Approved Experiential Essay Topics

General Education

Essay topics should be selected based off of personal or professional experience and the needs of the student program. Students should contact an academic advisor to determine program needs.

Possible Course Duplication - This identifies possible course duplication between the essay topic and other coursework. The essay descriptions listed below could duplicate the courses indicated and/or any other coursework required or completed. Please contact your AC or plac@phoenix.edu to verify there is no duplication with your chosen topic before writing an essay.

Possible Supporting Documentation - This section identifies possible or recommended supporting documentation for the chosen topic. This is to assist students in choosing appropriate documentation. It is not all inclusive. If you are unable to provide the possible supporting documentation identified please contact PLA customer service to discuss other options for appropriate documentation.

Table of Contents

Lower Division Topics

Upper Division Topics

Data Communication Systems	3 UD	Science/ Technology
Database Systems	3 UD	Science/ Technology
Development and Application of Management Information Systems	3 UD	Science/ Technology
Digital System Design and Application	3 UD	Science/ Technology
Electric Power Distribution	3 UD	Science/ Technology
Electric Power Plants	3 UD	Science/ Technology
Electrical Communication Systems	3 UD	Science/ Technology
Electrical Engineering Laboratory	3 UD	Science/ Technology
Electronic Instrumentation	3 UD	Science/ Technology
Introduction to Computer Operating Systems	3 UD	Science/ Technology
Introduction to Principles of Artificial Intelligence	3 UD	Science/ Technology
Manufacturing Engineering	3 UD	Science/ Technology
Microcomputer System Design	3 UD	Science/ Technology
Noise in Electrical Communications	3 UD	Science/ Technology
Nuclear Power Systems Environmental Analysis	3 UD	Science/ Technology
Operating Systems	3 UD	Science/ Technology
Propagation of Electromagnetic Waves in Space	3 UD	Science/ Technology
Semiconductor Special Circuits	3 UD	Science/ Technology
Solar Energy Systems	3 UD	Science/ Technology
Structural Engineering	3 UD	Science/ Technology
Systems Analysis, Design and Implementation	3 UD	Science/ Technology
Systems Programming	3 UD	Science/ Technology

Lower Division Topics

Course Title	Credit Award	General Education
Active Circuits & Devices	**3 LD**	**Science/ Technology**

Course Description

Theory, characteristics and applications of semiconductor devices. The following subtopics are to be addressed:

Subtopic 1:	thin film device design concepts
Subtopic 2:	integrated circuit design concepts
Subtopic 3:	solid state devices
Subtopic 4:	metallic oxide semiconductors
Subtopic 5:	gallium arsenic devices
Subtopic 6:	controlled rectifiers, etc.

Possible Course Duplication

This course may duplicate courses of similar content.

Possible Documentation

Professional letter, 2 or more personal letters, or certificate of completion for course of similar content

Course Title	Credit Award	General Education
Electronic Measurements	**3 LD**	**Science/ Technology**

Course Description	
The measurement of human and environmental characteristics. The following subtopics are to be addressed:	
Subtopic 1:	theory of operation of instruments
Subtopic 2:	temperature and atmospheric pressure
Subtopic 3:	humidity
Subtopic 4:	gas-presence
Subtopic 5:	radiation
Subtopic 6:	cardiac responses

Possible Course Duplication
This course may duplicate courses of similar content.

Possible Documentation
Professional letter, 2 or more personal letters, or certificate of completion for course of similar content

Course Title	Credit Award	General Education
Engineering Drawing	**3 LD**	**Science/ Technology**

Course Description	
Modern Engineering Mechanical Drawing practices and standards. The following subtopics are to be addressed:	
Subtopic 1:	dimensioning
Subtopic 2:	exploded views and assembly spatial visualization
Subtopic 3:	orthographic projection
Subtopic 4:	other techniques of descriptive geometry
Subtopic 5:	computer aided drawing
Subtopic 6:	computer aided design and manufacturing

Possible Course Duplication
This course may duplicate courses of similar content.

Possible Documentation
Professional letter, 2 or more personal letters, or certificate of completion for course of similar content

Course Title	Credit Award	General Education
Passive Circuits and Components	**3 LD**	**Science/ Technology**

Course Description	
An examination of the inherent characteristics and functions of passive components in direct current and alternating current circuits. Utilization of resistance and reactance concepts.The following subtopics are to be addressed:	
Subtopic 1:	basic components – capacitors, resistors, inductors, etc.
Subtopic 2:	Ohm's Law
Subtopic 3:	Kirchoff's Laws
Subtopic 4:	Thevenin's and Norton's Theorems
Subtopic 5:	The Supperposition Theorem
Subtopic 6:	practical examples of resonance, impedance matching and filters

Possible Course Duplication
This course may duplicate courses of similar content.

