



College: **ENGINEERING**
Department: **ELECTRICAL & COMPUTER ENGINEERING**
Cohorts: **2006**
Degree: **B. ENG.**
Major: **ELECTRICAL & COMPUTER ENGINEERING**

<u>Summary of Credits:</u>	
University Requirements (UR)	18
Arabic	3
English	6
Contemporary Omani Society	1
Oman & Islamic Civilization or Islamic Culture	2
Free Elective	6
College Requirements (CR)	35
Math	17
Physics	8
Computer Programming	3
Chemistry	3
Introduction to Engineering	2
Workshop	1
Elective	1
Industrial Trainings (I and II)	0
Department Requirements (DR)	87
Department Core	51
Track Core	27
Track Elective	9
TOTAL	140

For reference contact: Dr. Hadj Bourdoucen (HOD) Ext. 1325

HoD

Date

Dean's Office

Date

Registrar's Office

Date

Department of Electrical and Computer Engineering:

Degree Plan: 2006 Cohorts (Scheme I)

	Course Code	Course Title	Cr.	Lec.	Lab.	Tut.	Pre-req./Co-req.*	Cat.
Semester 1 Fall 2006		Intensive English	0					UR
	Total			0				

Semester 2 Spring 2007	HIST1010	Oman & Islamic Civilization or						
	ISLM1010	Islamic Culture	2	2	-	-		UR
	LANC2160	English for Engineering I	3	3	-	-		UR
	CHEM1071	General Chemistry for Engineers	3	3	-	-		CR
	ENGR1500	Introduction to Engineering	2	1	2	-		CR
	ENGR1600	Workshop I	1	-	2	-		CR
	MATH1106	Pre-Calculus Mathematics	4	3	-	2		CR
Total			15					

Semester 3 Fall 2007	ARAB1001	Arabic	3	3	-	-		UR
	LANC2161	English for Engineering II	3	3	-	-	LANC2160	UR
	SOCI3320	Contemporary Omani Society	1	1	-	-		UR
	MATH2107	Calculus I	4	3	-	2	MATH1106	CR
	PHYS2107	General Physics I	4	3	2	-	MATH2107*	CR
Total			15					

Semester 4 Spring 2008	COMP2002	Intr. to Comp. Program. for Engineers	3	2	-	2		CR
	PHYS 2108	General Physics II	4	3	2	-	PHYS2107	CR
	MATH2108	Calculus II	3	2	-	2	MATH2107	CR
		College Elective ¹	1					CR
	ECCE2016	Circuit Analysis I	3	2	2	-	PHYS2107	DR
	ECCE3206	Digital Logic Design	3	2	2	-		DR
Total			17					

Semester 5 Fall 2008		University Elective	3					UR
	MATH3171	Lin. Alg. & Mult. Calc. for Engineers	3	2	-	2	MATH 2108	CR
	MATH4174	Differential Equations for Engineers	3	2	-	2	MATH 2108	CR
	ECCE3152	Electronics I	3	3	-	-	ECCE2016	DR
	ECCE3016	Circuit Analysis II	3	2	2	-	ECCE2016 + MATH2108	DR
Total			15					

Semester 6 Spring 2009	ECCE3022	Electromagnetics I	3	3	-	-	MATH3171 + PHYS2108	DR
	ECCE3142	Signals & Systems	3	3	-	-	ECCE3016	DR
	ECCE4157	Electronics II	4	3	2	-	ECCE3152	DR
	STAT2103	Probability for Engineers	3	2	-	2	MATH2108*	DR
	ECCE3352	Electrical Technology	3	2	2	-	ECCE3016	DR
Total			16					

¹ e.g. ENGR2015 Introduction to Engineering Drawing or ENGR1601 Workshop II

Department of Electrical and Computer Engineering
Degree Plan: 2006 Cohorts (Scheme II)

Semester 1 Fall 2006	Course Code	Course Title	Cr.	Lec.	Lab.	Tut.	Pre-req./Co-req.*	Cat.
			Intensive English	0	-	-	-	
Total			0					
Semester 2 Spring 2007		Intensive English	0	-	-	-		UR
	Total			0				

