

UNITE! Course catalogue (Autumn 2021)

KTH Royal Institute of Technology
Sweden

Course name	Credits (ECTS)	Professor	Level	N. of available positions for UI students	Link to Syllabus	Specific requirements for participation	Course start-end dates	Exam dates	Additional information	Teaching modality (synchronous/integrated to local students studying pace OR asynchronous)
MJ2480 Introduction to Computational Fluid Dynamics and Mathematics	6	Prof. Andrew Martin	Master	6 (total)	https://www.kth.se/student/kurser/kurs/MJ2480?l=en	Degree of Bachelor (Master of Science in Engineering) or the equivalent	2021/08/30 - 2022/01/17	No exams in the course	General information on courses at KTH: https://www.kth.se/en/student/kurs	Synchronous
MJ2411 Renewable Energy Technology	6	Prof. Andrew Martin/Jeevan Jayasuriya	Master	6 (total)	https://www.kth.se/student/kurser/kurs/MJ2411?l=en	B.Sc. in Engineering with prerequisite in MJ1112 Thermodynamics 9 ECTS or corresponding knowledge. Minimum 5 ECTS thermodynamics	2021/08/30 - 2022/01/17	11-15 October : Control test 1 13-17 December: Control test 2	Information on course for corresponding knowledge: MJ1112 Thermodynamics 9 ECTS https://www.kth.se/student/kurser/kurs/MJ1112?l=en General information on courses at KTH: https://www.kth.se/en/student/kurs	Synchronous
MJ2413 Energy and Environment	6	Prof. Viktoria Martin	Master	6 (total)	https://www.kth.se/student/kurser/kurs/MJ2413?l=en	Degree of Bachelor (Master of Science in Engineering) or the equivalent	2021/08/30 - 2022/01/17	13-17 December: Project examination 20-24 December: Take-home written exam	General information on courses at KTH: https://www.kth.se/en/student/kurs	Synchronous
MJ2503 Small Scale Polygeneration	6	Associate prof. Anders Malmquist	Master	6 (total)	https://www.kth.se/student/kurser/kurs/MJ2503	Degree of Bachelor (Master of Science in Engineering) or the equivalent	2021/08/30 - 2022/01/17	25-29 October	General information on courses at KTH: https://www.kth.se/en/student/kurs	Synchronous

Universidade de Lisboa – IST
Portugal

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Biofuels	6	Joana Neiva Correia	Master	10 (total)	https://fenix.tecnico.ulisboa.pt/cursos/mege/disciplina-	no	27/09/21 - 12/11/21	15/11/21 - 26/11/21	tbc	tbc
Energy Systems Management	6	Carlos Santos Silva	Master	10 (total)	https://fenix.tecnico.ulisboa.pt/cursos/mege/disciplina-	no	27/09/21 - 12/11/21	15/11/21 - 26/11/21	tbc	tbc
Energy Storage	6	Fátima Montemor	Master	10 (total)	https://fenix.tecnico.ulisboa.pt/cursos/mege/disciplina-	no	27/09/21 - 12/11/21	15/11/21 - 26/11/21	tbc	tbc
Hydropower	6	Helena Ramos	Master	10 (total)	https://fenix.tecnico.ulisboa.pt/cursos/mege/disciplina-	no	27 Sep - 12 Nov / 29 Nov-22 Dec / 3 Jan-28 Jan	15 Nov - 26 Nov/ 31 Jan-09 Feb	tbc	tbc
Wind Energy	6	Ricardo Pereira	Master	10 (total)	https://fenix.tecnico.ulisboa.pt/cursos/mege/disciplina-	no	27 Sep - 12 Nov / 29 Nov-22 Dec / 3 Jan-28 Jan	15 Nov - 26 Nov/ 31 Jan-09 Feb	tbc	tbc
Offshore Wind Energy	6	Ricardo Pereira	Master	10 (total)	https://fenix.tecnico.ulisboa.pt/cursos/mege/disciplina-	no	27 Sep - 12 Nov / 29 Nov-22 Dec / 3 Jan-28 Jan	15 Nov - 26 Nov/ 31 Jan-09 Feb	tbc	tbc
Solar Thermal Energy	6	Filipe Mendes	Master	10 (total)	https://fenix.tecnico.ulisboa.pt/cursos/mege/disciplina-	no	27/09/21 - 12/11/21	15/11/21 - 26/11/21	tbc	tbc