Possible Documentation
Professional letter, 2 or more personal letters, or certificate of completion for course of similar content

Course Title	Credit Award	General Education
Semiconductor Analog Amplifiers	**3 LD**	**Science/ Technology**

Course Description	
Theory of operation of small signal amplifiers and of Class A, B, and C power amplifiers. The following subtopics are to be addressed:	
Subtopic 1:	equivalent circuits and mathematical methods of circuit analysis
Subtopic 2:	transistor curves and graphical methods of circuit analysis
Subtopic 3:	inherent characteristics and practical applications of common-emitter, common-base and common-collector amplifiers
Subtopic 4:	frequency response
Subtopic 5:	bandwidth in audio, intermediate frequency and radio frequency amplifiers
Subtopic 6:	feedback in audio, intermediate frequency and radio frequency amplifiers

Possible Course Duplication
This course may duplicate courses of similar content.

Possible Documentation
Professional letter, 2 or more personal letters, or certificate of completion for course of similar content

Course Title	Credit Award	General Education
Semiconductor Digital Electronics	**3 LD**	**Science/ Technology**

Course Description	
Digital Circuit Design.The following subtopics are to be addressed:	
Subtopic 1:	Boolean algebra
Subtopic 2:	Analyze Computer bus principles, transmission lines
Subtopic 3:	Digital number systems
Subtopic 4:	Decimal-binary conversion
Subtopic 5:	Binary Logic Gates: e.g., AND, OR, INVERTER, NAND, NOR, TTL, etc.
Subtopic 6:	Theory and application of digital circuits; e.g., flip-flops, counters, shift registers, arithmetic circuits, memories, etc.

Possible Course Duplication
This course may duplicate courses of similar content.

Possible Documentation
Professional letter, 2 or more personal letters, or certificate of completion for course of similar content

Upper Division Topics		
Course Title	Credit Award	General Education
Aerospace Engineering	**3 UD**	**Science/ Technology**

Course Description	
Theory and application of aerodynamics to atmospheric flight vehicles and to interplanetary space flight vehicles. The following subtopics are to be addressed:	
Subtopic 1:	supersonic flight theory in mach 2+ environments
Subtopic 2:	gravitational principles and orbital atmospheres
Subtopic 3:	unique terrestrial-solar-planetary phenomena; e.g., Van Allen belts, solar winds, geosynchronous orbits, etc
Subtopic 4:	the effect of the above on flight vehicle design
Subtopic 5:	safety considerations
Subtopic 6:	human factors considerations

Possible Course Duplication
This course may duplicate courses of similar content.

Possible Documentation
Professional letter, 2 or more personal letters, or certificate of completion for course of similar content

Course Title	Credit Award	General Education
Applications of Antenna Theory	**3 UD**	**Science/ Technology**

Course Description	
Principles of electromagnetic wave radiation and reflection. The following subtopics are to be addressed:	
Subtopic 1:	dipoles
Subtopic 2:	reflectors
Subtopic 3:	wave guides: including the theory and design of apertures
Subtopic 4:	mechanical and electronic scanning
Subtopic 5:	antenna pattern calculation and measurement
Subtopic 6:	applications in radio, radar, television and navigation systems

Possible Course Duplication
This course may duplicate courses of similar content.

Possible Documentation
Professional letter, 2 or more personal letters, or certificate of completion for course of similar content

Course Title	Credit Award	General Education
Applications of Artificial Intelligence	**3 UD**	**Science/ Technology**

Course Description	
The inference processes used for reasoning using symbolic knowledge. The following subtopics are to be addressed:	
Subtopic 1:	knowledge representation
Subtopic 2:	natural language comprehension
Subtopic 3:	game playing
Subtopic 4:	rule based systems
Subtopic 5:	robotics
Subtopic 6:	selection of hardware and software for AI applications

Possible Course Duplication
This course may duplicate courses of similar content.