Semester 3 Fall 2007		University Elective	3	-	-	-		UR
	ARAB1001	Arabic	3	3	-	-		UR
	LANC2160	English for Engineering I	3	3	-	-		UR
	ENGR1500	Introduction to Engineering	2	-	-	-		CR
	ENGR1600	Workshop I	1	-	2	-		CR
	MATH1106	Pre-Calculus Mathematics	4	3	-	2		CR
	Total			16				

Semester 4 Spring 2008	HIST1010	Oman & Islamic Civilization or						
	ISLM1010	Islamic Culture	2	2	-	-		UR
	SOCI3320	Contemporary Omani Society	1	1	-	-		UR
	LANC2161	English for Engineering II	3	3	-	-	LANC 2160	UR
	CHEM1071	General Chemistry for Engineers	3	3	-	-		CR
	MATH2107	Calculus I	4	3	-	2	MATH1106	CR
	PHYS2107	General Physics I	4	3	2	-	MATH2107*	CR
Total			17					

Summer 2008	MATH2108	Calculus II	3	2	-	2	MATH2107	CR
	ECCE2016	Circuit Analysis I	3	2	2	-	PHYS2107	DR
	Total			6				

Semester 5 Fall 2008	MATH3171	Lin. Alg. & Mult. Calc. for Engineers	3	2	-	2	MATH 2108	CR
	PHYS 2108	General Physics II	4	3	2	-	PHYS2107	CR
	COMP2002	Intr. to Comp. Program. for Engineers	3	2	-	2		CR
		College Elective ²	1	-	-	-		CR
	ECCE3152	Electronics I	3	3	-	-	ECCE2016	DR
	ECCE3016	Circuit Analysis II	3	2	2	-	ECCE2016+MATH2108	DR
Total			17					

Semester 6 Spring 2009	MATH4174	Differential Equations for Engineers	3	2	-	2	MATH 2108	CR
	ECCE3022	Electromagnetics I	3	3	-	-	MATH3171+PHYS2108	DR
	ECCE3206	Digital Logic Design	3	2	2	-		DR
	ECCE4157	Electronics II	4	3	2	-	ECCE3152	DR
	STAT2103	Probability for Engineers	3	2	-	2	MATH2108*	DR
	Total			16				

Summer 2009	ECCE3142	Signals & Systems	3	3	-	-	ECCE3016	DR
	ECCE3352	Electrical Technology	3	2	2	-	ECCE3016	DR
	Total			6				

² e.g. ENGR2015 Introduction to Engineering Drawing or ENGR1601 Workshop II

Department of Electrical and Computer Engineering

Degree Plan: 2006 Cohorts (Schemes I & II): Communications and Signal Processing Track

	Course Code	Course Title	Cr.	Lec.	Lab.	Tut.	Pre-req./Co-req.*	Cat.
Semester 7 Fall 2009	ECCE3036	Measurements & Instrumentation	3	2	2	-	ECCE3016+ECCE3152	DR
	ECCE4122	Principles of Analog & Digital Comm.	3	3	-	-	ECCE3142	DR
	ECCE4227	Embedded Systems	3	2	2	-	ECCE3206 + COMP2002	DR
	MATH3340	Discrete Mathematics for CS	3	2	-	2	MATH2107+COMP2002	DR
	MATH4452	Introduction to complex variables	3	-	-	-	MATH3171	DR
Total			15					

January 2010	ENGR3006	Industrial Training I	0	-	-	-	ECCE3152	CR
	Total		0					

Semester 8 Spring 2010	ECCE4022	Electromagnetics II	3	3	-	-	ECCE3022	DR
	ECCE4242	Introduction to Computer Networks	3	3	-	-	ECCE4122* or COMP3518*	DR
	ECCE4124	Digital Communications	4	3	2	-	ECCE4122	DR
	ECCE4142	Digital Signal Processing	3	3	-	-	ECCE3142	DR
	ECCE5004	Eng. Management & Economics I	3	3	-	-		DR
	ECCE4080	Seminars and Field-Work	0	-	-	-		DR
Total			16					

Summer 2010	ENGR4006	Industrial Training II	0	-	-	-	ENGR3006	CR
	Total		0					

Semester 9 Fall 2010	ECCE5009	Project (Part I)	2	-	-	-		DR
		University Elective	3	-	-	-		UR
	ECCE5112	Antennas & Wave Propagation	3	3	-	-	ECCE4022	DR
	ECCE5123	Optical Communications	3	3	-	-	ECCE4122	DR
	ECCE5143	Advanced Digital Signal Processing	3	3	-	-	ECCE4142	DR
	ECCE5xxx*	Track Elective	3	-	-	-		DR
Total			17					