Grenoble INP-UGA
France

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Design Models for Power Electronics	5	jean-luc.schanen@grenoble-inp.fr	M2	6 (total)	Not up to date - will be updated soon: description on last cell of the row	Power Electronics fundamentals (topologies, basic rules)	1/9/2020	January 22	The main objective of this course is to provide models for understanding and computing all necessary aspects useful for designing a power electronics converter: passives (inductors, capacitors), thermal (semiconductor losses, heatsink), and EMC (Electromagnetic Compatibility filters). A final project will gather all these models to design a case study using optimization techniques.	Mainly Asynchronous mode.
Optimization for energy systems	6	ahmad.hablv@grenoble-inp.fr	M2	12 (total)	http://www.gipsa-lab.grenoble-inp.fr/~ahmad.hablv/courses.html	programming and some mathematical notions	1/9/2021	January 22		Mainly Asynchronous mode.
Heat and Mass Transfer	5	samuel.siedel@grenoble-inp.fr	M1	6 (total)	https://theses.grenoble-inp.fr/en/academics/heat-and-mass-transfer-4	Thermodynamic basis - Thermal modeling Basic - Heat transfer	1/9/2021	January 22		Asynchronous mode.

Aalto University
Finland

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AAE-E3100 Energy Carriers D	5	Martti Larmi	Master and Doctoral	12 (total)	https://poodi.aalto.fi/a/opintiaikstied.jsp?Opinkohd=1142146526&haettuOpa		I teaching period (Autumn) (see sheet 2 for study period dates)		Note from Aalto: Regrettably only able to process the number of applications indicated in the list of courses offered for Unite! Students.	
AAE-E3120 Circular Economy for Energy Storage	5	Annukka Santasalo-Aarnio	Master and Doctoral	12 (total)	https://poodi.aalto.fi/a/opintiaikstied.jsp?Kiel=6&html=1&Tunniste=AAE-E3120		18/10/21 - 22/11/21	Last week during the course	Note from Aalto: Regrettably only able to process the number of applications indicated in the list of courses offered for Unite! Students.	
EEN-E3007 Process Integration and Energy Optimization D	5	Risto Lahdelma	Master and Doctoral	12 (total)	https://poodi.aalto.fi/a/opintiaikstied.jsp?Opinkohd=1125469287&haettuOpa		II teaching period (Autumn) (see sheet 2 for study period dates)		Note from Aalto: Regrettably only able to process the number of applications indicated in the list of courses offered for Unite! Students.	
PHYS-G6370 Fundamentals of New Energy Sources	5	Peter Lund, Muhammad Asghar	Master	12 (total)	https://poodi.aalto.fi/a/opintiaikstied.jsp?Opinkohd=1113003828&haettuOpa		I-II teaching period (Autumn) (see sheet 2 for study period dates)		Note from Aalto: Regrettably only able to process the number of applications indicated in the list of courses offered for Unite! Students.	
ELEC-E8409 High Voltage Engineering	5	Matti Lehtonen	Master	6 (total)	https://poodi.aalto.fi/a/opintiaikstied.jsp?Opinkohd=1121471987&haettuOpa		I-II teaching period (Autumn) (see sheet 2 for study period dates)		Note from Aalto: Regrettably only able to process the number of applications indicated in the list of courses offered for Unite! Students.	

