COMPUTER ENGINEERING

HANDBOOK

UNIVERSITY OF NEVADA, LAS VEGAS

DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING

UNIVERSITY OF NEVADA, LAS VEGAS 4505 MARYLAND PARKWAY, BOX 454026 LAS VEGAS, NV 89154-4026

1. OVERVIEW OF THE COMPUTER ENGINEERING MAJOR

Computer engineering is the application of scientific and mathematical principles to

2. MISSION, PROGRAM OBJECTIVES AND OUTCOMES

2.1 THE MISSION OF THE DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING

The mission of the Department of Electrical and Computer Engineering is to serve society as a center of higher learning by providing an electrical and computer engineering education to society's future leaders, innovators, and engineers.

<u>Goals</u>

- 1. Provide undergraduate, graduate, and professional education.
- 2. Create knowledge through research.
- 3. Disseminate knowledge through publication.
- 4. Provide private and public service, in as much as said service educates, creates and disseminates knowledge, or functions as a repository of knowledge.

2.2 COMPUTER ENGINEERING PROGRAM EDUCATIONAL OBJECTIVES

The Program Educational Objective of the Computer Engineering program is to create, apply, and disseminate knowledge immediately or within a few years after graduation the graduate

- 1. Can successfully practice and mature intellectually in the field of Computer Engineering or a related field.
- 2. Can be admitted to and successfully progress through a post graduate program in Computer Engineering or related program.

2.3 COMPUTER ENGINEERING STUDENT OUTCOMES

To achieve these objectives and goals, each graduate of the Computer Engineering Major will attain the following outcomes before graduation:

- 1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.
- 2. An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.
- 3. An ability to communicate effectively with a range of audiences.
- 4. An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.
- 5. An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.
- 6. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.
- 7. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

3. COMPUTER ENGINEERING MAJOR ENTRANCE REQUIREMENTS

To enter the Computer Engineering (CpE) Major, a student must be admitted to the College of Engineering. Students who have been admitted to the College of Engineering and are interested in being admitted to the CpE Major will be placed in the Computer Engineering Pre-major (CpEPRE). A student in the CpEPRE is eligible to submit an application to the Advising Center for advanced standing in the CpE Major after completing the 18 credits of the 45-credit CpEPRE curriculum listed below. Students who have not completed the CpEPRE curriculum and do not have advanced standing in the CpE Major cannot enroll in upper division Computer Engineering courses except for those listed below in the CpEPRE Extended Curriculum.

COMPUTER ENGINEERING PRE-MAJOR (CPEPRE) CURRICULUM

PHYS 180Physics for Scientists and Engineers IPHYS 180LPhysics for Scientists and Engineers Lab I

MATH 181 Calculus I MATH 182 Calculus II

4. COMPUTER ENGINEERING CURRICULUM

The undergraduate Computer Engineering major requires the completion of courses in the following areas, which are described in the remainder of this section.

General Education:27-30credits

Math, Computer Science, and Natural Science: its

- Engineering Electronics I Laboratory Senior Design Project I Senior Design Project II EE 320L
- EE 497
- EE 498

4.4 REQUIRED COMPUTER ENGINEERING CORE COURSES (12 CREDITS)

EE 310 Principles of Solid State and Optoelectronic Systems EE 330 Engineering Electromagnetics Power System Engineering EE 340 EE 370 Control System EE 420 Electronics II Digital Integrated Circuit Design EE 421 Transmission Lines EE 430 **Engineering Optics** EE 431 EE 432 Antenna Engineering Active and Passive Microwave Eng. EE 436 EE 442 **Power Electronics** Photovoltaic Devices and Systems EE 446 EE 450 Solid State Devices Electronic & Mag. Materials & Devic. EE 451 Intro to Optical Electronics EE 452 EE 453 Introduction to Nanotechnology EE 460 Analog and Digital Communication EE 462 Advanced Digital Communication Wireless and Mobile Comm. EE 466 EE 472 **Digital Control Systems Digital Signal Processing** EE 480 Intro to Biomedical Signals and EE 482

Systems

EE 493Independent StudyEE 495Special TopicsCHEM 121Chemistry ICHEM 121LChemistry I LaboratoryCHEM 122AGeneral Chemistry IIMATH 271Elementary ProbabilityMATH 283Calculuta2.BTc 18.80gy

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7. COURSE DESCRIPTIONS IN COMPUTER ENGINEERING

COMPUTER ENGINEERING

Seminar: Introduction to UNLV learning outcomes and the programs that reside within the College of Engineering. Topics include professional ethics, technical communication, the design process, and technology's impact on a global society.

