DESCRIPTION OF THE PROMENG Curricula/Module

TITLE OF THE MODULE	Code
CAD/CAM / CAE for engineers	

Teacher(s)	Department
Coordinating: Navasardian E.S. **Others:** Dontsova E.S., Parkin A.N.	Department E4 of BMSTU

Study cycle	Level of the module	Type of the module
Master	The variable part of the curriculum	Elective course

Form of delivery	Duration	Langage(s)
lectures	two semester	Russian

Prerequisites	
Prerequisites: lecture courses: "Analysis and design of machines and equipment of cryogenic systems"	**Co-requisites (if necessary):** No

Credits of the module	Total student workload	Contact hours	Individual work hours
3	51 hours	51	51

Aim of the module (course unit): competences foreseeen by the study programme		
Understanding technical drawings. Use high end MCAD modeler for modelling. Modelling of virtual prototypes. Use MCAD as an engineering tool. Use high end ECAD modeler for modelling. Use ECAD as an engineering tool. Integrate MCAD and ECAD		
Learning outcomes of module (course unit)	**Teaching/learning methods**	**Assessment methods**
1. Students must benifit from any situation where a graphical representation is usefull in solving a technical problem.	**Lectures,** Consultations, Practiacl work**, Individual work**	Interim certification, the final pass
2. Use high end MCAD modeler for modelling. Modelling of virtual prototypes. use MCAD as an engineering tool.	**Lectures,** Consultations, Practiacl work**, Individual work**	Interim certification, the final pass
3. Use high end MCAD modeler for modelling. Modelling of virtual prototypes. Use MCAD as an engineering tool	**Lectures,** Consultations, Practiacl work**, Individual work**	Interim certification, the final pass
4. Design of complex electronic systems. Design of elaborated schematics. Design of PCB artwork. Development of personnal library.	**Lectures,** Consultations, Practiacl work**, Individual work**	Interim certification, the final pass
5.Sheetmetal design. Surface modelling.	**Lectures,** Consultations, Practiacl work**, Individual work**	Interim certification, the final pass
6. Design an existing heat and mass exchange apparatus.	Consultations, Practiacl work**, Individual work**	Interim certification, the final pass

| Themes | Contact work hours | | | | | | | Time and tasks for individual work | |
	Lectures	Consultations	Seminars	Practiacl work	Laboratory work	Placements	Total contact work	Individual work	Tasks
1. Understanding technical drawings.	2	2	0	4	0	Э4	8	8	1. Descriptive geometry : Geometrical projections, general principles; projection of points and lines, projection of planes. 2. Engineering graphics : basic conventions for technical drawings : linetypes, views; sections, dimensions
2. MCAD Basics.	2	2	0	4	0	Э4	8	8	1. Different models of 3D-modelling, surface modelling, wire frame modelling, complex curves and surfacing 2. Concepts of feature modelling, introduction to ProEngineer, basic modelling (tutorial based) 3. Basic modelling techniques, basic features, graphics environment of ProEngineer. 4. Edit definition and references
3. ECAD Basics.	2	2	0	4	0	Э4	8	8	1. Different models of 3D-modelling, surface modelling, wire frame modelling, complex curves and surfacing.

									2. Concepts of feature modelling, introduction to ProEngineer, basic modelling (tutorial based). 3. Basic modelling techniques, basic features, graphics environment of ProEngineer.
4. MCAD Advanced.	2	2	0	4	0	34	**8**	**8**	1. Fundamentals on PCB design, and designing in industrial environment. 2. Schematic electronic design - design of PCB artwork on multilayer PCB - design of library schematic components and footprints. 3. Schematic electronic design - design of PCB artwork on multilayer PCB - design of library schematic components and footprints.
5. ECAD Advanced.	2	2	0	4	0	34	**8**	**8**	1.Walls, configuration, conversion of solids to sheetmetal. 2. Punches and dies, creation of sheetmetal drawings. 3. Surfaces made with solid-modelling features.
6. Student integrated project.	0	4	0	7	0	34	**11**	**11**	1. Model all parts in Proengineer 2. Create technical drawings from all

									parts.
Iš viso	**10**		**14**	**0**	**27**	**0**		**51**	**51**	

Assessment strategy	Weight in %	Deadlines	Assessment criteria
Issues in practical classes	20%	The end of practice session	Current Rating
Report on the material traversed themes	30%	End of topic	An interim pass
The final pass	50%	End of semester	The final pass

Author	Year of issue	Title	No of periodical or volume	Place of printing. Printing house or intrenet link
Compulsory literature				
		'Technical drawing' isbn 0-13-60648-X		Pearson
		Technical drawings — General principles of presentation — EN-ISO-128-1		
Farid Amirouche	2004	"Principles of Computer-Aided Design and manufacturing",		Pearson Education Inc
Chang TC- Wysk RA-Wang H	2005	"Computer-Aided Manufacturing"		Pearson Education Inc.
Valery Vodovozov		Introduction to electronic engineering, , ISBN 978-87-7681-539-4		
Lee W.		Right the first time, Ritchey, ISBN-0-9741936-0-7		
Charles E. Knight,		"The finite element method in Mechanical Design"		PWS Kent
Additional literature				
		Basic conventions for views EN-ISO-128-30		
		Basic conventions for cuts and sections EN-ISO-128-40		
		Basic conventions for lines EN-ISO-128-20		
		"Getting started with Proengineer WF5.0", PTC		
		High-Speed Board Layout Guidelines, Application Note 224, Altera		
Dean L. Taylor		"Computer Aided Design"		Addison Wesley