Possible Documentation
Professional letter, 2 or more personal letters, or certificate of completion for course of similar content

Course Title	Credit Award	General Education
Applications of Electromagnetic Fields	**3 UD**	**Science/ Technology**

Course Description	
General applications in electromagnetic communication. The following subtopics are to be addressed:	
Subtopic 1:	Maxwell's equations in transmission lines and Wave Guides
Subtopic 2:	Maxwell's equations as they apply to fiber optics
Subtopic 3:	Maxwell's equations as applied to propagation in space
Subtopic 4:	impedance matching and power losses
Subtopic 5:	microwave components and systems
Subtopic 6:	measuring devices and techniques
Possible Course Duplication	
This course may duplicate courses of similar content.	
Possible Documentation	
Professional letter, 2 or more personal letters, or certificate of completion for course of similar content	

Course Title	Credit Award	General Education
Applications of Fluid Mechanics	**3 UD**	**Science/ Technology**

Course Description	
Applications of the laws governing fluids and gases in hydraulic and pneumatic devices used in industrial, aerospace and naval systems. The following subtopics are to be addressed:	
Subtopic 1:	pumps
Subtopic 2:	accumulators
Subtopic 3:	valves
Subtopic 4:	static, kinematic, and dynamic considerations important to the utilization of fluids and gases
Subtopic 5:	instrumentation and data reduction techniques
Subtopic 6:	environmental, space, weight, and material considerations
Possible Course Duplication	
This course may duplicate courses of similar content.	
Possible Documentation	
Professional letter, 2 or more personal letters, or certificate of completion for course of similar content	

Course Title	Credit Award	General Education
Applications of Lasers	**3 UD**	**Science/ Technology**

Course Description	
Laser theory, design and applications. The following subtopics are to be addressed:	
Subtopic 1:	theory of lasers
Subtopic 2:	design considerations
Subtopic 3:	stimulated emission and amplification, including coherence
Subtopic 4:	regeneration and feedback
Subtopic 5:	reliability and safety consideration
Subtopic 6:	selection criteria for engineering, manufacturing, commercial and medical applications

Possible Course Duplication
This course may duplicate courses of similar content.

Possible Documentation
Professional letter, 2 or more personal letters, or certificate of completion for course of similar content

Course Title	Credit Award	General Education
Applications of Network Analysis	**3 UD**	**Science/ Technology**

Course Description	
Practical applications of analysis tools. The following subtopics are to be addressed:	
Subtopic 1:	use of Fourier Series in analyzing waveforms
Subtopic 2:	use of the LaPlace Transform to determine transient responses
Subtopic 3:	theory and purpose of circuit simplification as a tool for analysis
Subtopic 4:	circuit analysis through the use of equivalent circuits
Subtopic 5:	Thevenin's and Norton's Theorems
Subtopic 6:	Kirchoff's Voltage and Current Laws

Possible Course Duplication
This course may duplicate courses of similar content.

Possible Documentation
Professional letter, 2 or more personal letters, or certificate of completion for course of similar content

Course Title	Credit Award	General Education
Applications of Network Synthesis	**3 UD**	**Science/ Technology**

Course Description	
Mathematical methods of approximation. The following subtopics are to be addressed:	
Subtopic 1:	time domains
Subtopic 2:	frequency domains
Subtopic 3:	the theory of band pass filters
Subtopic 4:	passive filters
Subtopic 5:	active filters
Subtopic 6:	optimization techniques

Possible Course Duplication
This course may duplicate courses of similar content.

Possible Documentation
Professional letter, 2 or more personal letters, or certificate of completion for course of similar content

Course Title	Credit Award	General Education
Applications of Nuclear Energy	**3 UD**	**Science/ Technology**

Course Description	
Theory, design, and applications of nuclear energy systems. The following subtopics are to be addressed:	
Subtopic 1:	radioisotope heat sources
Subtopic 2:	fission chain and fusion reactors
Subtopic 3:	nuclear reactor criticality, safety and control
Subtopic 4:	instrumentation methods
Subtopic 5:	nuclear fuel cycle, heat removal and waste disposal, including comparative costs
Subtopic 6:	Federal regulation and licensing of nuclear power generating plants

Possible Course Duplication
This course may duplicate courses of similar content.