Semester 10 Spring 2011	ECCE5099	Project (Part II)	3	-	-	-	ECCE5009	DR
	ECCE5124	Wireless Communications	3	3	-	-	ECCE5112 + ECCE4124	DR
	ECCE5125	Advanced Communications Lab.	2	-	2	-	ECCE4124	DR
	ECCE5xxx*	Track Elective	3	-	-	-		DR
	ECCE5xxx*	Track Elective	3	-	-	-		DR
Total			14					

*or ECCE4xxx

Department of Electrical and Computer Engineering
Degree Plan: 2006 Cohorts (Schemes I & II): Computer Systems and Networks Track

	Course Code	Course Title	Cr.	Lec.	Lab.	Tut.	Pre-req./Co-req.*	Cat.
Semester 7 Fall 2009	ECCE3036	Measurements & Instrumentation	3	2	2	-	ECCE3016+ECCE3152	DR
	ECCE4122	Principles of Analog & Digital Comm.	3	3	-	-	ECCE3142	DR
	ECCE4227	Embedded Systems	3	2	2	-	ECCE3206 + COMP2002	DR
	MATH3340	Discrete Mathematics for CS	3	2	-	2	MATH2107+COMP2002	DR
	MATH4452	Introduction to complex variables	3	-	-	-	MATH3171	DR
Total			15					

January 2010	ENGR3006	Industrial Training I	0	-	-	-	ECCE3152	CR
	Total		0					

Semester 8 Spring 2010	ECCE4252	Data Structure & Algorithms	3	3	-	-	COMP2002	DR
	ECCE4416	Linear Control Systems	3	2	2	-	MATH4174 + ECCE3142	DR
	ECCE4242	Introduction to Computer Networks	3	3	-	-	ECCE4122* or COMP3518*	DR
	ECCE5223	Adv Embedded Systems Design	3	2	2	-	ECCE4226 or ECCE4227	DR
	ECCE5232	Computer Architecture & Organ.	3	3	-	-	ECCE4226 or ECCE4227	DR
	ECCE4080	Seminars and Field-Work	0	-	-	-		DR
Total			15					

Summer 2010	ENGR4006	Industrial Training II	0	-	-	-	ENGR3006	CR
	Total		0					

Semester 9 Fall 2010	ECCE5009	Project (Part I)	2	-	-	-		DR
	ECCE5242	Advanced Computer Networks	3	3	-	-	ECCE4242	DR
	ECCE4254	Operating Systems	3	3	-	-	COMP2002	DR
	ECCE5245	Computer Lab.	2	-	4	-	ECCE4242	DR
	ECCE5004	Eng. Management & Economics I	3	3	-	-		DR
	ECCE5xxx*	Track Elective	3	-	-	-		DR
Total			16					

Semester 10 Spring 2011		University Elective	3	-	-	-		UR
	ECCE5099	Project (Part II)	3	-	-	-	ECCE5009	DR
	ECCE5235	Advanced Computer Lab.	1	-	2	-	ECCE5232	DR
	ECCE5252	Software Engineering Practice	3	3	-	-	ECCE5232	DR
	ECCE5xxx*	Track Elective	3	-	-	-		DR
	ECCE5xxx*	Track Elective	3	-	-	-		
Total			16					

*or ECCE4xxx

Department of Electrical and Computer Engineering

Degree Plan: 2006 Cohorts (Schemes I & II): Industrial Electronics and Control Track

	Course Code	Course Title	Cr.	Lec.	Lab.	Tut.	Pre-req./Co-req.*	Cat.
Semester 7 Fall 2009	ECCE3036	Measurements & Instrumentation	3	2	2	-	ECCE3016+ECCE3152	DR
	ECCE4122	Principles of Analog & Digital Comm.	3	3	-	-	ECCE3142	DR
	ECCE4227	Embedded Systems	3	2	2	-	ECCE3206 + COMP2002	DR
	MATH3340	Discrete Mathematics for CS	3	2	-	2	MATH2107+COMP2002	DR
	MATH4452	Introduction to complex variables	3	-	-	-	MATH3171	DR
	Total		15					