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Renewable Energies, Energy scenarios and Climate protection	5	Prof. Dr. rer. nat. Liselotte Schebek	Master	2 per home university	(data from the winter semester 2020/21) https://www.tu-darmstadt.de/scripts/mgrqispi.dll?APPNAME=CampusNet&PRGNAME=COURSEDETAILS&ARGLUMENTS=-N000000000000001.-N000335.-NO.-N375083760390016.-N375083760383017.-NO.-NO.-N3	participation in the regular synchronous tutorials	18.10.2021 - 18.02.2022	no fixed date yet - in February or March 2022	The lecture introduces the students to system considerations of problems of the future energy supply. In the lecture the topics societal challenges, characteristics of renewable energies as well as system technical and political approaches for the development of strategies for "sustainable" energy systems will be dealt with. Lecture units: 0. Introduction and Administration 1. Energy Systems: Today's energy system and the role of Fossil energies 2. Climate Change and Global Warming 3. Scenario analysis and development 4. Global energy scenarios and the role of Renewables 5. Electricity: Renewables' potential and technologies (I) 6. Electricity: Renewables' potential and technologies (II) 7. Heat and Fuels: Renewables' potential and technologies 8. Life Cycle Assessment/Sustainability/Critical Raw Materials of Renewables 9. Energy Policy and Renewables (I) 10. Energy Policy and Renewables (II) 11. Energy system models 12. Demand sectors and efficiency 13. Sector coupling, transport and storage 14. Transformation of Energy systems: Example of German Energiewende	
Energy Technologies in Mechanical Engineering	5	Dr. Paul Michael Falk	Master	2 per home university	(data from the winter semester 2020/21) https://www.tu-darmstadt.de/scripts/mgrqispi.dll?APPNAME=CampusNet&PRGNAME=COURSEDETAILS&ARGLUMENTS=-N000000000000001.-N000335.-NO.-N375083760390016.-N375083760383017.-NO.-NO.-N3		18.10.2021 - 18.02.2022	no fixed date yet - in February or March 2022		

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Nuclear Fusion Reactor Physics	8	Fabio Subba	MSc	6-12 (1-2 per partner, indicative number)	https://didattica.polito.it/pls/portal30/gap.pk_g_guide.viewGap?p_cod_ins=01PUCND&p_a	An introduction to nuclear engineering could be helpful, but it is not mandatory.	27/09/2021 - 14/01/2021	17/01 - 26/02/2022		Synchronous (but recorded lessons available on our website)
Solar Photovoltaic Systems	6	Filippo Spertino	MSc	6-12 (1-2 per partner, indicative number)	https://didattica.polito.it/pls/portal30/gap.pk_g_guide.viewGap?p_cod_ins=01TVAND&p_a	Basic knowledge about electric circuit theory (electrical circuit analysis).	27/09/2021 - 14/01/2021	17/01 - 26/02/2022		Synchronous (but recorded lessons available on our website)
Smart Electricity Systems	8	Gianfranco Chicco	MSc	6-12 (1-2 per partner, indicative number)	https://didattica.polito.it/pls/portal30/gap.pk_g_guide.viewGap?p_cod_ins=02RUKNC&p_a	Knowledge of matrix calculations, complex numbers, basic electrotechnics (direct current circuits, single-phase and three-phase alternating current circuits), and the principles of operation of the electrical machines (synchronous machine and transformer).	27/09/2021 - 14/01/2021	17/01 - 26/02/2022		Synchronous (but recorded lessons available on our website)
Energy Management for IoT	6	Massimo Poncino	MSc	6-12 (1-2 per partner, indicative number)	https://didattica.polito.it/pls/portal30/gap.pk_g_guide.viewGap?p_cod_ins=01UDGOV&p_a	The course requires the knowledge of C/C++ programming (data structures and algorithms). A basic knowledge of the Matlab/Simulink environment, as well as of calculus, statistics, digital electronics and digital design, and computer architecture can be useful. No specific skills in hardware design (e.g., VHDL/Verilog) is required.	27/09/2021 - 14/01/2021	17/01 - 26/02/2022		Synchronous (but recorded lessons available on our website)
Advanced Materials for Nuclear Applications	6	Monica Ferraris	MSc	6-12 (1-2 per partner, indicative number)	https://didattica.polito.it/pls/portal30/gap.pk_g_guide.viewGap?p_cod_ins=0	Materials Science and Technology, Physics, Chemistry	27/09/2021 - 14/01/2021	17/01 - 26/02/2022		Synchronous (but recorded lessons available on our website)
Computational Thermal Fluid Dynamics	6	Roberto Zanino	MSc	6-12 (1-2 per partner, indicative number)	https://didattica.polito.it/pls/portal30/gap.pk_g_guide.viewGap?p_cod_ins=01RMFND&p_a	As a minimum, the knowledge coming from traditional introductory courses in thermal fluid dynamics, e.g. from the course "Termofluidodinamica" in the Energy engineering BSc program at Politecnico di Torino, as well as in numerical analysis ("Calcolo numerico"), will be taken for granted. The former includes a basic knowledge of Navier-Stokes equations. The latter includes: basic numerical linear algebra (direct and iterative methods for the solution of large algebraic sets of equations), elementary methods for the numerical solution of nonlinear algebraic problems, numerical quadrature formulae, numerical integration of ordinary differential equations (initial value problems), together with some basic knowledge of MATLAB. As a reference for the students enrolled in the Energy and Nuclear engineering MSc program at Politecnico di Torino, the knowledge acquired in the course "Introduction to computational heat transfer" will be fully sufficient.	27/09/2021 - 14/01/2021	17/01 - 26/02/2022		Synchronous (but recorded lessons available on our website)
Polygeneration and Advanced Energy Systems	10	Massimo Santarelli	MSc	6-12 (1-2 per partner, indicative number)	https://didattica.polito.it/pls/portal30/gap.pk_g_guide.viewGap?p_cod_ins=01QGXND&p_a	Preliminary knowledge acquired in the courses of Thermodynamics and Heat Transfer, Chemical Plants, Material Science.	27/09/2021 - 14/01/2021	17/01 - 26/02/2022		Synchronous (but recorded lessons available on our website)
Electrochemical power sources	6	Stefania Specchia, Silvia Bodoardo	MSc	6-12 (1-2 per partner, indicative number)	https://didattica.polito.it/pls/portal30/gap.pk_g_guide.viewGap?p_cod_ins=03OZNMW&p_a	Basic knowledge of mathematics, physics, physical thermodynamics, chemistry, and materials properties.	27/09/2021 - 14/01/2021	17/01 - 26/02/2022		Synchronous (but recorded lessons available on our website)

