA)
Prerequisite: ENG 1030.
Writing Emphasis Course
- TECH 2920 Computers Systems (3)**
An introductory course covering the operational characteristics of modern computing systems and their applications. Computer systems and architecture are examined, particularly operating systems. (SP)
Prerequisites: CPS 1231.
- TECH 2925 Web Client-Side Programming (3)**
Fundamental concepts and standards for web client-side development. Design and development of client-side web pages using eXtensible Hypertext Markup Language (XHTML), Javascript, Cascading Style Sheets (CSS), Document Object Model (DOM), Asynchronous Javascript and XML (AJAX) and web browsers. (FA)
Prerequisite: CPS 2231.
- TECH 3200 Design Fundamentals (3)**
An investigation of the basic aspects and the traditional concepts of design and of their implication to contemporary design. (AN)
Prerequisite: CPS 2231
- TECH 3220 Computer Aided Design I (3)**
This course presents a comprehensive introduction to methods and applications of computer aided design systems. Emphasis is placed in the use of CAD hardware and software for automating the design processes and implementing the CAD into planning, costing, database design, productivity and automated production. (AN)
Prerequisite: TECH 1010.
- TECH 3230 Computer Aided Design II (3)**
This course presents advanced techniques using computer aided design software on a micro-based system. Emphasis is placed on menu macros, customizing for 3-D, script files, and an introduction to AutoLISP programming. (AN)
Prerequisite: TECH 3220.
- TECH 3250 Advanced CAD (3)**
This course presents a comprehensive introduction to the methods and applications of surface, wire and solids modeling using 2D as well as 3D CAD software. Emphasis is placed in the use of the newly emerging expert systems approach to CAD through applications of artificial intelligence and automated design generation Techniques. (AN)
Prerequisite: TECH 3220.
- TECH 3510 Microprocessors (4)**
An introduction to 16-bit microprocessor architecture with special emphasis upon the Intel 8086/88 microprocessor family. Assembly language programming, design and interfacing techniques will be covered. (AN)
Prerequisite: TECH 2504.
- TECH 3520 Networking Essentials (3)**
The function and structure of networking communication protocols, TCP/IP architecture, operational characteristics and design of Local Area Networks (LANs) and Wide Area Networks (WANs), and the operation and purpose of internetworking devices will be covered in this course. (SP)
Prerequisites: TECH 2920 and CPS 2231.
- TECH 3525 Unix/Linux Operating Systems (3)**
Introduction to UNIX or Linux operating systems. Emphasis on hand-on laboratory assignments, which reinforce classroom lectures. (FA)
Prerequisites: CPS 2231 and TECH 2920.
- TECH 3601 New Media Programming I (3)**
Fundamental concepts and standards for new media development; design and implementation processes; navigational strategies; time-driven and event-driven models of interaction; incorporating graphics, text, video, sound, animation and interactivity. (SP)
Prerequisites: TECH 2925 or CPS 3250.
- TECH 3602 New Media Programming II (3)**
Advanced concepts for new media development; advanced programming constructs; XML and database integration; custom component design and development; security. (FA)
Prerequisites: TECH 2740 (or CPS 3740) and TECH 3601.
- TECH 3640 Virtual and Augmented Reality (3)**
Fundamental concepts of virtual reality (VR) and augmented reality (AR) technologies; hardware devices and software tools; building virtual worlds. (AN)
Prerequisite: CPS 2231.
- TECH 3650 Game Design and Development (3)**
Fundamental concepts related to computer/video game design and development; hardware devices and software tools of game development; game industry; mathematics, physics, and psychology of games; game engines, graphics, rendering, modeling, and the user interface of games. (AN)
Prerequisite: CPS 2231
- TECH 3910 IT Project Management (3)**
Practical approaches to managing information technology projects. Topics include IT project management context, life cycles, scope, time, cost, sizing, planning, scheduling, quality, risk, analysis, communications, procurement and current issues in information systems project management. (SP)
Prerequisite: TECH 3525.
- TECH 4181 Independent Study in Industrial Education (3)**
Industrial Education majors are given the opportunity to develop independent projects or research studies in their field. Each student is expected to initiate an independent program of study under the close supervision of a faculty member. Student is responsible for the plan of work, its accomplishment and suitable presentation at completion of course. Hours to be arranged by student and instructor; study shall involve a minimum of 135 clock hours of classroom and/or laboratory work. Enrollment is by permission of advising faculty member and in compliance with University policy concerning independent study. (AN)
- TECH 4182 Independent Study in Industrial Education II (3)**
A continuation of TECH 4181. (AN)
- TECH 4425 CIM Programming and Database (3)**
Application of modern object oriented computer programming and database management Techniques in solving computer integrated design and manufacturing. Development of user interfaces, algorithms, database management using standard relational databases and interface to World Wide Web/Internet/ Intranet. (AN)
Prerequisites: TECH 2740.
- TECH 4440 Robotics Programming (3)**
Comprehensive study of robotics technology and application of industrial robots. Students are introduced to different robotics programming methodologies. Motion planning, simulation, and experimental projects are essential components of the course work. (FA)
Prerequisite: TECH 2504, TECH 3525 and CPS 2231.

