# MEENAKSHI SUNDARARAJAN ENGINEERING COLLEGE

### 363, Arcot Road, Kodambakkam, Chennai – 24
### Approved by AICTE & Affiliated to Anna University
### email Id: principal@msec.edu.in
### Website : www.msec.edu.in
## DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

### REGULATION – 2017
### COURSE OUTCOMES

### MA8352 - Linear Algebra and Partial Differential Equations [C201]

| | |
|---|---|
| C201.1 | Interpret the basic notions of groups, rings, fields and Vector Space which will then be used to solve related problems |
| C201.2 | Identify the concepts of vector space, linear transformations and diagonalization.. |
| C201.3 | Classify and apply the concept of inner product spaces in orthogonalization processes |
| C201.4 | Evaluate the procedure to solve partial differential equations |
| C201.5 | Examine and Able to solve the engineering problems using Fourier series. |

### EC8393 - Fundamentals of Data Structures in C [C202]

| | |
|---|---|
| C202.1 | Implement Linear and Non-Linear data structure operations using C |
| C202.2 | Suggest appropriate linear/non-linear data structure for any given data set |
| C202.3 | Apply hashing concepts for a given problem |
| C202.4 | Modify or suggest new data structure for an application |
| C202.5 | Appropriately choose the sorting algorithm for an application |

### EC8351 - Electronic Circuits – I [C203]

| | |
|---|---|
| C203.1 | Understand the basic concept of biasing and design biasing for various types of amplifiers |
| C203.2 | Design and analyse single stage and multistage BJT amplifiers |
| C203.3 | Design and analyse single stage and multistage FET amplifiers |
| C203.4 | Analyse the frequency response of BJT and MOSFET amplifiers |
| C203.5 | Design, troubleshoot and fault analysis the regulated DC power supplies |

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## EC8352 - Signals and Systems [C204]

| | |
|---|---|
| C204.1 | Analyze & classify Continuous and Discrete time signals and to identify LTI systems |
| C204.2 | Derive the Fourier series for continuous time signals and analyze the Fourier transform and Laplace transform of different signals |
| C204.3 | Analyze the output response of the Continuous Time systems by performing convolution and realize the continuous Time Systems |
| C204.4 | Analyze the Discrete Time Fourier Transform and Z transform of Discrete Time signals &Understand the sampling theorem and to convert the analog signal to discrete signal |
| C204.5 | Analyze the output response of the Discrete Time systems by performing convolution andrealize the Discrete Time Systems |

## EC8392 - Digital Electronics [C205]

| | |
|---|---|
| C205.1 | Simplify Boolean functions using Kmap and quine Mclasky |
| C205.2 | Design and analyze combinational circuits |
| C205.3 | Design and analyze Synchronous sequential circuits |
| C205.4 | Design and Analyze Asynchronous Sequential Circuits |
| C205.5 | Implement designs using programmable logic devices and digital integrated circuits |

## EC8391 - Control Systems Engineering [C206]

| | |
|---|---|
| C206.1 | Understand the methods of representation of systems and getting their transfer function models for analysis of physical systems and to introduce the control system components |
| C206.2 | Get adequate knowledge in the time response of systems and steady state error analysis and to introduce the effects of controllers |
| C206.3 | Obtain basic knowledge in obtaining the open loop and closed loop frequency responses of systems and to study the design of compensators |
| C206.4 | Understand the concept of stability of control system and methods of stability analysis |
| C206.5 | Understand the state space model of a physical system and the concepts of sampled data control system. |

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### EC8381 - Fundamentals of Data Structures in C Laboratory [C207]

| | |
|---|---|
| C207.1 | Write basic and advanced programs in C |
| C207.2 | Implement functions and recursive functions in C |
| C207.3 | Implement data structures using C |
| C207.4 | Choose appropriate sorting algorithm for an application and implement it in a modularized way |

### EC8361 - Analog and Digital Circuits Laboratory [C208]

| | |
|---|---|
| C208.1 | Design regulated power supplies |
| C208.2 | Design regulated power supplies |
| C208.3 | Simulate amplifier using SPICE |
| C208.4 | Design and implement combinational circuits. |
| C208.5 | Design and implement sequential circuits. |

