EERE2201	Introduction to Renewable Energy		3 Credit Hours
Prerequisites	**Physics II and Chemistry**	**Co - Requisites**	
Goal	To understand the importance of renewable energy resources and its utilization for the thermal and electrical energy needs and also the environmental aspects of these resources.		

Objectives	Outcomes
The course should enable the students to : 1. Understand the various forms of conventional energy resources. 2. Learn the present energy scenario and the need for energy conservation 3. Explain the concept of various forms of renewable energy 4. Outline division aspects and utilization of renewable energy sources for both domestics and industrial application 5. Analyse the environmental aspects of renewable energy resources.	Upon completion of the course, the student will be able to: 1. Describe the environmental aspects of non-conventional energy resources. In Comparison with various conventional energy systems, their prospects and limitations. 2. Know the need of renewable energy resources, historical and latest developments. 3. Describe the use of solar energy and the various components used in the energy production with respect to applications like - heating, cooling, desalination, power generation, drying, cooking etc. 4. Appreciate the need of Wind Energy and the various components used in energy generation and know the classifications. 5. Understand the concept of Biomass energy resources and their classification, types of biogas Plants- applications 6. Compare Solar, Wind and bio energy systems, their prospects, Advantages and limitations. 7. Acquire the knowledge of fuel cells, wave power, tidal power and geothermal principles and applications.

MATH 2100	Calculus II	3 Credit Hours
Prerequisites:	MATH 1200	
Goal	To provide the students with further calculus to extend the applications	

Objectives

The course should enable the student to:

1. Grasp the various techniques of integration
2. Perceive the partial derivatives in dealing with functions of two and three variables
3. Conceive multiple integration
4. Realize the mathematical model to formulate the governing differential equation of a problem and predict the solution under different sets of conditions

Outcomes

The students should be able to:

1. Apply various techniques of integration
2. Employ definite integrals to find area between two curves, volume, arc length, work, power and energy
3. Deal with indeterminate forms and improper integrals
4. Recognize integrals with infinite limits of integration
5. Carry out partial derivatives
6. Find total differential and approximations
7. Treat integration by partial fractions
8. Deal with functions of several variables and carry out multiple integrals
9. Deal with infinite series and test for convergence and divergence
10. Operate with conic sections and polar coordinate system with applications
11. Differentiate and integrate power series
12. Be familiar with numerical approximations of integrals
13. Formulate the differential equation by using mathematical model approach to represent a realistic situation and find the solutions which predict the behavior under various boundary conditions

ACT
English Language Center
Course Outline
Technical Communication (ENGL 2100)
Credit Hours 3
Lecture Hours 3

1. Course Description

At the end of this course, the students will have learned to write on technical subjects for the practical needs of a special audience. They will also have learned to process information, objectively and persuasively, making use of information and communication technologies.

2. General Aims

- Develop clear and accurate written and oral presentation of business,
- technical and scientific information.
- Promote critical thinking, continuous self- assessment and peer review.
- Encourage independent research skills.
- Prepare students for their professional environment.

3. Learning Outcomes

At the end of the course, students should be able to:

- Analyze, synthesize, evaluate and interpret information and ideas.
- Write in a style appropriate to the technical purpose and audience.
- Identify and write various kinds of business and technical documents.
- Plan and manage writing projects in terms of drafting, designing, revising and editing documents.
- Write collaboratively, providing peers with constructive feedback on their work.
- Develop effective style and tone, following businesses and technical writing guidelines.
- Analyze charts, graphs, specifications, diagrams, etc. and respond orally and in writing.
- Design visually effective documents (e.g. layouts, formatting, incorporating graphics and visuals into documents)
- Prepare and deliver an effective mixed media presentation.

4. Resources

a. McMurry, D.A. (2002). ***Power Tools for Technical Communication,*** Harcourt College Publishers.

