# Spring 2015/3016
# POWE238 – Electronics

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| **Curricular Area** | **Electrical Engineering/ power and mechanical** | |
| **Type of Course** | Core (2 crd) | |
| **Prerequisites by Courses** | POWE210 | |
| **Instructors** | M. Tarnini<br>m.tarnini@bau.edu.lb<br>Engineering Building – G111<br>Phone Ext: 3404 | |
| **Office Hours** | Monday 9:00 → 1:00<br>Wed 9 → 10:00 and 1:00 → 2:00<br>Th 11:00 → 3:00 | |
| **Textbook** | **Power Electronics (Daniel Hart)** 2011 | |
| **Reference Books** | Power Elec. Rashide | |
| **Topics** | *Subjects covered* | *Week* |
| | • Revision of basic AC circuits<br>• RLC Circuit | 1 |
| | • Power electronics definition<br>• Converter classifications<br>• Concepts<br>• Electronics switches (diode thy) | 2 |
| | • Electronic switches (IGBT, MOSFET, BJT)<br>• Characteristics and curves<br>• Switch selection (voltage control and current control) | 3 |
| | • Thyristor firing circuit (circuit)<br>• Diac and Triac Firing circuit exp. And simulation<br>• Building of power electronic circuits including diodes and switch | 4 |
| | • Power and energy of switches<br>• Average power and energy recovery<br>• Effective values RMS APP. power and power factor | 5 |
| | • Fourier series and Average power, nonsinusoidal sources and linear loads<br>• Power computation by PSIM | 6 |

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| | • Introduction to amplifier<br>• Amplifier as amplification source<br>• Amplifier as diff.<br>• Amplifier as difference for two sources<br>• Amplifier as integrator | 7 |
| | • SCR Application (DC motor control) building circuits<br>• Crowbar protection circuit<br>• Thyristor and RC control angle circuit | 8 |
| | • Half wave rectifier with R and RL loads<br>• RL Source load (supplying power to a DC from an AC source)<br>• Freewheeling diode | 9 |
| | • Half wave rectifier with C filter<br>• Controlled half wave rectifier by using convenient switches with R load<br>• Controlled with RL load | 10 |
| | • Controlled of full-wave rectifier with Rload<br>• With RL load continuous and discontinuous current | 11 |
| | • Single phase uncontrolled full wave rectifier (bridge) and center tapped transformer rectifier all with R load and with RL load | 12 |
| | • Single phase controlled full wave rectifier (bridge) and center tapped transformer rectifier all with R load and with RL load | 13 |
| | • Buck converter for linear mode with all v-I equations. Design and ripple calculation. applications | 14 |
| | • Boost converter for linear mode with all v-I equations. Design and ripple calculation<br>• Buck- boost converter | 15 |

***Assessment:***

| Assessment: | Dates | Weighing |
|---|---|---|
| Midterm_1 | 20-3-2016 | 30% |
| Midterm_2 | 4-5-2016 | 30% |
| Final Exam | To be set later by BAU registrar | 40% |
| Total | | 100% |

**ملاحظات:**

١. محاولة الغش تعتبر غش لاغي بشكل نهائي لأي امتحان تمت فيه محاولة الغش

٢. التغيب فوق النسبة المسموح فيها تؤدي الى سحب المقرر بشكل تلقائي بعد ارسال تحذيرين متتاليين للطالب

٣. اتماما المشاريع بشكل متقن وصحيح يعني منح الطالب زيادة في الدرجات تصل الى ١٠% كحد اقصى

٤. اثارة الفوضى والازعاج تؤدي الى منح الطالب انذارات قد تؤدي الى سحب المادة او الى حسم من درجاته الفعلية