### HS8381 - Interpersonal Skills/Listening&Speaking [C209]

| | |
|---|---|
| C209.1 | Ability to listen and respond appropriately |
| C209.2 | Ability to participate in group discussions. |
| C209.3 | Ability to make effective presentation. |
| C209.4 | Ability to listen/view and comprehend different spoken discourses/excerpts different accents and to speak clearly in simple language. |
| C209.5 | Ability to participate confidently and appropriately in formal and informal conversations. |

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### MA8451 - Probability and Random Processes [C210]

| | |
|---|---|
| C210.1 | Interpret the axiomatic formulation of Probability theory and random variables as an intrinsic need for the analysis of random phenomena |
| C210.2 | Identify probability models, function of random variables based on one & two dimensional random variables and determine regression. |
| C210.3 | Classify the concept of random processes and to demonstrate the specific applications to Poisson and Markov Processes. |
| C210.4 | Evaluate correlation and spectral density of stationary random processes. |
| C210.5 | Examine the idea of linear time invariant system. |

### EC8452 - Electronic Circuits II [C211]

| | |
|---|---|
| C211.1 | To understand the concepts and design of feedback amplifiers. |
| C211.2 | To understand the basic concepts, design and analyze RC, LC and crystal oscillators. |
| C211.3 | To understand the performance of tuned amplifiers. |
| C211.4 | To understand the concepts of clipper, clamper, comparator circuits and multivibrators. |
| C211.5 | To understand the concepts power amplifiers and DC convertors. |

### EC8491 - Communication Theory [C212]

| | |
|---|---|
| C212.1 | Design AM communication systems |
| C212.2 | Design Angle modulated communication systems |
| C212.3 | Apply the concepts of Random Process to the design of Communication systems |
| C212.4 | Analyze the noise performance of AM and FM systems |
| C212.5 | Gain Knowledge in sampling and quantization |

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### EC8451 - Electromagnetic Fields [C213]

| | |
|---|---|
| C213.1 | Able to understand the concepts of vector calculus and vector coordinate systems |
| C213.2 | Able to understand the behaviour of static electric field and the concept of conductors and dielectrics in static electric fields. |
| C213.3 | Able to understand the behaviour of magnetic circuits and magnetic material |
| C213.4 | To analyse Maxwell's equation in differential and integral form |
| C213.5 | Able to analyse the propagation of EM waves in lossy and lossless media. |

### EC8453 - Linear Integrated Circuits [C214]

| | |
|---|---|
| C214.1 | To understand the basic building blocks of linear integrated circuits |
| C214.2 | To understand the linear and non-linear applications of operational amplifiers |
| C214.3 | To understand the concepts and applications of analog multipliers and PLL |
| C214.4 | To understand the concepts of ADC and DAC using Op-Amps |
| C214.5 | To understand the concepts of waveform generation and introduce some special function ICs |

### GE8291 - Environmental Science and Engineering [C215]

| | |
|---|---|
| C215.1 | The knowledge gained on flora and fauna in our environment helps to know about social environment. |
| C215.2 | The students will gain knowledge on the offensive effects of pollution in the day-to-day life. |
| C215.3 | The students will acquire knowledge on the natural resources available and their conservation. |
| C215.4 | The students will have adequate knowledge on the concepts of adverse effects of social issues like acid rain and global warming. |
| C215.5 | The students will get knowledge about the problems faced by the society due to population explosion. |

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### EC8461 - Circuits Design and Simulation Laboratory [C216]

| | |
|---|---|
| C216.1 | Analyze various types of feedback amplifiers |
| C216.2 | Design oscillators and tuned amplifiers. |
| C216.3 | Demonstrate the various types of multivibrators. |
| C216.4 | Simulate Oscillators, tuned amplifiers, wave-shaping circuits and multivibrators using SPICE Tool. |
| C216.5 | Analyze various types of power amplifiers. |