January 2010	ENGR3006	Industrial Training I	0	-	-	-	ECCE3152	CR
		Total	0					

Semester 8 Spring 2010	ECCE4416	Linear Control Systems	3	2	2	-	MATH4174 + ECCE3142	DR
	ECCE4356	Electrical Machines I	3	2	2	-	ECCE3352	DR
	ECCE4142	Digital Signal Processing	3	3	-	-	ECCE3142	DR
	ECCE4466	Power Electronics	3	2	2	-	ECCE3154 or ECCE4157	DR
	ECCE4456	Sensors and Sensor Systems	3	3	-	-	ECCE3036	DR
	ECCE4080	Seminars and Field-Work	0	-	-	-		DR
	Total		15					

Summer 2010	ENGR4006	Industrial Training II	0	-	-	-	ENGR3006	CR
		Total	0					

Semester 9 Fall 2010	ECCE5009	Project (Part I)	2	-	-	-		DR
	ECCE4422	Digital Control Systems	3	3	-	-	ECCE4416	DR
	ECCE4436	Industrial Control Systems Design	3	3	-	-	ECCE4416	DR
	ECCE5452	Computer-Aided Instrumentation	3	2	2	-	ECCE4456 + ECCE4226 or ECCE4227	DR
	ECCE5004	Eng. Management & Economics I	3	3	-	-		DR
	ECCE5xxx*	Track Elective	3	-	-	-		DR
	Total		17					

Semester 10 Spring 2011		University Elective	3	-	-	-		UR
	ECCE5099	Project (Part II)	3	-	-	-	ECCE5009	DR
	ECCE5464	Advanced Power Electronics	3	-	-	-	ECCE4466	DR
	ECCE5xxx*	Track Elective	3	-	-	-		DR
	ECCE5xxx*	Track Elective	3	-	-	-		DR
	Total		15					

*or ECCE4xxx

Department of Electrical and Computer Engineering
Degree Plan: 2006 Cohorts (Schemes I & II): Power Systems and Energy Track

	Course Code	Course Title	Cr.	Lec.	Lab.	Tut.	Pre-req./Co-req.*	Cat.
Semester 7 Fall 2009	ECCE3036	Measurements & Instrumentation	3	2	2	-	ECCE3016+ECCE3152	DR
	ECCE4122	Principles of Analog & Digital Comm.	3	3	-	-	ECCE3142	DR
	ECCE4227	Embedded Systems	3	2	2	-	ECCE3206 + COMP2002	DR
	MATH3340	Discrete Mathematics for CS	3	2	-	2	MATH2107+COMP2002	DR
	MATH4452	Introduction to complex variables	3	-	-	-	MATH3171	DR
	Total		15					

January 2010	ENGR3006	Industrial Training I	0	-	-	-	ECCE3152	CR
		Total	0					

Semester 8 Spring 2010	ECCE4022	Electromagnetic II	3	3	-	-	ECCE3022	DR
	ECCE4312	Power System Analysis I	3	3	-	-	ECCE3352	
	ECCE4356	Electrical Machines I	3	2	2	-	ECCE3352	
	ECCE4416	Linear Control Systems	3	2	2	-	MATH4174 + ECCE3142	DR
	ECCE5004	Eng. Management & Economics I	3	3	-	-		DR
	ECCE4080	Seminars and Field-Work	0	-	-	-		DR
	Total		15					

Summer 2010	ENGR4006	Industrial Training II	0	-	-	-	ENGR3006	CR
		Total	0					

Semester 9 Fall 2010	ECCE5009	Project (Part I)	2	-	-	-		DR
	ECCE4316	Power System Analysis II	3	2	2	-	ECCE4312	DR
	ECCE4357	Electrical Machines II	3	2	2	-	ECCE4356	DR
	ECCE5332	High Voltage Engineering	3	2	2	-	ECCE4022* + ECCE4312	DR
	ECCE5xxx*	Track Elective	3	-	-	-		DR
		University Elective	3	-	-	-		UR
	Total		17					

Semester 10 Spring 2011	ECCE5099	Project (Part II)	3	-	-	-	ECCE5009	DR
	ECCE5303	Power Distribution System Eng.	3	3	-	-	ECCE4316	DR
	ECCE5302	Power Systems Protection	3	2	2	-	ECCE4316	DR
	ECCE5xxx*	Track Elective	3	-	-	-		DR
	ECCE5xxx*	Track Elective	3	-	-	-		DR
		Total		15				