Web sites

www.-unix.oit.umass.edu/~pwtc/tw/lonks.html
http://techpubs.com/resources.html
http://garnet.indstate.edu/kliener/eng305t/lessons/04html
http://www.prenhall.com/pfiefer
http://www.english.vt.edu/~toomy/researcy.html

5. Content Outline

- Written communication in a variety of formats (reports, business letters, memos, employment letters, resumes)
- Technical text such as definition, description, comparison, classification, instructions and cause and effect

- Making oral presentations.

6. Learning Activities

- Discussion: one-to-one, group
- Listen and take notes
- Speak to an audience
- Write formal reports, letters etc.
- Read and respond orally and in writing.

7. Assessment Outline

Quizzes	5%
Mid-semester Exam	20%
Assignment (Report and Presentation) (Report 20% and Presentation 5%)	25%
Final Exam	50%
TOTAL	**100%**

Final grades will be based on the following scale:

Letter Grade	Percentage Range	Grade Point
A	90-100	4.0
A-	85-89	3.7
B+	80-84	3.3
B	76-79	3.0
B-	73-75	2.7
C+	70-72	2.3
C Major Requirement	67-69	2.0
C- Major Elective	60-66	1.7
D	55-59	1.0
F	54 and below	0.0

8. Assessment Specifications

8.1 Quiz (5%)

There will be 1 quiz per semester. The quiz should be answered on the standard paper provided on a topic provided by the tutor. The approximate length of the quiz shall be 250 words, and written in 30 minutes of class time. Printed or electronic dictionaries can be used to minimize spelling mistakes.

8.2 Mid-semester Exam (20%)

Time: 1 hour

Content: One writing task of 300 words covering any topic covered up to the MSE. Refer to the delivery plan.

8.3 Final Exam (50%)

Time: 2 hours

Content: Q 1. A guided task based on an item that was taught during the course.

Q 2. Free writing. The nature of the task determines the length.

8.4 Assignment (25%)

Assignment shall be research-based and can be done by individual students or by a group. The outcome shall be a written report and an oral presentation.

The assignment should include the following:

1. *Secondary Research:* Literature review using books and the internet to discuss the research topic. The literature review should include student' own words, direct quotes, and paraphrasing of the information s/he has searched.

Written Report (20%)

- The report must consist of:
  - Title page (Cover page)
  - Introduction, Body, Conclusion, and Recommendation
  - References & Appendixes
- The Body of the report should be approximately 500 words. The Introduction, Conclusion and Recommendations sections are additional.
- An outline of the report is due 2 weeks after the topic is issued.
- The first draft is due 2 weeks after that.
- The final draft is due before their presentation.
- The reference list should include at least three sources.
- The report must be word-processed, double-spaced on *A4* paper with one inch margins and *size 12 Times New Roman or* Arial font.

Grade Criteria:

A) Report	**(20%)**
B) Oral Presentation	**(5%)**

See also the appendix on marking criteria

9. Course Policies

Attendance: Attendance and active participation in class activities are required. Irregular attendance will be dealt with according to item 75 in section 8 of the "College Bylaws for Technical Colleges" (Ministerial Order No. 72/2004). Students must have an official sick leave

from a government hospital or written, signed permission from the HoD/HoC. Three incidences of lateness (exceeding 5 minutes) will be considered one absence.

Late Assignment: For late submission of assignments, students need a legitimate reason and they need to inform the instructor in advance of the reason. Otherwise, assignments will be marked down by 5% (e.g. 80% will be 75%).

Plagiarism and Cheating: Plagiarism is the presentation of another person's work, words, or ideas as if they were one's own. It ranges from an entire assignment which is not the student's own work to specific passages within an assignment which are not the student's own work but taken from a source without acknowledgement. Students are responsible for ensuring that they understand and follow the principles of proper documentation and scholarship.

