Department	General	Title and code of subject,	ETR 466 Power Electronics Devices 8 E	ECTS credits	
Program Master Academic semester 2024 fall Lecturer Associate Professor, Ph.D Sevda N. Garibova E-mail: gevdiagaribova@khazar.org Phone number:	information	number of credits	District Plant		
Academic semester 2024 fall Lecture Associate Professor, Ph.D Sevda N. Garibova E-mail: sevdagaribova@khazar.org Phone number: 11 Mehseti Street, AZ1096 Baku, Azerbaijan (Neftchilar campus), room Lectures: Consultations Saturday 12-00-13-20 Prerequisites EENG 245 Course English Inguage Major Trype of the subject Textbooks 1. Keith Billings, Taylor Morey, Switchmode power supply, London 2011. 2. V. Ramanarayanan. Course on material on Switched mode power conversion. Indian Instit of science. 2008. E-book pdf Additional material: Muhammad H. Rashid, Power Electronics. Third edition, USA 2016. https://poweruiic_iu_com/wp-content/uploads/2016/11/Brook-Power_Bectronics_Hundbook_3rd_Edition_M_Rashid.pdf Web pages: https://www.belarticaldu.com/electrical-engineering-articles/power-electronics/# https://www.belarticaldu.com/electrical-engineering-e					
Lecturer Associate Professor, Ph.D Sevda N. Garibova					
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Phone number:			, , , , , , , , , , , , , , , , , , ,	ibova	
Lecture room/Schedule		***	sevdaqaribova@knazar.org		
Teaching methods Computer Substitution Subs			11 Mahaati Starat A71006 Dalam Aana	oiler (Nefteliler comme)	
Lectures: Saturday 12-00-13-20		Lecture room/Schedule		baijan (Neffchilar campus),	
Consultations Saturday 12-00-13-20					
Prerequisites EENG 245		Consultations			
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2. V.Ramanarayanan. Course on material on Switched mode power conversion. Indian Instit of science.2008. E-book pdf Additional material: Muhammad H.Rashid. Power Electronics. Third edition, USA 2016. https://power.nit-ju.com/wp-content/uploads/2016/11/Book-Power Electronics Handbook 3rd Edition M. Rashid.pdf Web pages: https://www.electrical4u.com/electrical-engineering-articles/power-electronics/# https://www.bharathuniv.ac.in/page_images/pdf/courseware_eee/Notes/sem5/SEM%20V%20BEE%502POWER%20ELECTRONICS.pdf Teaching methods Group discussions at seminars 15 Assessment Components Date/ Deadline Percent (%) Tests Active participation, oral At each lesson 10 questions and discussion 5 point for participation 5 point for activity Assignment and quizzes 2 quizzes during the semester Each 5 point Presentation work Prepare presentation work on the topics given by the teacher during the semester 10 Midterm exam 40 Final exam 50 Final exam 40 Final exam 40 Final exam 40 Final exam 40 Final exam 50 Final exam 60 Final exam 70 Footper, cycloconverter and other electronic devices. This course studies the operation, switch characteristics, structure and application of DC to AC. The design of power electronics devices involves interactions with the source and the load, and utilizes small-signal electronic control circ as well as power devices. Therefore, power electronic devices and associated components to course electrical power engineering.		Textbooks:			
https://www.electrical4u.com/electrical-engineering-articles/power-electronics/# https://www.bharathuniv.ac.in/page_images/pdf/courseware_eee/Notes/sem5/SEM%20V%20BEE%502POWER%20ELECTRONICS.pdf Teaching methods Assessment Components Date/ Deadline Percent (%) Tests Active participation, oral and discussion Active participation, oral and discussion Spoint for participation Spoint for activity Assignment and quizzes 2 quizzes during the semester Each 5 point Presentation work Prepare presentation work on the topics given by the teacher during the semester Midterm exam Audition the topics given by the teacher and during the semester Final Course description Course description Course description Course description Course and the control and conversion electrical energy with high efficiency. Conversion process of the energy is carried out with the help converters, inverters, power diodes, transistors, MOSFET, SCR and thyristors, IGBT, TRIAC, DC DC chopper, cycloconverter and other electronic devices. This course studies the operation, switch characteristics, structure and application of power circuits and it control. This process achieved rectification of AC to DC or the inversion of DC to AC. The design of power electronics devi involves interactions with the source and the load, and utilizes small-signal electronic control circ as well as power devices. Therefore, power electronics is related to and dependent on other areas electrical power engineering. Course Power electronics is defined as the application of electronic devices and associated components to		of science.2008. E-book pdf **Additional material:* Muhammad H.Rashid. Power Electronics. Third edition, USA 2016. https://powerunit-ju.com/wp-content/uploads/2016/11/Book-			
Components Date/ Deadline Percent (%)		https://www.bharathuniv.ac.in/page_images/pdf/courseware_eee/Notes/sem5/SEM%20V%20BEE%20			
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	the efficiency of power processing. The subject of power electronics is introduced in curriculam more
	as thyristor and its applications. In this course, students will study the working principle, switching
	characteristics and application of basic power semiconductor devices and control systems, in particular
	its power diode, thyristors, SCR, controller, DC chopper and other converters. Students will be able to
	understand how power electronics is developed with the solid state power switching devices, will
	examine the conversion and control processes of electrical energy, how the device supplies electric
	energy to the load with high efficiency, be able to analyze the basic power electronic circuit.
Learning	What students should know by the end of the course: how power energy convert, transfer and control at
outcomes	Lid off in a line in the GCD and it was MOSETT ICDT and a

