ANNEX 2 – COURSE DESCRIPTION

Course Title	**POWER SYSTEM PROTECTION**				
Course Code	AEEE533				
Course Type	Technical Elective				
Level	MSc (Level 2)				
Year / Semester	2nd Fall				
Teacher's Name	Dr Alexis Polycarpou				
ECTS	8	Lectures / week	3	Laboratories/week	0
Course Purpose	The aim of the course is to provide knowledge to students to be able to analyse and evaluate the effect of various faults on Power Systems. All types of balanced and unbalanced faults are considered.				
Learning Outcomes	By the end of the course, students must be able to: 1. Analyse types and operation of switchgear, isolators, circuit breaker operation and design. 2. Analyse and assess operating characteristics of fuses, protecting radial feeder circuit with fuses. 3. Calculate parameters regarding unit, non-unit protection, zones of protection, backup protection. 4. Analysis of IDMT (inverse definite medium time) relay types. 5. Calculation of relay current settings, relay time settings. Sizing a relay for a specific application. 6. Determine characteristics, applications and limitations of power system transducers.				
Prerequisites	AEEE521, AEEE522	Corequisites	None		
Course Content	**Introduction to protection**: types of protection systems and protection device design (oil, air, vacuum, and sf6). Introduction to protection principles. **Fuse:** operating characteristics of a fuse, rupture time, energy let through, use of fuses for protection of radial feeders. **The protection overlay**: unit protection, circulating current , voltage balanced differential scheme, non-unit protection, zones of operation of				

	protection device, primary and secondary protection, dual/main protection schemes. **Overcurrent relays**: IDMT operating characteristics, static and digital relays. **Relay application for protection of feeder circuits**: relay current settings (min, max, chosen), time multiplier setting, protection of feeder circuits, parallel feeders. **Power system transducers**: current transformers, operation, saturation, voltage transformers, errors, tests associated with protection
Teaching Methodology	Students are taught the course through lectures (3 hours per week) in class rooms, by means of traditional tools. Auditory exercises, where examples regarding matter represented at the lectures, are solved and further, questions related to particular open-ended topic issues are compiled by the students and answered, during the lecture or assigned as homework. Topic notes are compiled by students, during the lecture which serve to cover the main issues under consideration. Students are also advised to use the subject's textbook or reference books for further reading and practice in solving related exercises. Tutorial problems are also submitted as homework and these are solved during lectures or privately during lecturer's office hours. Students are prepared for final exam, by revision on the matter taught, problem solving and concept testing and are also trained to be able to deal with time constraints and revision timetable. The final assessment of the students is formative and is assured to comply with the subject's expected learning outcomes and the quality of the course.
Bibliography	**Textbooks:** • Fundamentals of power system protection, Y.G. PAITHANKAR, S.R. BHIDE, 2nd edition, 2010, ISBN: 978-81-203-4123-4 **References:** • Power system protection , IEEE press series on Power engineering, 1999, Paul, M. Anderson, IEEE, ISBN: 0-7803-3427-2. • PPT presentations provided by the lecturer.
Assessment	The Students are assessed via continuous assessment throughout the duration of the Semester, which forms the Coursework grade and the final

	written exam. The coursework and the final exam grades are weighted 40% and 60%, respectively, and compose the final grade of the course. Mid-term test assessments are used for the continuous assessment of the students, Group research project is also used. The assessment weight, date and time of each type of continuous assessment is being set at the beginning of the semester via the course outline. An indicative weighted continuous assessment of the course is shown below: • Mid-Term written exams 70% • Group Research project 30% Students are prepared for final exam, by revision on the matter taught, and problem solving and are also trained to be able to deal with time constrains. The final assessment of the students is formative and summative and is assured to comply with the subject's expected learning outcomes and the quality of the course.
Language	**English**