



RTU Course "Electronics in Medicine"

13211 Radioiekārtu katedra

General data

Code	RRI311
Course title	Electronics in Medicine
Course status in the programme	Compulsory/Courses of Limited Choice
Course level	Undergraduate Studies
Course type	Academic
Field of study	Electronics and Telecommunications
Responsible instructor	Balodis Guntars
Academic staff	Puriševs Dmitrijs
Volume of the course: parts and credits points	1 part, 2.0 Credit Points, 3.0 ECTS credits
Language of instruction	LV
Possibility of distance learning	Not planned
Abstract	Broad spectrum of signals with a high dynamic range and frequency bands characterizes human actions and health monitoring. Within the framework of the course, electric circuits are designed and analyzed that cover widely used solutions.
Goals and objectives of the course in terms of competences and skills	To develop understanding about application of electronic appliances in medical therapy and diagnostics; to introduce students to basic circuit design solutions, their positive and negative features depending on design methods and manufacturing technology. To acquire basic skills in circuit design and parameter analysis.
Structure and tasks of independent studies	Students have to find solutions to basic problems independently.
Recommended literature	J.Greivulis, I. Raņķis. Modernas elektronikas pamati. Rīga, "Avots", 1992.g. -165 lpp. Прянишников В.А. Электроника: Полный курс лекций. - 7-е изд. - СПб.: КОРОНА-Век, 2010. - 416 с. J.Ziemelis. Mikroviļņu tehnika. Lekciju konspekts. Rīga.: RTU ETF, 2003.g. - 189 lpp. Амосов В.В. Схемотехника и средства проектирования цифровых устройств. - СПб.: БХВ-Петербург, 2007.- 560 с. Васильев А. Е. Микроконтроллеры. Разработка встраиваемых приложений. - СПб.: БХВ-Петербург, 2008. - 304 с. Уилмсхерст Т. Разработка встроенных систем с помощью микроконтроллеров PIC. Принципы и практические примеры:Пер. с англ. - К.: "МК-Пресс", СПб.: "КОРОНА-ВЕК", 2008. - 544 с. Микушин А. В. Занимательно о микроконтроллерах. - СПб.: БХВ-Петербург, 2006. - 432 с. Швец В. А., Шестакова В. В., Бурцева Н.В., Мелешко Т. В. Одноплатные микроконтроллеры. Проектирование и применение. - К.: "МК-Пресс", 2005. - 304 с. Ливенсон А.Р. Электромедицинская аппаратура. Медицина, 1981. Зарубежные микросхемы, транзисторы, тиристоры, диоды+SMD. 0...9. Справочник. - Изд. 4-е. - СПб.: Наука и техника, 2008. - 672 с.
Course prerequisites	Students are expected to have a basic knowledge of engineering, medical physics, electronic technology and electronics.

Course outline

Theme	Hours
Basics of electronic circuits	4
Analogue electronics	4
Data processing	4
Digital electronics	6
Microprocessors	2
Basics of medical equipment design	2
Basics of electronic circuit design	6
Safety of medical equipment	4

Learning outcomes and assessment

Learning outcomes	Assessment methods
Students are able to analyse parameters of medical equipment depending on circuit design and manufacturing technology	Theoretical part of the examination
Students are able to analyse reliability parameters of medical equipment depending on circuit design and manufacturing technology.	Theoretical part of the examination
Students are able to demonstrate safe operation of equipment and apply skills necessary to carry out technical evaluation.	Practical part of the examination

Study subject structure

Part	CP	ECTS	Hours per Week			Tests		
			Lectures	Practical	Lab.	Test	Exam	Work
1.	2.0	3.0	1.0	1.0	0.0		*	