L outcomes

high efficiency; working principle of converters, SCR or thyristors, MOSFET, IGBT, dual converter, phase converter, flyback converter, controllers; functions of converters and their applications as power supply, cycloconverter, chopper and DC-DC converter, buck and boost converter; be able to analyze power electronics circuit.

Rules (Educational policy and behavior)

Lesson organization

General information on the subject will be provided for the students during lectures.

Student's knowledge on the previous topics will be evaluated and new topic will be explained by mins of visual aids during seminars. Student's knowledge level will be tested oraly and in written forms (quizzes) before midterm and final exams. Submission of the individual works by the end of course is obligatory.

Exams (pass/fail)

In accordance with the University rules the overall success rate to complete the course should be 60% or above. The students who failed the exam would be to take this subject next semester or next year. All the issues related to the participation and admission to the exam are regulated by the faculty dean. Topics of midterm and final exams are provided for the students before the exams. The questions of midterm exam are not repeated in the final exam. Students who got 57% can retake the exam.

Violation of the rules of the exams

Disrupting the test and taking copy during midterm and final exams is forbidden. Test papers of the student who do not follow these rules are canceled and the students are expelled from the test by getting 0 (zero).

Rules of conduct for Students

Disruption of the lesson and not following ethical norms during the lesson, as well as conduction of the discussions by the students without permission and using mobile phones is forbidden.

Attendance

Participation of students at all classis is important. Students should inform dean's office about missing lessons for particular reasons (illness, family issues and etc.). Students, missing more than 25% of lessons, are not allowed to take the exam. Students who attend the whole classes will get 5 marks. For three absences student loses 1 mark.

Ouizzes

There will be quizzes per two weeks. The quizzes will be announced in the classroom two weeks before and will relate to homework. Depending on the difficulty of the lesson, quizzes can be two or three times during the semester, each with three or five points.

Activity

For activity during lessons in the whole semester, students are rewarded with 5 points. The activity of students is assessed by the preparation of home questions, which is given by the teacher after the lessons; it can also be oral discussions.

Project or presentation work

Students individually or in a group must prepare a project or presentation work either on a free topic or and a topic assigned by a teacher. Students have two months to prepare, and at the end of the semester, each group or individual student must present their work. The good work of the students are rewarded with 10 points.

This program reflects the comprehensive information about the subject and information about any changes will be provided in advance.

