Faculty: FACULTY OF TELECOMMUNICATIONS AND MANAGEMENT
Department: GENERAL ENGINEERING
Professional Field: 5.13. GENERAL ENGINEERING
Specialty: DIGITAL ENTREPRENEURSHIP AND HIGH TECHNOLOGY
Educational-qualification degree: BACHELOR

LEARNING COURSE DESCRIPTION

1. Course title: *REVERSE ENGINEERING AND MODERNIZATION*
2. Course code: B.45.029.2
3. Type of the course: *Elective*
4. Level: *Bachelor*
5. Year of study: *Second*
6. Semester: *Third*
7. Number of credits: *3*
8. Name of the lecturer: *Prof. Dr. eng. Dimitar Damyanov Damyanovski, Assoc. Prof. Ivaylo Stoyanov, PhD*
9. Course learning outcomes:

The aim of the course is for students to study, know and apply the basic requirements in the approaches, methods and technical means for reverse engineering and modernization. To design technical solutions for reversible engineering and modernization and in accordance with their needs and interests to acquire new knowledge and opportunities in this subject area.Students who have completed their training in the discipline must acquire:

Basic knowledge of the theoretical and practical problems of reversible engineering and modernization in the conditions of modern organizational and technical requirements.

Practical skills for developing reversible engineering and modernization projects and systems.

Competencies: After completing the course, students must know the basic elements for building modern high-performance reversible engineering solutions.

10. Teachingmethods:

The lectures are conducted with the help of multimedia means, through which the structure of the lecture, the definitions, the quantities, the drawings, the analytical dependences, the tables and the graphs are presented. The practical exercises are conducted as the whole laboratory group performs one topic under the guidance of the teacher. Students study the theoretical part in advance using lecture notes and literature and independently prepare for the entrance test.

11. Prerequisites:

Students should have a thorough knowledge in the field of Fundamentals of Engineering Design, Fundamentals of Electronics, Engineering - I.

Courses using the discipline are Mechatronic machines and cyber systems, Cyberphysical production systems, Additive production.

12. Course contents:

The discipline deals with topical topics related to nature and scope of reverse engineering and modernization, basic principles and approaches for modernization, strategy of reversible engineering, technical levels and modernization of equipment, approaches for updating machinery devices and processes, design of modernized products and processes, main directions for modernization, stages of conducting modernization and reverse engineering, modernization as part of the process of reverse engineering, conditions for application of modernization, development of modernization projects, basics and design calculations and organization of their implementation, strategy development reverse engineering, bringing the principles of conventional technologies to the requirements of the fourth industrial revolution.

13. Bibliography

Basic literature:

1. **Дамянов, Д.** Модернизация на производството. ТУ- София, 2010.
2. **Дамянов, Д.** Технология на иновациите. „ПРИМАКС“, Русе 2019.
3. **Дамянов Д., Соколов, Е., Томов, П., Панайотова Т.** Основи на конкурентния инженеринг. ТУ-София, 2007.
4. **Дамянов Д., Гешев, Т., Чукалов, К.** Четвърта индустриална революция – същност и проблеми. „КИНГ“ София, 2019.

Additional literature:

1. **Theories** of Industrial Modernization and Development, Lewis Frederick Abbott – ISR 2011
2. **Theories** of the Labour Market and Employment, Lewis Frederick Abbott – ISR 2010
3. **Localised** Technological Change: Towards the Economics of Complexity, Cristiano Antonelli, Taylor & Francis, 2008

14. Assessment methods and criteria:

The course ends with an *ongoing assessment*. The individual and team work of the student during the semester is reported - current control during lectures and practical classes.

1. Requirements for the design of the six-point system

The grade for the course is formed by a point system, the maximum number of points that students can receive is 100 (see Table 1).

2. Formation of the final assessment

The formation of an assessment in the training course at each of the indicated stages, according to the received points and their arrangement according to the six-point system is given in Table 1.

Table 1.

Number of points	**Assessment According to the 6-point Scale System**
0 – 20	Fail 2 **(**F)
20 – 39	Fail 2 (FX)
40 – 49	Satisfactory 3.00 (E)
50 – 59	Satisfactory 3.00 (D)
60 – 69	Good 4.00 (C)
70 – 84	Very good 5.00 (B)
85 – 100	Excellent 6.00 (A)

15. Language of instruction: *Bulgarian*