Cheating is usually understood as copying from another student. However, it also includes a student or a group of students, using or attempting to use unauthorized aids, assistance, material, or methods in assignment, reports, presentations and/or examinations. If an instructor determines that the student has cheated and /or plagiarized, the college will take punitive action and a grade of zero will be assigned for the affected assignment, report, presentation, or examination.

EETE 2102	Electronics I		3 Credit Hours
Prerequisites	**PHYS 1210**	**Co-requisites**	**EEPW 2150**
Goal	To provide students with an understanding of the basic electronic devices and circuits.		

Objectives	Outcomes
The course should enable the student to: 1. Understand the basic concepts of electronics and fundamentals of electronic devices. 2. Recognize the PN junction and understand the characteristics and applications PN diodes. 3. Know the structure, types and characteristics of Bipolar Junction Transistors (BJT). 4. Understand the use of BJT in small signal amplifier circuits. 5. Know the structure, types and characteristics of Junction Field Effect Transistors (JFET) and Metal-Oxide Semiconductor Field Effect Transistors (MOSFET). 6. Understand the use of JFET and MOSFET in different electronic applications.	A student who completes this course should be able to: 1. Recognize and understand the basic concepts of semiconductor materials & how to be used in active electronic devices. 2. Describe and analyze the diode circuits. 3. Design and test different diode circuits, for example- rectifying, clipping, clamping, logic circuits etc. 4. Describe, analyze & test a basic dipolar transistor circuit. 5. Design test and repair small signal amplifier circuit using BJT. 6. Describe, analyze & investigate a basic JFET and MOSFET transistor circuits. 7. Design and test MOSFET circuits as a small signal amplifier and digital switches.

EEPW 2150	Electrical Principles	3 Credit Hours
Prerequisites:	PHYS 1210	
Goal	To provide students with an understanding of basic electrical principles and concepts, leading to the ability to carry out calculations involving DC circuits, inductive circuits, capacitive circuits and AC fundamentals.	

Objectives

This course should enable the student to:

1. Understand DC circuit theorems.
2. Select a suitable replacement inductor for a specific application
3. Select a suitable replacement capacitor for a specific application
4. Examine simple RL and RC circuits and determine time constants and magnitudes of instantaneous voltage and current
5. Determine the basic terms used to define periodic AC voltage and AC current waveforms.
6. Analyze series and parallel AC circuits containing resistance (R), inductance (L) and capacitance (C) connected to a steady-state sinusoidal voltage source.
7. Correctly use a dual trace CRO to determine AC voltage and current, period, phase angle, frequency and DC voltage.
8. Explain the operating principles of the ideal transformers.

Outcomes

A student who satisfactory complete the course should be able to:

1. Apply DC circuit theorems to solve engineering problems.
2. Distinguish between different types of commercially available inductors.
3. Identify inductor characteristics using manufacturers' data sheets.
4. List typical applications for inductors in electric circuits.
5. Determine by measurement whether a given inductor is serviceable and state common faults.
6. Describe the precautions to be taken when opening highly inductive circuits.
7. Define capacitance and explain how a capacitor is charged and discharged in terms of its electrostatic field.
8. Calculate the capacitance of a capacitor given voltage and charge.
9. List the factors which determine the capacitance of a capacitor.
10. Distinguish between different types of commercially available capacitors.
11. Identify capacitor characteristics using manufacturers' data sheets.
12. List typical applications for capacitors in electric circuits.
13. Calculate and measure the equivalent capacitance of series and parallel connected capacitors.
14. Determine through measurement whether a given capacitor is serviceable and state common faults.
15. State the hazards and precautions to be observed when working with large capacitors.
16. Construct simple circuits incorporating RL and RC networks for a given time constant .