### EC8462 - Linear Integrated Circuits Lab [C217]

| | |
|---|---|
| C217.1 | To understand the basics of linear integrated circuits and available ICs |
| C217.2 | To understand the characteristics of the operational amplifier |
| C217.3 | To apply operational amplifiers in linear and nonlinear applications |
| C217.4 | To acquire the basic knowledge of special function IC. |
| C217.5 | To use SPICE software for circuit design |

### EC8501 - Digital Communication [C301]

| | |
|---|---|
| C301.1 | To Design PCM systems |
| C301.2 | To Design and implement base band transmission schemes |
| C301.3 | To Design and implement band pass signalling schemes |
| C301.4 | To Analyze the spectral characteristics of band pass signalling schemes and their noise performance |
| C301.5 | To Design error control coding schemes |

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### EC8553 - Discrete Time Signal Processing [C302]

| | |
|---|---|
| C302.1 | Apply DFT for the analysis of digital signals and systems |
| C302.2 | Design IIR filters |
| C302.3 | Design FIR filters and Characterize finite word length effects on filters |
| C302.4 | Analyse Finite word length effect |
| C302.5 | Study the architecture, addressing modes and programming of DSP processor |

### EC8552 - Computer Architecture and Organization [C303]

| | |
|---|---|
| C303.1 | Describe Data representation, instruction formats and the operation of a digital computer |
| C303.2 | Illustrate the fixed point and floating-point arithmetic for ALU operation |
| C303.3 | Discuss about implementation schemes of control unit and pipeline performance. |
| C303.4 | Explain the concept of various memories, interfacing and organization of multiple processors |
| C303.5 | Discuss parallel processing technique and unconventional architectures. |

### EC8551 - Communication Networks [C304]

| | |
|---|---|
| C304.1 | Able to explain the components requirement of networks and link layer service. |
| C304.2 | Able to classify the Media Access Control Protocols and different Internetworking. |
| C304.3 | Able to Demonstrate various types of routing techniques. |
| C304.4 | Able to outline the mechanisms involved in transport layer. |
| C304.5 | Able to experiment with different application layer protocols. |

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### EC8073 – Medical Electronics [C305 A]

| | |
|---|---|
| C305.1 | Discuss the terminologies of electro-physiological and recording of bio-potential. |
| C305.2 | Comprehend the measurement techniques of bio-chemical and non-electrical parameters. |
| C305.3 | Interpret the various types of assist devices. |
| C305.4 | Comprehend the various diathermy and bio-telemetry techniques. |
| C305.5 | Outline current trends in medical instrumentation. |

### EC8074 – Robotics & Automation [C305 B]

| | |
|---|---|
| C305.1 | Identify components, advantages, disadvantages, applications of robots and review the history of robotic evolution. |
| C305.2 | Understand actuators and sensors for measurement of parameters used in robot manipulator. |
| C305.3 | Solve direct and inverse kinematics of simple robot manipulators. |
| C305.4 | Develop mathematical equations related to robot kinematics, dynamics and path planning. |
| C305.5 | Understand the impact and progress in AI and other research trends in the field of robotics |

### OIT552 – Cloud Computing [C306 A]

| | |
|---|---|
| C306.1 | Articulate the main concepts, key technologies, strengths and limitations of cloud computing |
| C306.2 | Learn the key and enabling technologies that help in the development of cloud |
| C306.3 | Develop the ability to understand and use the architecture of compute and storage cloud, service and delivery models. |
| C306.4 | Explain the core issues of cloud computing such as resource management and security |
| C306.5 | Be able to install and use current cloud technologies and choose the appropriate technologies, algorithms and approaches for implementation and use of cloud |

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### EC8562 - Digital Signal Processing Laboratory [C307]

| | |
|---|---|
| C307.1 | To implement Linear and Circular Convolution |
| C307.2 | To implement FFT and IFFT algorithms |
| C307.3 | To implement FIR and IIR filters |
| C307.4 | To study the architecture of DSP processor |
| C307.5 | To demonstrate Finite word length effect effect |