**TECH 4513 Senior Project Seminar
in Technology (3)**

Students will utilize appropriate research, analysis and design tools required to solve a technical problem related to their major technical area of (networking, electronics, telecommunications, etc.). The major intent of this course is to provide the students with the opportunity to synthesize what they have learned in all their technical courses, and solve a timely "real world" problem. Students will produce a working model or prototype of their solution to the technical problem. (SP)

Prerequisites: Completion of 30 semester hours in Technology at the 2000 level or above.

TECH 4524 Switches and Routers (3)

This course enhances the learner's theoretical and practical knowledge of the use of switches and routers in local area networks. Hands-on practical experiences will be emphasized throughout this course. (2 hr. lec./2 hr. lab). (FA)

Prerequisite: TECH 3520.

TECH 4525 Digital Signal Processing (3)

A practical approach to the analysis and design of infinite impulse response, finite impulse response, continuous time, linear, and time invariant filters. Laboratory experimentation and computer simulation of digital filters will be emphasized. (AN)

Prerequisites: TECH 2920.

**TECH 4527 System and Network
Administration (3)**

Designed to provide student with classroom and laboratory experiences covering the configuration and management of network client and servers. Student will set up operational Windows and UNIX/Linux computer networks (2 hr. lec./2 hr. lab). (SP)

Prerequisite: TECH 3520 and TECH 3525.

**TECH 4881, 4882 or 4883
Independent Study in
Information Technology (3)**

Advanced topics in Information Technology which are not available in courses offered during the semester. An independent course of study is developed by the student under the direction of a faculty member in the department; an independent study contract is used. May be repeated up to three times; can be used as a major elective. (AN)

Prerequisite: Permission of instructor.

**TECH 4980,4981,4982 Special Topics in
Information Technology (3)**

Research study of areas in information technology influenced by contemporary developments as well as interests and needs of students majoring in information technology. A maximum of nine semester hours may be taken in this area towards major electives. (AN)

Prerequisite:Permission of instructor.

**TECH 4996, 4997, 4998, and 4999
Cooperative Education in
Information Technology (3)**

An opportunity for students majoring in Technology or Industrial Technology to obtain supervised work experience related to their major area of specialization. (E)

Prerequisites: Sophomore standing; 2.5 average in the major; completion of 12 semester hours in major specialization requirements which must include 3 semester hours of study related to the proposed work experience.

Limitations on assignment: Department approval.

Departmental elective for Information Technology majors.

INFORMATION TECHNOLOGY

**ID 1400 Computing
in Modern Society (3)**

Fundamental computing concepts, technology and skills used in modern society; problem abstraction and design principles; data and information representation; algorithm concepts; introduction to a programming language. (AN)