17. Determine the time constant for RL and RC circuits .
18. Determine the instantaneous voltage and current values in RL and RC circuits for multiples of time constant.
19. Describe periodic AC voltage and current waveforms in the time domain.
20. Explain how a sinusoidal output voltage is generated in a single turn coil rotating in a uniform magnetic field and sketch the sine wave.
21. Discuss the various types and characteristics of AC generators used to produce sine, square, rectangular and triangular AC waveforms.
22. Measure the instantaneous, peak, peak-peak values and period of sinusoidal waveform.
23. Calculate the Root Means Square (RMS) value and frequency of a sinusoidal waveform using measured values of peak voltage and period.
24. Determine the phase relationship between two or more sinusoidal waveforms given a waveform diagram or from measurements.
25. Define inductive reactance, capacitive reactance and impedance, and indicate how each varies with frequency.
26. Draw phasor diagrams to show the phase relationship between voltage and current in a pure resistor, pure capacitor and pure inductor respectively.
27. Calculate and measure the voltages and currents in series and parallel RL, RC and RLC circuits.
28. Draw the impedance triangle and phasor diagrams for series and parallel RL, RC and RLC circuits.
29. Define true, reactive and apparent power and power factor.
30. Describe the function of each block given the block diagram of a CRO.
31. Identify and describe the functions of each control on the faceplate of the CRO.
32. Calibrate the CRO in order to make accurate measurements.
33. Connect the CRO in circuit and measure period AC voltages, DC voltages.
34. Derive AC circuit current and signal frequency by calculation from CRO measurements.
35. Describe the calibration and measurement limitations of CRO probes.

	36. Describe the basic operation and construction of a transformer mentioning the need for a sine wave input. 37. Define transformer turns ratio. 38. List typical applications of power transformers. 39. Define volt-amp rating. 40. Calculate and measure primary and secondary voltages and currents in step-up and step-down transformer circuits.

EETE 2210	Telecommunications I	3 Credit Hours
Prerequisites:	EEPW 2150 and EETE 2102	
Goal	To explores analogue and digital concepts, and introduces telecommunications basics such as networks, business communications systems, signaling, Internet telephony, and switching.	

Objectives

This course should enable the student to:

1. Understand the fundamental concepts and terminology of telecommunications.
2. Apply telecommunication's concepts and principles to solve engineering problems.
3. Demonstrate skills and abilities needed to conduct an experiment.
4. Know basic sequence of steps in fault diagnosis.

Outcomes

A student who satisfactory complete the course should be able to:

1. Explain various types of telecommunications systems.
2. Distinguishes between different types of modulations.
3. Describe a number of transmission media used by the telecommunication industry.
4. Distinguishes between analogue and digital communications.
5. Design a simple telecommunications system.
6. Break down a system into its main components.
7. Compare and contrast key elements of a telecommunication infrastructure.

EECP 2270	Digital Electronics	3 Credit Hours
Prerequisites:	EETE 2102	
Goal	To provide students with an understanding of the different digital electronic circuits used in Digital Systems.	

Objectives	Outcomes
The course should enable the student to: 1. Understand and analyze switching circuits and devices. 2. Understand the basic operational parameters and characteristics of digital devices. 3. Know the different digital IC new and old families. 4. Understand the operation and applications of Schmitt trigger and multivibrator circuits. 5. Know the conversion circuits used as the interface between analog and digital systems.	A student who satisfactorily completes the course should be able to: 1. Analyze switching circuits, RC circuits and the exponential form of the signal. 2. Describe the operation of switching devices, diode circuits & bipolar and MOSFET as a switch circuit. 3. Describe the input/output voltage and current characteristics of digital devices and the important operational parameters and characteristics of digital devices like fan-out, propagation delay, switching frequency, noise margin, power dissipation and speed-power product. Basic digital terminology including the transfer characteristics, fan out, power dissipation propagation, delay times and noise margins. 4. Describe the differences between logic families RTL, DTL, TTL, CMOS, NMOS, PMOS, ECL and I^2L. 5. Analyze the operation of Schmitt trigger, monostable, astable and bistable multivibrator circuits. 6. Describe the applications 555 IC timer in digital system. 7. Analyze and describe different conversion circuits including A/D and D/A.