### EC8561 - Communication Systems  Laboratory [C308]

| | |
|---|---|
| C308.1 | Simulate and validate the various functional modules of a communication system |
| C308.2 | Demonstrate their knowledge in baseband signaling schemes through implementation of digital modulation schemes |
| C308.3 | Apply various channel coding schemes & demonstrate their capabilities towards the improvement of the noise performance of communication system |
| C308.4 | Simulate end to end communication link |

### EC8563 - Communication Networks Laboratory [C309]

| | |
|---|---|
| C309.1 | Communicate between two desktop computers |
| C309.2 | Implement the different flow control protocols |
| C309.3 | Write program using sockets |
| C309.4 | Implement and compare various routing algorithms |
| C309.5 | Use the network simulation tool |

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### EC8691 - Microprocessors and Microcontrollers  [C310]

| | |
|---|---|
| C310.1 | Understand architecture of 8086 and Design and implement programs on 8086 microprocessor. |
| C310.2 | Understand signals, system bus architecture of 8086 and multiprocessor configuration. |
| C310.3 | Design and implement interfacing of I/O circuits with 8086 microprocessor |
| C310.4 | Understand architecture of 8051microcontroller. |
| C310.5 | Understand architecture of 8051 , Design and implement programs on 8051 microcontroller. |

### EC8095 - VLSI Design  [C311]

| | |
|---|---|
| C311.1 | Realize the concepts of digital building blocks using MOS transistor. |
| C311.2 | Design combinational MOS circuits and power strategies. |
| C311.3 | Design and construct Sequential Circuits and Timing systems. |
| C311.4 | Design arithmetic building blocks and memory subsystems. |
| C311.5 | Apply and implement FPGA design flow and testing. |

### EC8652 - Wireless Communication [C312]

| | |
|---|---|
| C312.1 | Able to Characterize a wireless channel and evolve the system design specifications |
| C312.2 | Able to Design a cellular system based on resource availability and traffic demands. |
| C312.3 | Able to Identify suitable signalling and multipath mitigation techniques for the wireless channel and system under consideration |
| C312.4 | Able to understand the concepts of diversity in channels. |
| C312.5 | Able to understand the concepts of fading and non- fading channels |

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### MG8591 - Principles of Management [C313]

| C313.1 | Understand the managerial functions like planning, organizing, staffing, leading & controlling |
|--------|-----------------------------------------------------------------------------------------------|
| C313.2 | The basic knowledge on international aspect of management |
| C313.3 | The basic knowledge on management and its evolution |
| C313.4 | A knowledge on budgetary control and their strategies |
| C313.5 | A understanding of the motivational theories existing in the management |

### EC8651 - Transmission Lines and RF Systems  [C314]

| C314.1 | Discuss the signal propagation through transmission lines. |
|--------|-------------------------------------------------------------|
| C314.2 | Discuss the difference between low frequency transmission and propagation at Radio Frequencies. |
| C314.3 | Analyse impedance matching techniques using stubs. |
| C314.4 | Analyse the various modes of propagation of wave guides and cavity resonators. |
| C314.5 | Analyse the various functions of different RF systems and stability considerations of RF systems. |

### EC8004 – Wireless Networks  [C315]

| C315.1 | Able to understand the architecture, protocol stack and services offered by Wireless Local Area Networks. |
|--------|-----------------------------------------------------------------------------------------------------------|
| C315.2 | Able to understand the basics of mobile IP networks, mechanism behind packet delivery and various routing protocols of MANETs. |
| C315.3 | Able to understand the architecture of UMTS, protocol layers and various services offered by 3G networks. |
| C315.4 | Able to understand the internetworking architecture of WLANS & WWANS. |
| C315.5 | Able to understand the motivation behind 4G evolution and various technologies developed for 4G networks. |

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### EC8681 – Microprocessors and Microcontrollers Laboratory [C316]

| | |
|---|---|
| C316.1 | Write ALP for arithmetic and logical operations |
| C316.2 | Interface different I/O's with processor |
| C316.3 | Generate waveforms using Microprocessors |
| C316.4 | Execute programs in 8051 |
| C316.5 | Familiar with 8086 and 8051 Simulators. |