*or ECCE4xxx

LIST OF DEPARTMENTAL CORE COURSES

Code	Title	Credits	Pre-Requisite / Co-req. *
ECCE2016	Circuit Analysis I	3	PHYS2107
ECCE3206	Digital Logic Design	3	
ECCE3152	Electronics I	3	ECCE2016
ECCE3016	Circuit Analysis II	3	ECCE2016 + MATH2108
ECCE3022	Electromagnetics I	3	MATH3171 + PHYS2108
ECCE3142	Signals & Systems	3	ECCE3016
ECCE4157	Electronics II	4	ECCE3152
ECCE3352	Electrical Technology	3	ECCE3016
ECCE3036	Measurements & Instrumentation	3	ECCE3016 + ECCE3152
ECCE4122	Principles of Analog & Digital Comm.	3	ECCE3142
ECCE4227	Embedded Systems	3	ECCE3206 + COMP2002
ECCE5004	Eng. Management & Economics I	3	
ECCE4080	Seminars and Field-Work	0	
ECCE5009	Project (Part I)	2	
ECCE5099	Project (Part II)	3	ECCE5009
MATH3340	Discrete Mathematics for CS	3	MATH2107+COMP2002
MATH4452	Introduction to complex variables	3	MATH3171
STAT2103	Probability for Engineers Probability/Stat.	3	MATH2108*
Total		51	

LIST OF ELECTIVES: COMMUNICATIONS AND SIGNAL PROCESSING TRACK

Code	Title	Credits	Pre-Requisite / Co-req. *
ECCE4226	Microprocessors	3	ECCE3206
ECCE4253	Object Oriented Programming	3	COMP2002
ECCE4263	Database Systems	3	COMP2002
ECCE4264	Teletraffic Engineering	3	ECCE4122
ECCE4272	Artificial Intelligence	3	
ECCE4416	Linear Control Systems	3	MATH4174 + ECCE3142
ECCE5005	Engineering Management & Economics II	3	ECCE5004
ECCE5008	Project Management	3	ECCE5004
ECCE5122	Communication Systems	3	ECCE4124 or ECCE3122
ECCE5132	Information Theory	3	ECCE4122
ECCE5133	Satellite Communications	3	ECCE4122 or ECCE3122
ECCE5134	Selected Topics in Communications	3	ECCE4122
ECCE5142	Image and Video Processing	3	ECCE4142
ECCE5152	Electronic Communication Circuits	3	ECCE3154 or ECCE4157
ECCE5162	Microwave Engineering	3	ECCE4022
ECCE5242	Advanced Computer Networks	3	ECCE4242
ECCE5243	Network Software Design & Programming	3	ECCE4242
ECCE5262	Multimedia Coding & Processing	3	ECCE4242
ECCE5263	Information Systems Analysis & Design	3	ECCE3122 or ECCE4122
ECCE5264	Information Systems Management	3	ECCE3122 or ECCE4122
ECCE5282	Computer Network Security	3	ECCE4242
ECCE5283	Cryptography, Security & e-Business	3	ECCE4242
ECCE5443	Optimization Techniques in Engineering	3	MATH3171