Possible Documentation
Professional letter, 2 or more personal letters, or certificate of completion for course of similar content

Course Title	Credit Award	General Education
Applications of Thermodynamics	**3 UD**	**Science/ Technology**

Course Description	
Applications of the laws and concepts of thermodynamics in conductive, convective, and radiative heat transfer systems. The following subtopics are to be addressed:	
Subtopic 1:	heat exchanging systems; e.g., heat pumps, air conditioners and refrigerators
Subtopic 2:	propulsion systems; e.g., piston, gas turbine, ramjet, turbojet and rocket engines
Subtopic 3:	solar heat collection system; e.g., water and space heaters
Subtopic 4:	homeostatic equilibrium and stability in dynamic systems
Subtopic 5:	computer aided data collection and analysis techniques
Subtopic 6:	measurement techniques

Possible Course Duplication
This course may duplicate courses of similar content.

Possible Documentation
Professional letter, 2 or more personal letters, or certificate of completion for course of similar content

Course Title	Credit Award	General Education
Automatic Control Systems	**3 UD**	**Science/ Technology**

Course Description	
Theory and applications of feedback control systems. The following subtopics are to be addressed:	
Subtopic 1:	characteristics of components for electronic and mechanical systems
Subtopic 2:	principles of design
Subtopic 3:	transient analysis
Subtopic 4:	random signal techniques
Subtopic 5:	stabilization techniques by modifying the transfer function
Subtopic 6:	viscous-output and error-rate damping

Possible Course Duplication
This course may duplicate courses of similar content.

Possible Documentation
Professional letter, 2 or more personal letters, or certificate of completion for course of similar content

Course Title	Credit Award	General Education
Artificial Intelligence	**3 UD**	**Science/ Technology**

Course Description	
The symbolic representation of knowledge for computer use, and the symbolic inference processes used for reasoning with the knowledge. Concepts and methods for problem solving, hypothesis formation, knowledge representation, knowledge acquisition, perceptual behavior and programming tools such as LISP and PROLOG. Commercial, industrial and military applications such as pattern recognition, theorem proving, game playing, natural language comprehension, cognitive simulation, rule-based systems and robotics. Selection of hardware and software for AI systems. The following subtopics are to be addressed:	
Subtopic 1:	artificial Intelligence as a concept; i.e., a discussion of the “philosophical justification” of AI as a possibility
Subtopic 2:	perceptual behavior and programming tools: e.g., LISP and PROLOG
Subtopic 3:	methods for problem solving; e.g., hypothesis formation, knowledge representation, knowledge acquisition, etc
Subtopic 4:	examples of commercial, industrial and military applications
Subtopic 5:	selection of Hardware and Software
Subtopic 6:	rule based systems including a discussion of pattern recognition, cognitive simulation and Game Theory

Possible Course Duplication
This course may duplicate courses of similar content.

Possible Documentation
Professional letter, 2 or more personal letters, or certificate of completion for course of similar content

Course Title	Credit Award	General Education
Business Management Information Systems	**3 UD**	**Science/ Technology**

Course Description	
The student must demonstrate knowledge gained from experience working in either a Management Information Systems group or an End User group. The essay should focus on principles and concepts for producing information to be used in the decision making process. The following subtopics are to be addressed:	
Subtopic 1:	hardware considerations
Subtopic 2:	software considerations
Subtopic 3:	communications, networks and the internet
Subtopic 4:	decision support systems
Subtopic 5:	organization support systems
Subtopic 6:	ethical considerations in an information society

Possible Course Duplication
This course may duplicate courses of similar content.

Possible Documentation
Professional letter, 2 or more personal letters, or certificate of completion for course of similar content

Course Title	Credit Award	General Education
Compiler Construction	**3 UD**	**Science/ Technology**

Course Description	
Design and implementation of compilers. The following subtopics are to be addressed:	
Subtopic 1:	lexical analysis
Subtopic 2:	parsers
Subtopic 3:	code generation
Subtopic 4:	optimization
Subtopic 5:	error recovery
Subtopic 6:	translator writing systems

Possible Course Duplication
This course may duplicate courses of similar content.

Possible Documentation
Professional letter, 2 or more personal letters, or certificate of completion for course of similar content

Course Title	Credit Award	General Education
Computer Decision Modeling	**3 UD**	**Science/ Technology**

Course Description	
The application of the methods of computer science to problems in management decision making. The following subtopics are to be addressed:	
Subtopic 1:	decision trees
Subtopic 2:	payoff and Opportunity Loss Tables
Subtopic 3:	analysis of risk and time preferences
Subtopic 4:	encoding of information and preferences
Subtopic 5:	methods of simulation, optimization and alternative evaluation
Subtopic 6:	selection of hardware and software

Possible Course Duplication
This course may duplicate courses of similar content.