### EC8661 – VLSI Design Laboratory [C317]

| | |
|---|---|
| C317.1 | Write HDL code for basic as well as advanced digital integrated circuit |
| C317.2 | Import the logic modules into FPGA Boards |
| C317.3 | Design, Simulate and Extract the layouts of Digital & Analog IC Blocks using EDA tools |

### EC8611 – Technical Seminar [C318]

| | |
|---|---|
| C318.1 | Identify the domain specific engineering problem for presentation. |
| C318.2 | Prepare the document with proper work plan. |
| C318.3 | Compare and analyze the emerging technology. |
| C318.4 | Show the presentation skill in front of the audience. |
| C318.5 | Discuss with the peer members. |

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### HS8581 – Professional Communication [C319]

| | |
|---|---|
| C319.1 | Enhance the students to make effective presentations. |
| C319.2 | Help the students participate confidently in Group Discussions. |
| C319.3 | Motivate and prepare the students to attend job interviews and be successful in their pursuit. |
| C319.4 | Train and develop the adequate Soft Skills required for the workplace. |
| C319.5 | Interpret different genres of texts, infer implied meanings and evaluate it for ideas as well as for methods of presentation relevant in different situations. |

### EC8701 – Antennas & Microwave Engineering [C401]

| | |
|---|---|
| C401.1 | Apply the basic principles and evaluate antenna parameters and link power budgets |
| C401.2 | Design and assess the performance of various antennas |
| C401.3 | Analyse Antenna Array and its different mode of operation |
| C401.4 | Analyse various operation of microwave passive devices and microwave generators |
| C401.5 | Design a microwave system given the application specifications |

### EC8751 – Optical Communication [C402]

| | |
|---|---|
| C402.1 | Realize basic elements in optical fibers, different modes and configurations. |
| C402.2 | Analyze the transmission characteristics associated with dispersion and polarization techniques |
| C402.3 | Design optical sources and detectors with their use in optical communication system. |
| C402.4 | Construct fiber optic receiver systems, measurements and coupling techniques. |
| C402.5 | Design optical communication systems and its networks. |

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### EC8791 – Embedded and Real Time Systems  [C403]

| | |
|---|---|
| C403.1 | Interpret the concepts of embedded system design and analysis. |
| C403.2 | Describe the architecture and programming of ARM Processor. |
| C403.3 | Analyze the performance and optimization techniques of embedded programming components. |
| C403.4 | Explain the basic concepts of Real Time System for Embedded system design |
| C403.5 | Evaluate the Real time operating system performance and power optimization strategies for embedded system process. |

### EC8702 – Ad hoc and Wireless Sensor Networks [C404]

| | |
|---|---|
| C404.1 | Explain the various protocols of Adhoc networks |
| C404.2 | Describe the Architecture of Wireless Sensor Network. |
| C404.3 | Describe the Wireless Sensor Network concepts and protocol. |
| C404.4 | Discuss about the Network Security in Sensor based network. |
| C404.5 | Discuss about the Wireless Sensor Network software tools. |

### GE8071 – Disaster Management

| | |
|---|---|
| C405.1 | Differentiate the types of disasters, causes and their impact on environment and society |
| C405.2 | Assess vulnerability and various methods of risk reduction measures as well as mitigation. |
| C405.3 | Draw the hazard and vulnerability profile of India, Scenarios in the Indian context, Disaster damage assessment and management. |
| C405.4 | Gain knowledge on Role of GIS and Information Technology Components in Preparedness, Risk Assessment, Response and Recovery Phases of Disaster |
| C405.5 | Gain knowledge on Space Based Inputs for Disaster Mitigation and Management and field works related to disaster management. |

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### OME754 – Industrial Safety [C406A]

| | |
|---|---|
| C406A.1 | Identify the various possible hazards in different fields of engineering |
| C406A.2 | Classify various hazards based on their nature and severity |
| C406A.3 | Apply the principles for maintaining safety, occupational health and hygiene in an industry |
| C406A.4 | Examine the factors that lead to an accident |
| C406A.5 | Plan the safety measures appropriate for an industry. |