EETE 2201	Cable & Fiber Splicing		3 Credit Hours
Prerequisites:	NONE	Co-requisites	EETE 2210
Goal	To build upon students knowledge and skills required to become entry-level technicians in the Telecommunications Network industry.		

Objectives

The course should enable the student to:

1. Identify and describe the characteristics, application and configuration of various cables and terminations
2. Identify and explain the safety precautions, installation techniques and tools used to install copper-based network cabling systems
3. Identify, describe, terminate and test coaxial – cable
4. Identify light communication systems and define key historical development in Fibre Optic technology
5. Identify cabling standards and codes that effect cabling systems to include colour codes, labelling and cabling substitution methods
6. Understand the operation and characteristics of Sources and Detectors used in Fibre Optic systems
7. Terminate both an SC and ST Fibre Optic connector on Fibre Optic light guide building cable and Fibre Optic patch cord
8. Identify and describe the purpose of the components used in Fibre Optic cabling systems.
9. Recognize the standards that apply to Fibre optic network cabling
10. Demonstrate knowledge of pulling and placement of Fibre Optic cabling
1. Identify the correct steps in completing Fibre Optic testing using optic tester, power meter and light source and an OTDR.

Outcomes

The students should be able to:

1. Identify the characteristics and application of Twisted Pair Cables
2. Identify the characteristics and application of 4-Pair UTP Cables
3. Identify the three types of configurations for terminating twisted pair on modular patch cords, plugs and outlets
4. Identify configuration and application of 66-type terminal block
5. Identify configuration and application of 110-type terminal block
6. Identify configuration and application of a modular patch panel
7. Identify characteristics and application of screened 4-Pair twisted cable
8. Identify the characteristics and applications of 25-Pair UTP Cables
9. Identify and explain the safety procedures and precautions that should be followed for personnel protection
10. Identify and explain the safety procedures and precautions that should be followed at the work site
11. Identify and explain the safety procedures and precautions that should be followed to prevent electrical hazard
12. Identify and explain the safety procedures and precautions that should be followed when working with hazardous materials
13. Identify and explain the safety procedures and precautions that should be followed when working with tools and equipment
14. Identify and explain the safety procedures and precautions that should be followed for fire prevention and safety

	15. Identify the minimum distance requirements between network cables and power sources 16. Identify types and location for cable supports 17. Identify and describe the step-by-step process used to pull cable 18. Identify and describe the step-by-step process used to install cable in buildings 19. Identify and describe the tools used in network cabling 20. Identify the characteristics, type and applications of coaxial cable 21. Identify characteristics, type and application of coaxial connectors 22. Identify tools for installing connectors on coaxial cable

EETE 2200	Electronics Skills	3 Credit Hours
Prerequisites:	EETE 2102	
Goal	To introduce students to the practical electronics and modern electronics software by doing small electronics projects. To enhance the students level of confidence in electronics and circuits analysis through design, implementation, and troubleshooting of simple electronics circuits.	

Objectives

The course should enable the student to:

1. Develop basic skills and techniques related to electronics
2. Recognize the basic electronics tools and components, their use and function and relate them to actual circuit wiring
3. Explain the operation of a simple practical circuit
4. Read, Interpret, and design schematic diagrams and PCB drawings
5. Use test equipment to perform basic electronic tests and measurements on circuits and components and recognize the basic failure modes
6. Create basic breadboard, Strip-board, and PCB circuits using a variety of discrete and integrated circuit components.
7. Use tools and techniques to solve electronics problems.