Possible Documentation
Professional letter, 2 or more personal letters, or certificate of completion for course of similar content

Course Title	Credit Award	General Education
Computer Graphics	**3 UD**	**Science/ Technology**

Course Description	
The application of computers for input, manipulation and display of graphical information. The following subtopics are to be addressed:	
Subtopic 1:	function of the Graphical User Interface (GUI)
Subtopic 2:	human engineering aspects (Human Factors considerations) (this should include a discussion of research on the dangers of long time exposure to Cathode Ray Tube emissions)
Subtopic 3:	principles and types of display hardware
Subtopic 4:	graphical input methods
Subtopic 5:	hardware and software selection
Subtopic 6:	screen design and evaluation

Possible Course Duplication
This course may duplicate courses of similar content.

Possible Documentation
Professional letter, 2 or more personal letters, or certificate of completion for course of similar content

Course Title	Credit Award	General Education
Computer Networks	**3 UD**	**Science/ Technology**

Course Description	
This course includes all the methods and hardware used for interconnecting computers. The following subtopics are to be addressed:	
Subtopic 1:	network functions
Subtopic 2:	network structures and components
Subtopic 3:	interconnection of Networks
Subtopic 4:	protocols – purpose and methods; include session protocols (end to end communication), data link protocols (bit oriented, character oriented, multi-access, error checking, etc.)
Subtopic 5:	switching techniques such as circuit switching, and packet switching, Asynchronous Transfer Mode (ATM).
Subtopic 6:	synchronous Optical Networks (SONET)

Possible Course Duplication
This course may duplicate courses of similar content.

Possible Documentation
Professional letter, 2 or more personal letters, or certificate of completion for course of similar content

Course Title	Credit Award	General Education
Data Communication Systems	**3 UD**	**Science/ Technology**

Course Description	
Theory and applications of telecommunications networks. The following subtopics are to be addressed:	
Subtopic 1:	analog theory vs. digital theory
Subtopic 2:	voice digitalization and encoding – PAM and PCM
Subtopic 3:	characteristics of hardware components, software structures and transmission media
Subtopic 4:	bits, bytes and baud rates
Subtopic 5:	channel bandwidth and capacity
Subtopic 6:	transmission rates; explanation of OS-0, OS-1, etc.

Possible Course Duplication
This course may duplicate courses of similar content.

Possible Documentation
Professional letter, 2 or more personal letters, or certificate of completion for course of similar content

Course Title	Credit Award	General Education
Database Systems	**3 UD**	**Science/ Technology**

Course Description	
Design and evaluation of database management systems. The following subtopics are to be addressed:	
Note This topic duplicates coursework in the BSB/IS required course of study.	
Subtopic 1:	tree, network and relational models
Subtopic 2:	query Languages
Subtopic 3:	secondary storage devices
Subtopic 4:	access methods between Users and Database Management Systems (DBMS's)
Subtopic 5:	evaluation of performance
Subtopic 6:	management issues

Possible Course Duplication
This course may duplicate courses of similar content.

Possible Documentation
Professional letter, 2 or more personal letters, or certificate of completion for course of similar content

Course Title	Credit Award	General Education
Development and Application of Management Information Systems	**3 UD**	**Science/ Technology**
Course Description		
The functions and evolution of MIS as a management function, including its effect on the End User. The following subtopics are to be addressed:		
Subtopic 1:	functions of MIS, include a discussion of MIS as it impacts the End User	
Subtopic 2:	“systems” point of view in the development process, including a discussion of life cycles	
Subtopic 3:	system architectures	
Subtopic 4:	data and storage structures	
Subtopic 5:	discussion of operating systems and the philosophy used	
Subtopic 6:	hardware and software characteristics	
Possible Course Duplication		
This course may duplicate courses of similar content.		
Possible Documentation		
Professional letter, 2 or more personal letters, or certificate of completion for course of similar content		

Course Title	Credit Award	General Education
Digital System Design and Application	**3 UD**	**Science/ Technology**
Course Description		
Theory and applications of digital building blocks in computer systems. The following subtopics are to be addressed:		
Subtopic 1:	control theory and methods	
Subtopic 2:	control systems	
Subtopic 3:	interfacing considerations	
Subtopic 4:	peripheral equipment	
Subtopic 5:	operational theory	
Subtopic 6:	selection criteria	
Possible Course Duplication		
This course may duplicate courses of similar content.		
Possible Documentation		
Professional letter, 2 or more personal letters, or certificate of completion for course of similar content		