Week	Dates	Subject topics	Textbook/
	(planned)		Assignments
1	19.09	Power semiconductor devices: construction, principle of operation power diodes,	[2] chapter 1,
		ideal switches, real swiches, practical power switching devices, power supply and	p.1-10
		power supply circuit.	https://www.bhar
	19.09		athuniv.ac.in/pag
		Oral questions and discussing	e images/pdf/cou

			rseware_eee/Note
			s/sem5/SEM%20
			V%20BEE%205
			02POWER%20E
			LECTRONICS.p
			<u>df</u>
			https://www.elect
			rical4u.com/elect
			rical-engineering-
			articles/power-
			electronics/#
2	26.09	Silicon controlled rectifier (SCR): construction, modes of operation,	[2] chapter 1
		characteristics of SCR, application	p.9-11
	26.09		https://www.elect
		Discussing and testing	rical4u.com/thyri
			stor-silicon-
			controlled-
			rectifier-scr/
3	03. 10	Direct –off-line switchmode power supplies. Triac:construction and operation.	[1] chapter 1
			p.1.3
		Oral qustions and discussing	
	03.10		
4	10.10	DC Power Supply, AC to DC Power supply, Protection devices, varistors.	[1] chapter 2
	10.10	Testing and discussing	p.1.17
5	17.10	MOSFET, Gate turn-off thyristor.	http://www.electr
			ical4u.com/
		Testing	
	17.10		https://www.bhar
			athuniv.ac.in/pag
			e images/pdf/cou
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			s/sem5/SEM%20
			V%20BEE%205
			02POWER%20E
			LECTRONICS.p
			<u>df</u>
			_
6	24.10	IGBT - insulated gate bipolar transistor	[2] chapter 1,
		Testing and discussing	p. 26-30
	24.10		https://www.elect
			rical4u.com/insul
			ated-gate-bipolar-
			transistor-igbt/
7	31.10	Converters: converters, primitive converter, DC converter, isolated and non-	[2] chapter 4,
		isolated converter.	p. 95-99
			https://www.bhar
	31.10	Quizze 1	athuniv.ac.in/pag
		~	e images/pdf/cou
			rseware_eee/Note
			s/sem5/SEM%20
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			df
8	07.11	Line rectification and capacitor input filters for direct -off-line switchmode power	[1] chapter 6
		supplies.	p.1.55
		**	•
	07.11	Midterm exam	
9	14.11	Inrush control. Inrush current in power supply.	[1] chapter 7
		cui cui cui cui cui ponei suppiji	[-] *****P*** /

	14.11	Activity testing	p.1.73
	1	new, wy testing	https://www.ele
			ctronicproducts.
			com/Electromec
			hanical_Compo
			nents/Understan
			ding power sup
			<u>plies_and_inrus</u> <u>h_current.aspx</u>
10	21.11	Phase controlled converters - Single phase and three phase controlled	http://www.electr
10	21.11	rectifiers.	ical4u.com/
		Presentation work	
11	28.11	Control, drive and protection of power switching devices: base drive circuits,	[2] chapter 3
		requirements of base drive, drive circuits. Copper or DC to DC.	p.69-80
			https://www.ele
	28.11	Presentation work	ctrical4u.com/ch
			opper-dc-to-dc-
			converter/
12	05.12	Controller basics: DC to DC controller, buck and boost converter, DC -to -DC	[2] chapter 5
		converter dynamics, idealized DC-DC converter	p.135, 159-160
		Quizze 2	p.208-212
	05.12		
13	12.12	Overvoltage and overload protection. Types of over protection. Dual converter	[1] chapter 11,
	12.12	Testing for activity point	13 p.1.107
			https://www.sun
			power-
			uk.com/glossary
			/what-is-over-
			voltage-
			protection/
14	19.12	Flyback transformer design, flyback converter.	[1] part 2,
	19.12	Presentation work	chapter 2,
			p.2.53
			https://www.sun
			power-
			uk.com/glossary
			/what-is-a-
			flyback-
			converter/
15	26.12	AC chopper, cycloconverter and voltage controller.	
	26.12	Testing for activity point and prepare to final exam	https://www.ele
			ctrical4u.com/cy
			cloconverter/
		Final Exam	<u> </u>
		1 view Livelli	I

This program reflects the comprehensive information about the subject and information about any changes will be provided in advance