Outcomes

The students should be able to:

1. Demonstrate the ability to work in a safe manner while in the laboratories
2. Identify different types of components, their uses in electronic circuits, and their characteristics using manufacturers' data sheets
3. Explain the terms 'circuit', 'load' , 'source' , 'short-circuit' , 'open-circuit' , and 'overload'
4. Read and interpret Schematic diagrams and implement basic electronic circuits in breadboard
5. Employ techniques to install, terminate, solder and desoldering of electronic components to a Printed Circuit Board
6. transfer schematic diagrams into strip-boards and PCB drawing using computer software
7. Analyze simple circuits using electronic work bench/ Spice software
8. Determine the resistance, voltage, current and power in any part of a series, parallel and series/parallel DC circuit containing one voltage source
9. Set up, operate, and interpret oscilloscope
10. Recognize the importance of: proper solder alloy, cleanliness and heat control used throughout the soldering process
11. demonstrate competency in using various tools and test equipments
12. Develop an effective troubleshooting strategy
13. Build, test, and document a simple group power supply project

PHIL2108	Business Ethics	3 Credit Hours
Prerequisites:	None	
Goal	To equip the student with the highest ethical standards that will guide him/her through real life dilemmas.	

Objectives	Outcomes
The course should enable the student to: 1. Understand the concept of value 2. Understand Islamic and Omani values 3. Understand, appreciate and respect ethnic and cultural diversity 4. Gain the highest work ethics	The students should be able to: 1. Define the concept of values 2. Define how values develop 3. Understand the effects of religion and society on values 4. Understand the effects of Islamic and Omani values on work ethics 5. Define the concept of ethnic and cultural diversity 6. Understand the importance of ethnic and cultural diversity for society and the world 7. Work with people from different ethnicities/cultures 8. Function in a moral and ethical manner in his/her life

EEPW 2320	Instrumentation and Measurement Techniques	3 Credit Hours
Prerequisites:	EETE 2102 and EEPW2150	
Goal	To provide the working principles and applications of different types of measuring instruments and transducers along with their applications.	

Objectives	Outcomes
This course should enable the student to: 1. Understand the operation, principles and characteristics of functional elements in engineering Advanced measurement Techniques. 2. Perceive the principle of operation of Instrumentation systems. 3. Grasp the techniques of electrical measurements and know the range and limitations of measuring instruments. 4. Know the principle of operation of various types of electrical transducers. 5. Understand the operation of Data Acquisition System and Data Conversion. 6. Know how to maintain and test engineering measurement systems.	The students should be able to: 1. Define the functional elements of a typical measurement system and evaluation of its performance. 2. Be acquainted with the principle of operation and construction of Analog indicating instruments. Its calibration. 3. Deal with the principle of operation and construction of Wattmeter and Energy meter. Working of Insulation Megger 4. Get acquainted with the principle of operation and construction of Digital instruments. 5. Get acquainted with the principle of operation and construction of cathode ray oscilloscope. Be familiar with the principle of operation and construction of Instrument Transformers. 6. Get acquainted with the principle of operation of Potentiometers. A.C. D.C. Bridges, Maxwell and Andersons bridges. 7.Identify various types of sensors and transducers 8. Deal with all types of signal processing and conditioning. 9. Be acquainted with all common analogue and digital devices for data presentation.

EETE 2399	Diploma Project	3 Credit Hours
Prerequisites:	**None**	
Goal	To expose each student to the situation where he/she works individually or on a team in a project in the field of electronics and communication engineering.	

Objectives	Outcomes
The course should enable the student to: 1. Integrate the various areas of knowledge he/she gained through the program 2. Consolidate personal confidence in working independently or an a team and improve his/her spirit of performance	The students should be able to: 1. Apply the knowledge he/she gained through the program into an integrated project 2. Demonstrate communication effectiveness through oral presentations and written reports 3. Present the results of work in a seminar and submit a properly written and edited final report 4. Manage his/her time to achieve a time-constrained target 5. Solve engineering problems

Introduction

This project is carried out by the student in the summer term of the Diploma program. This may be

A. One which is based on practical work

B. One, which is mostly theory based, such as design, case study, computer programming, etc.

C. A combination of A and B