Course Title	Credit Award	General Education
Electric Power Distribution	**3 UD**	**Science/ Technology**

Course Description	
Modern Power Distribution Systems. The following subtopics are to be addressed:	
Subtopic 1:	power distribution theory
Subtopic 2:	modern techniques of power distribution
Subtopic 3:	configurations and transmission lines
Subtopic 4:	components; e.g., transformers, resistors, load coils, capacitors, etc.
Subtopic 5:	analysis of brownouts and system degradation
Subtopic 6:	computer control and fault analysis

Possible Course Duplication
This course may duplicate courses of similar content.

Possible Documentation
Professional letter, 2 or more personal letters, or certificate of completion for course of similar content

Course Title	Credit Award	General Education
Electric Power Plants	**3 UD**	**Science/ Technology**

Course Description	
Current and future methods for the generation of power. The following subtopics are to be addressed:	
Subtopic 1:	characteristics of fossil fuels – pros and cons
Subtopic 2:	characteristics of nuclear energy – pros and cons
Subtopic 3:	economics and technical considerations; include computer modeling
Subtopic 4:	plant operational theory, cost, life, efficiency, etc.
Subtopic 5:	energy conversion
Subtopic 6:	pollution control

Possible Course Duplication
This course may duplicate courses of similar content.

Possible Documentation
Professional letter, 2 or more personal letters, or certificate of completion for course of similar content

Course Title	Credit Award	General Education
Electrical Communication Systems	**3 UD**	**Science/ Technology**

Course Description	
Theory and organization of modern systems. The following subtopics are to be addressed:	
Subtopic 1:	characteristics of state of the art components
Subtopic 2:	technological trends
Subtopic 3:	theory and organization of radio, radar, navigation, television and telephone systems
Subtopic 4:	wireless transmission systems; cell phones, wireless computers
Subtopic 5:	the internet
Subtopic 6:	potential future application impact on lifestyles
Possible Course Duplication	
This course may duplicate courses of similar content.	
Possible Documentation	
Professional letter, 2 or more personal letters, or certificate of completion for course of similar content	

Course Title	Credit Award	General Education
Electrical Engineering Laboratory	**3 UD**	**Science/ Technology**

Course Description	
A development-oriented laboratory experience with inclusion of the following aspects of a multi-circuit radio, television, radar, navigation, control, or computer system. The following subtopics are to be addressed:	
Subtopic 1:	specifications
Subtopic 2:	design
Subtopic 3:	costs
Subtopic 4:	economics
Subtopic 5:	test
Subtopic 6:	evaluation
Possible Course Duplication	
This course may duplicate courses of similar content.	
Possible Documentation	
Professional letter, 2 or more personal letters, or certificate of completion for course of similar content	

Course Title	Credit Award	General Education
Electronic Instrumentation	**3 UD**	**Science/ Technology**

Course Description	
The measurement of human and environmental characteristics. The following subtopics are to be addressed:	
Subtopic 1:	theory of operation of instruments (specify for each)
Subtopic 2:	temperature and atmospheric pressure
Subtopic 3:	humidity
Subtopic 4:	gas-presence
Subtopic 5:	radiation
Subtopic 6:	cardiac responses
Possible Course Duplication	
This course may duplicate courses of similar content.	
Possible Documentation	
Professional letter, 2 or more personal letters, or certificate of completion for course of similar content	

Course Title	Credit Award	General Education
Introduction to Computer Operating Systems	**3 UD**	**Science/ Technology**

Course Description	
The function and impact of the operating system in computers. The following subtopics are to be addressed:	
Note This topic duplicates coursework in the BSB/IS required course of study.	
Subtopic 1:	function and purpose of the operating system
Subtopic 2:	design and implementation of operating systems in large computers
Subtopic 3:	design and implementation of operating systems in small computers
Subtopic 4:	multiprogramming: processes and scheduling, synchronization and communication
Subtopic 5:	multitasking
Subtopic 6:	memory management
Possible Course Duplication	
This course may duplicate courses of similar content.	
Possible Documentation	
Professional letter, 2 or more personal letters, or certificate of completion for course of similar content	

Course Title	Credit Award	General Education
Introduction to Principles of Artificial Intelligence	**3 UD**	**Science/ Technology**

Course Description	
The symbolic representation of knowledge for computer use. The following subtopics are to be addressed:	
Subtopic 1:	concepts and methods of problem solving
Subtopic 2:	hypothesis formation
Subtopic 3:	knowledge acquisition
Subtopic 4:	cognitive stimulation
Subtopic 5:	pattern recognition; applications to commercial, industrial and military situations
Subtopic 6:	perpetual behavior and programming tools; e.g., LISP and PR

Possible Course Duplication
This course may duplicate courses of similar content.