LIST OF ELECTIVES: COMPUTER SYSTEMS AND NETWORKS TRACK

Code	Title	Credits	Pre-Requisite / Co-req. *
ECCE4142	Digital Signal Processing	3	ECCE3142
ECCE4203	Advanced Logic Design	3	ECCE3206
ECCE4213	Digital Electronics – Reliability and Testing	3	ECCE3152
ECCE4226	Microprocessors	3	ECCE3206
ECCE4232	Introduction to Distributed & Parallel Systems	3	ECCE4226 or ECCE4227
ECCE4253	Object Oriented Programming	3	COMP2002
ECCE4263	Database Systems	3	COMP2002
ECCE4264	Teletraffic Engineering	3	ECCE4122
ECCE4272	Artificial Intelligence	3	
ECCE4282	Coding and Data Encryption	3	ECCE3122 or ECCE4122
ECCE5005	Engineering Management & Economics II	3	ECCE5004
ECCE5008	Project Management	3	ECCE5004
ECCE5132	Information Theory	3	ECCE3122 or ECCE4122
ECCE5211	Diagnosis & Design of Reliable Digital Systems	3	ECCE3206
ECCE5212	VLSI Design	3	ECCE3154 or ECCE4157
ECCE5213	Fault-Tolerant Computing Systems	3	ECCE4226 or ECCE4227
ECCE5222	Microprocessor Interfacing	3	ECCE4226 or ECCE4227
ECCE5224	Microprocessor Based Control Design	3	ECCE4226 or ECCE4227+ ECCE4416
ECCE5233	Computer Architecture and Organization II	3	ECCE5232
ECCE5243	Network Software Design & Programming	3	ECCE4242
ECCE5253	Java Programming	3	
ECCE5254	Programming in C++	3	
ECCE5262	Multimedia Coding & Processing	3	ECCE4242
ECCE5263	Information Systems Analysis & Design	3	ECCE3122
ECCE5264	Information Systems Management	3	ECCE3122
ECCE5275	Neural Networks and Fuzzy systems	3	
ECCE5282	Computer Network Security	3	ECCE4242
ECCE5283	Cryptography, Security & e-Business	3	ECCE4242
ECCE5292	Selected Topics in Computer Engineering	3	ECCE4226 or ECCE4227+ ECCE4242
ECCE5443	Optimization Techniques in Engineering	3	MATH3171

LIST OF ELECTIVES: INDUSTRIAL ELECTRONICS AND CONTROL TRACK

Code	Title	Credits	Pre-Requisite / Co-req. *
ECCE4226	Microprocessors	3	ECCE3206
ECCE4272	Artificial Intelligence	3	
ECCE5005	Engineering Management & Economics II	3	ECCE5004
ECCE5008	Project Management	3	ECCE5004
ECCE5224	Microprocessor Based Control Design	3	ECCE4226 or ECCE4227+ ECCE4416
ECCE5275	Neural Networks and Fuzzy systems	3	
ECCE5412	Mechatronics	3	ECCE4416 + ECCE3154 or ECCE4157
ECCE5422	Selected Topics in Control Systems	3	ECCE4422
ECCE5423	Robotics and vision	3	ECCE4416
ECCE5432	Programmable Logic Control Systems	3	ECCE3206 + ECCE4416
ECCE5433	Modern Control Systems	3	ECCE4416
ECCE5434	System Dynamics and Simulation	3	ECCE3142
ECCE5443	Optimization Techniques in Engineering	3	MATH3171
ECCE5462	Electric Drives	3	ECCE4466
MEIE3150	Manufacturing Processes	3	
MEIE5041	Quality Control	3	

LIST OF ELECTIVES: POWER SYSTEMS AND ENERGY TRACK

Code	Title	Credits	Pre-Requisite / Co-req. *
ECCE4142	Digital Signal Processing	3	ECCE3142
ECCE4226	Microprocessors	3	ECCE3206
ECCE4422	Digital Control Systems	3	ECCE4416
ECCE4456	Sensors and Sensor Systems	3	ECCE3036
ECCE4466	Power Electronics	3	ECCE3154 or ECCE4157
ECCE5005	Engineering Management & Economics II	3	ECCE5004
ECCE5008	Project Management	3	ECCE5004
ECCE5304	Power Stations	3	ECCE4316
ECCE5312	Power Systems Control and Stability	3	ECCE4316
ECCE5313	Electric Power Transmission System Eng.	3	ECCE4316
ECCE5314	Selected Topics in Power	3	ECCE4312
ECCE5322	Electrical Power Systems Quality	3	ECCE4312
ECCE5323	Power System operation	3	ECCE4316
ECCE5324	Power System Reliability and Planning	3	ECCE4312
ECCE5333	Power System Economics	3	ECCE2016 (dated 4/9/2005)
ECCE5342	Electrical Engineering Material	3	ECCE3022
ECCE5352	Generalized Machine Theory	3	ECCE4357
ECCE5353	Special Electrical Machines	3	ECCE4357
ECCE5443	Optimization Techniques in Engineering	3	MATH3171
ECCE5464	Advanced Power Electronics	3	ECCE4466

Track coordinators:

1. **Communications and Signal Processing**
2. **Computer Systems and Networks**
3. **Industrial Electronics and Control**
4. **Power Systems and Energy**

Dr. Joseph Jervase
 Mr. Ahmed Al-Maashari
 Dr. Faical Mnif
 Dr. Arif Saeed Malik