For undergraduate degree-seeking students only. Combination of EGG 101 and EGG 202 satisfies First Year Seminar requirement.

A holistic experience for second-year engineering and computer science students. Lab work, improve study skills, strengthen/solidify their sense of community, career paths exploration, update of their academic plan.

Sophomore standing and EGG 101. Combination of EGG 101 and EGG 202 satisfies First Year Seminar requirement.

Number systems, including unsigned binary and two's complement numbers. Logic gates. Boolean algebra. Combinational circuits. Introduction to sequential circuits. : MATH 127 or MATH 128 or MATH 181

Sequential circuits, finite state machines (FSMs), and integer arithmetic circuits. Timing analysis. Programmable logic devices (PLDs). Hardware Description Language (HDL). Assembly language.

CpE 200D; CpE 100

HDL tools and ass93 (ua)-1-17.998 (i4m)5.996 (t)41(rc)-5bd002 (ni9.004 (:)E13y245:)E48.002 (n)-44.855 ()] JEM

Design of dedicated digital systems and general microprocessors using HDL and CAD tools. RISC-V Instruction set and assembly language. Performance analysis. Memory systems. CpE 200

Design of dedicated digital systems and general purpose RISC microprocessors using HDL tools and design platforms. Instruction sets and Assembly language. Datapath and control unit design. Performance analysis. Memory systems.

CpE 300; CpE 200L

Microcontrollers and their application to a broad range of engineering problems. Microcontroller architecture, instruction set, and interfaces with sensors, actuators, motors, peripheral devices, and

This discussion class reinforces electromagnetic theory and problem solving by applying the laws of nature in a vector calculus manner. EE 330

Review of quantum mechanics and wave optics. Quantum harmonic oscillators. Field quantization. Single mode, two mode, and multi-mode quantum optics. Quantum information. Semiclassical and

EE 330 and (MATH 432 or MATH 459)

Waveguides, dispersion diagrams, microwave network analysis, broadband impedance matching, open and closed resonators, power dividers, directional couplers, filters, circulators, phase shifters, introduction to solid state amplifier or oscillator design. EE 330 and (MATH 432 or MATH 459)

Fundamentals of radar including industry applications such as mapping, imaging and electronic warfare.

EE 320 or equivalent or consent of instructor.

Diode circuits and rectifiers, power semiconductor diodes and transistors, thyristors and static switches, controlled rect-74.156 -12sA6 (c)-w558 (MA)2..SMAd t-74.995 (v)30 ltagdplicats, ele c,ts, ginrreaa, and e An introduction to analog and digital communication systems. Communication channels, modulation and demodulation, DSB, AM, SSB, FM and PM modulation schemes. Analog to digital conversation, sampling theorem, quantization noise and PCM systems. Line coding and digital carrier modulation schemes including ASK, PSK, FSK and QAM.

Design, evaluation and implementation of programming languages. Includes data types and data abstraction, sequence control and procedural abstraction, parameter passing techniques, scope rules, referencing environments and run-time storage management. Study and evaluation of a number of current programming languages.

: CS 302 and either CS 219 or CpE 300

Operating systems organization, sharing and allocation of system resources, protection mechanisms and integration of system components.

: CS 302 and either CS 219 or CpE 300

8. EXAMPLE COURSE SCHEDULES AND DEGREE WORKSHEET

COMPUTER ENGINEERING FOUR-YEAR PROGRAM

COMPUTER ENGINEERING FIVE-YEAR PROGRAM



	Sem	Cred	Grade
ENG 101		3	
ENG 102		3	