Possible Documentation
Professional letter, 2 or more personal letters, or certificate of completion for course of similar content

Course Title	Credit Award	General Education
Manufacturing Engineering	**3 UD**	**Science/ Technology**

Course Description	
Design, implementation and evaluation of manufacturing processes and techniques.The following subtopics are to be addressed:	
Subtopic 1:	properties of materials; e.g., mechanical, optical, electrical, magnetic, and microstructure
Subtopic 2:	design of gauges, dies, jigs, fixtures and the tools required in manufacturing processes
Subtopic 3:	analysis of tool and process costs
Subtopic 4:	considerations of tool-human compatibility and life expectancy
Subtopic 5:	methods of specifying and controlling critical surfaces and tolerances
Subtopic 6:	human factors considerations

Possible Course Duplication
This course may duplicate courses of similar content.

Possible Documentation
Professional letter, 2 or more personal letters, or certificate of completion for course of similar content

Course Title	Credit Award	General Education
Microcomputer System Design	**3 UD**	**Science/ Technology**

Course Description	
The theoretical and practical principles of design for specific application. The following subtopics are to be addressed:	
Subtopic 1:	evaluation of building blocks
Subtopic 2:	hardware and software tradeoffs; e.g., cost, speed, size, etc.,
Subtopic 3:	interaction of hardware and software and the impact of tradeoffs on design
Subtopic 4:	inherent characteristics of microcomputer system communications
Subtopic 5:	multi-user considerations
Subtopic 6:	human factor considerations; screen design, user friendly aspects, etc.
Possible Course Duplication	
This course may duplicate courses of similar content.	
Possible Documentation	
Professional letter, 2 or more personal letters, or certificate of completion for course of similar content	

Course Title	Credit Award	General Education
Noise in Electrical Communications	**3 UD**	**Science/ Technology**

Course Description	
Theory and applications of Systems. The following subtopics are to be addressed:	
Subtopic 1:	AM vs. FM systems
Subtopic 2:	PCM systems
Subtopic 3:	signal enhancement in the presence of noise
Subtopic 4:	matched filters
Subtopic 5:	correlation detection
Subtopic 6:	phase-locked loops
Possible Course Duplication	
This course may duplicate courses of similar content.	
Possible Documentation	
Professional letter, 2 or more personal letters, or certificate of completion for course of similar content	

Course Title	Credit Award	General Education
Nuclear Power Systems Environmental Analysis	**3 UD**	**Science/ Technology**

Course Description	
Identification of the problems arising from the interactions between the nuclear power plant and its environment. The following subtopics are to be addressed:	
Subtopic 1:	plant siting considerations including emissions and thermal effects
Subtopic 2:	waste disposal
Subtopic 3:	population removal
Subtopic 4:	environmental impacts
Subtopic 5:	economic feasibility considerations
Subtopic 6:	educational methods for public image improvement

Possible Course Duplication
This course may duplicate courses of similar content.

Possible Documentation
Professional letter, 2 or more personal letters, or certificate of completion for course of similar content

Course Title	Credit Award	General Education
Operating Systems	**3 UD**	**Science/ Technology**

Course Description	
Operating system functions, design and implementation. Multiprogramming: processes and scheduling. Concurrent programming: mutual exclusion, synchronization and communication. Memory management: static relocation, virtual memory, segmentation, paging and load control. I/O and file systems: file structures, naming, and disk management. Job management and protection. The following subtopics are to be addressed:	
Note This topic duplicates coursework in the BSB/IS required course of study.	
Subtopic 1:	A brief discussion of computer hardware; component function
Subtopic 2:	Operating system functions, design and implementation;
Subtopic 3:	I/O and file systems: file structures, naming and disk management
Subtopic 4:	Multiprogramming & concurrent programming
Subtopic 5:	Hardware and Memory management
Subtopic 6:	Job management and protection; include a serious discussion of security aspects

Possible Course Duplication
This course may duplicate courses of similar content.