### OCS751 – Data Structures & Algorithms [C406A]

| | |
|---|---|
| C406B.1 | Understand the various algorithm design and analysis techniques and Implement various linear data structures operations and applications using List ADT. |
| C406B.2 | Implement and apply the linear data structures stack and queue to problem solutions. |
| C406B.3 | Illustrate and compare various techniques for searching and sorting. |
| C406B.4 | Represent and manipulate data using nonlinear data structure tree to design algorithms for various applications. |
| C406B.5 | Implement and apply the nonlinear data structure Graph ADT to problem solutions using dynamic programming and greedy approach. |

### OCS752 – Introduction to C Programming [C406B]

| | |
|---|---|
| C406C.1 | Develop executable C programs with decision making and looping statements, which illustrate the use of various operators. |
| C406C.2 | Write executable C programs which process the data that are stored in an array. |
| C406C.3 | Create executable C programs to process strings and use pointers for array processing and parameter passing |
| C406C.4 | Divide a given computational problem into a number of modules called functions and develop multi-function C program by using recursion if required, to solve the computational problem. |
| C406C.5 | Develop executable C programs with structure for storing the data to be processed |

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### EC8711 – Embedded Laboratory [C407]

| | |
|---|---|
| C407.1 | Understand the Building Blocks of ARM CORTEX M4 Embedded Kit. |
| C407.2 | Write programs in ARM for a specific Application |
| C407.3 | Interface A/D and D/A convertors with ARM system |
| C407.4 | Write program for interfacing motor and sensor. |
| C407.5 | Write program for interfacing keypad and LCD. |

### EC8761 - Advanced Communication Laboratory [C408]

| | |
|---|---|
| C408.1 | Analyze the performance of simple optical link by measurement of losses and analyzing the mode characteristics of fiber |
| C408.2 | Analyze the Eye Pattern, Pulse broadening of optical fiber and the impact on BER |
| C408.3 | Estimate the Wireless Channel Characteristics and analyze the performance of Wireless |
| C408.4 | Understand the characteristics of Microwave Sources |
| C408.5 | Understand the Characteristics in Microwave System design |

### GE8076 - Professional Ethics in Engineering [C409]

| | |
|---|---|
| C409.1 | Gain awareness on human values for professional excellence and stress management |
| C409.2 | Gain knowledge on engineering ethics, moral issues & uses of ethical theories |
| C409.3 | Understand the role of engineers as responsible experimenters along with courses of ethics in engineering field . |
| C409.4 | Gain awareness of responsibilities of an engineer for safety and risc along with risc benefit analysis |
| C409.5 | Acquire knowledge on global issues and able to apply ethical principles to resolve situations that arise in their professional lives |

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## DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

### EC8094 – Satellite Communication  [C410A]

| C410A.1 | Analyze the satellite orbit |
|---------|------------------------------|
| C410A.2 | Analyze the earth segment and space segment |
| C410A.3 | Analyze the various methods of satellite access |
| C410A.4 | Analyze the satellite Link design |
| C410A.5 | Design various satellite applications |

### IT8006- Principles of Speech Processing   [C410]

| C410.1 | Understand the Fundamentals of speech production |
|--------|--------------------------------------------------|
| C410.2 | To understand the speech compression techniques |
| C410.3 | To understand the speech recognition techniques |
| C410.4 | Deal with the issues in speech recognition |
| C410.5 | Explain the concept of Text-to-Speech Synthesis |

### EC8811- Project Work [C411]

| C411.1 | Apply the fundamental knowledge and skills in engineering and effectively formulate a project. |
|--------|-----------------------------------------------------------------------------------------------|
| C411.2 | Plan and manage the time effectively as a team. |
| C411.3 | Orally present and demonstrate the product to peers, academics, general and industry community. |
| C411.4 | Consider the business context and commercial positioning of designed devices or systems |
| C411.5 | Explore the knowledge for the 'real world' situations that a professional engineer can encounter |

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