Universitat Politècnica de Catalunya - BarcelonaTech (UPC)
Spain

Course name	Credits (ECTS)	Professor	Level	N. of available positions for UI students	Link to Syllabus	Specific requirements for participation	Course start-end dates	Exam dates	Additional information	Teaching modality (synchronous/integrated to local students studying pace OR asynchronous)
Electrical Energy Processing	6	Herminio Martínez	Master	12	https://www.upc.edu/estudis/pdf/guia_docent/nhn?rndie=295		20/9/21-20/01/22	7/1/22-20/01/2022	EEBE	Synchronous integrated with local students.
Renewable Energy Systems	6	Yolanda Vidal	Master	12	https://www.upc.edu/estudis/pdf/guia_docent/nhn?rndie=295		20/9/21-20/01/22	7/1/22-20/01/2022	EEBE	Synchronous integrated with local students.
Fuel Cells	6	Jordi Llorca	Master	12	https://www.upc.edu/estudis/pdf/guia_docent/nhn?rndie=295		20/9/21-20/01/22	7/1/22-20/01/2022	EEBE	Synchronous integrated with local students.
Energy Efficiency and Rational Use of Energy	5	Rigola Serrano, Joaquim	Master	6	https://www.upc.edu/estudis/pdf/guia_docent/nhn?rndie=820	Bachelor degree in mechanical engineering, energy engineering, power engineering, and similar	3rd or 4th week of September - End January	Final exam period: 7 January - End of January	ETSEIB	synchronous/integrated to local students studying place.
Energy Resources	5	Batet Miracle, Lluís	Master	12	https://www.upc.edu/estudis/pdf/guia_docent/nhn?rndie=820	Bachelor degree in mechanical engineering, energy engineering, power engineering, and similar	3rd or 4th week of September - End January	Final exam period: 7 January - End of January	ETSEIB	synchronous/integrated to local students studying place.
Industrial Iot and Cyber-Physical Systems	3	Miguel Delgado/Luis Romeral	Master	12	https://eseiaat.upc.edu/ca/estudis/estudis-empresaries	Basic knowlegde of Industrial Automatization	15th September - a 30th October	7th-21st January	ESEIAAT	Synchronous (asynchronous mode is also possible).
Smart grids and data analytics	3	Alvaro Luna	Master	12					ESEIAAT	
Smart Buildings	5	Blanca Tejedor	Master	12	https://www.upc.edu/content/master/guia_docent/pdf/ing/202122	Basic knowlegde of facilities in buildings	Mid-September 2021 - Mid-January 2022	7th-21st January	ESEIAAT	Synchronous (with the possibility to record the lesson for students who work in enterprises).