Possible Documentation
Professional letter, 2 or more personal letters, or certificate of completion for course of similar content

Course Title	Credit Award	General Education
Propagation of Electromagnetic Waves in Space	**3 UD**	**Science/ Technology**

Course Description	
Theory and application of electromagnetic wave propagation. The following subtopics are to be addressed:	
Subtopic 1:	radiation
Subtopic 2:	reflection
Subtopic 3:	absorption
Subtopic 4:	scattering
Subtopic 5:	all of the above as a function of frequency and transmission medium
Subtopic 6:	ground, ionospheric and tropospheric waves

Possible Course Duplication
This course may duplicate courses of similar content.

Possible Documentation
Professional letter, 2 or more personal letters, or certificate of completion for course of similar content

Course Title	Credit Award	General Education
Semiconductor Special Circuits	**3 UD**	**Science/ Technology**

Course Description	
Theory and applications of special circuits.The following subtopics are to be addressed:	
Subtopic 1:	operational amplifiers
Subtopic 2:	wave-form generators
Subtopic 3:	oscillators
Subtopic 4:	multivibrators
Subtopic 5:	modulators and demodulators
Subtopic 6:	analog-to-digital and digital-to-analog converters

Possible Course Duplication
This course may duplicate courses of similar content.

Possible Documentation
Professional letter, 2 or more personal letters, or certificate of completion for course of similar content

Course Title	Credit Award	General Education
Solar Energy Systems	**3 UD**	**Science/ Technology**

Course Description	
Operation and comparative analysis of Solar Energy and Solar Energy Systems. The following subtopics are to be addressed:	
Subtopic 1:	solar collectors and solar cells
Subtopic 2:	energy storage components
Subtopic 3:	design configurations
Subtopic 4:	cost effectiveness of Solar Energy Systems versus Conventional Water and Space Heaters
Subtopic 5:	selection criteria for materials used in solar energy components
Subtopic 6:	technical efficiency and cost improvement

Possible Course Duplication
This course may duplicate courses of similar content.

Possible Documentation
Professional letter, 2 or more personal letters, or certificate of completion for course of similar content

Course Title	Credit Award	General Education
Structural Engineering	**3 UD**	**Science/ Technology**

Course Description	
Application of the principles of mechanics to the structural design and analysis of a mechanical or an aerospace component. The following subtopics are to be addressed:	
Subtopic 1:	mechanics
Subtopic 2:	strength and microstructure of materials
Subtopic 3:	kinematics of stress, fracture, fatigue and creep
Subtopic 4:	electrical, magnetic, optical, chemical, thermal, and thermoelectric properties
Subtopic 5:	relationships between the internal behavior and structure of solids
Subtopic 6:	experimental techniques and mathematical tools

Possible Course Duplication
This course may duplicate courses of similar content.

Possible Documentation
Professional letter, 2 or more personal letters, or certificate of completion for course of similar content

Course Title	Credit Award	General Education
Systems Analysis, Design and Implementation	**3 UD**	**Science/ Technology**

Course Description	
A study of the concept of systems and the system approach. The following subtopics are to be addressed:	
Note This topic duplicates coursework in the BSB/IS required course of study.	
Subtopic 1:	general systems theory: The meaning of “systems” and the “systems approach”
Subtopic 2:	application analysis
Subtopic 3:	systems engineering methods
Subtopic 4:	design and implementation of computer systems
Subtopic 5:	methods of structured programming and analysis
Subtopic 6:	processes

Possible Course Duplication
This course may duplicate courses of similar content.

Possible Documentation
Professional letter, 2 or more personal letters, or certificate of completion for course of similar content

Course Title	Credit Award	General Education
Systems Programming	**3 UD**	**Science/ Technology**

Course Description	
Programming as an intellectual discipline. The following subtopics are to be addressed:	
Subtopic 1:	principles of programming
Subtopic 2:	systematic design of programs
Subtopic 3:	verification and testing of programs
Subtopic 4:	functions and characteristics of assemblers and compilers
Subtopic 5:	data structures
Subtopic 6:	operating systems

Possible Course Duplication
This course may duplicate courses of similar content.

Possible Documentation
Professional letter, 2 or more personal letters, or certificate of completion for course of similar content