Tempus

"Pilot Teaching" Implementation Software for Embedded Systems

Galyna Tabunshchyk

Prof. Software Tools Department

Development of Embedded System Courses with implementation of Innovative Virtual approaches for integration of Research, Education and Production in UA, GE, AM

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Developed Modules

	Discipline	Specialty	Developers
1	C for Embedded Systems	Informational Technology of Design	Prof. Galyna Tabunshchyk
2	Embedded Software Development	Software Engineering Informational Technology of Design	Prof. Galyna Tabunshchyk Senior Lecture Natalya Mironova Ba Student Evgeniy Tverdohleb
3	Quality Engineering	Informational Technology of Design	Prof. Galyna Tabunshchyk Seniour Lecture Tetyana Kaplienko
4	ES Software Testing	Artificial Intelligence	Prof. Galyna Tabunshchyk Seniour Lecture Tetyana Kaplienko
5	FC Buggy	Project Work	Prof. Galyna Tabunshchyk

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ES Software Testing

Basic information ⓜ

Learning objectives
- To explain differences between validation and verification
- To describe the common types of faults that occur in embedded systems
- To give basics of model-oriented testing
- To give knowledge about boundary scan methods
- To describe different approaches to the embedded software testing

Learning outcomes
- distinguish between different faults in embedded system
- to build FSM and UML test models
- to use boundary scan methods
- develop automated tests for hard-ware and software for embedded systems

Prerequisites
- C++ programming
- Digital Systems Design
- UML
- Statistics

Basic Information

Duration:72h

Lectures: 36 h

Lab works: 36 h

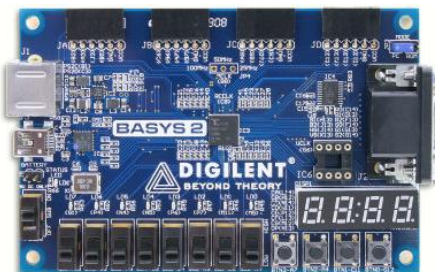| Lecturer	Teaching Assistant
Galyna TABUNSHCHYK , PhD, Prof. galina.tabunshchik@gmail.com	Tatyana Kaplienko, tabr007@yandex.ua

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Week	Subject
1	Introduction
2	Validation and verification of the digital systems
3	Faults in Embedded Systems. Hardware Faults
4	Software-Hardware covalidation Faults Model
5	Model based testing
6	FSM Models for test generation
7	Midterm Exam
8	Testing of Embedded core-based systems ob chips
9-10	Boundary scan methods and standards.
11	Virtual instrumentation for boundary scan
12	Embedded software testing. Functional testing
13	Embedded software testing. Coverage testing,
14	On-line testing of embedded systems
15	Comparison of IT technologies used for verification and validation
16	Review, Exam

ZNTU, Ukraine
15 October, 2015

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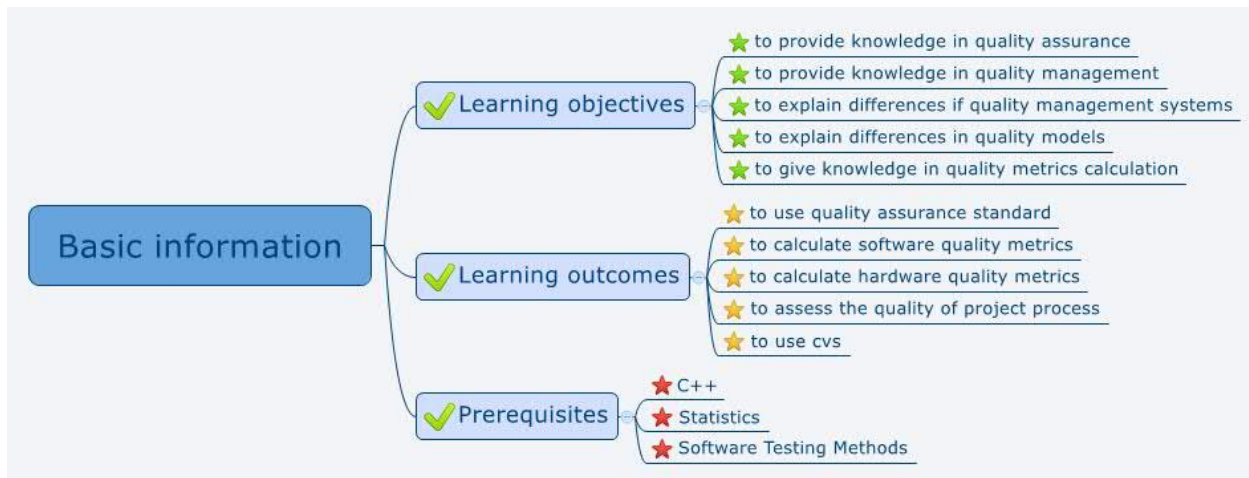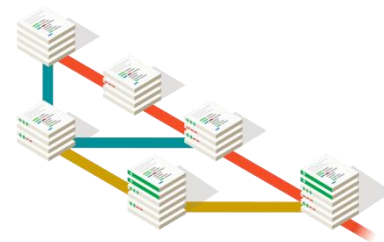| Experiments, Projects, Lab Works	Subject
Lab work 1	Working with Git
Lab work 2	Functional Testing with Basys 2 Board
Lab work 3	Functional testing of embedded software
Lab work 4	FMS based testing with remotes experiments
Lab work 5	Remote functional testing

Quality Engineering

Total hours 108h

- Lectures: 12 h

- Lab works: 12 h

- Self work 60 h

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Week	Subject
1	Introduction
2	Quality Management Philosophy.
3	The economics of Quality
4	Quality Engineering
5	Quality Control Methods
6	Configurational Management
7	Software Quality Assurance
8	Software quality system organization.
9	Software quality models
10	Software quality metrics
11	Software certification
12	Licenses of software and documentation

Embedded Software Development

Total hours 108h

- Lectures: 12 h
- Lab works: 24 h
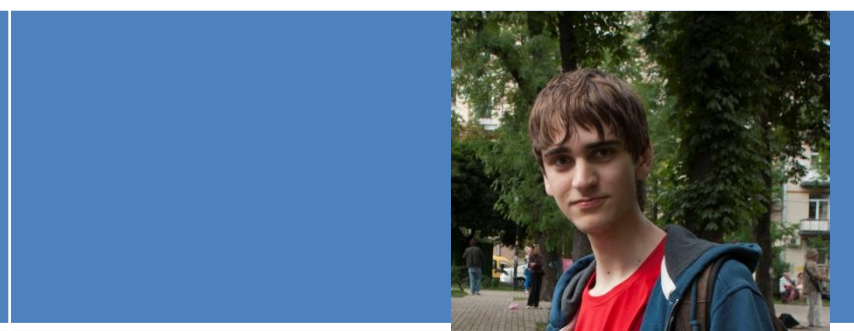- Self work 72 h

Lecturer
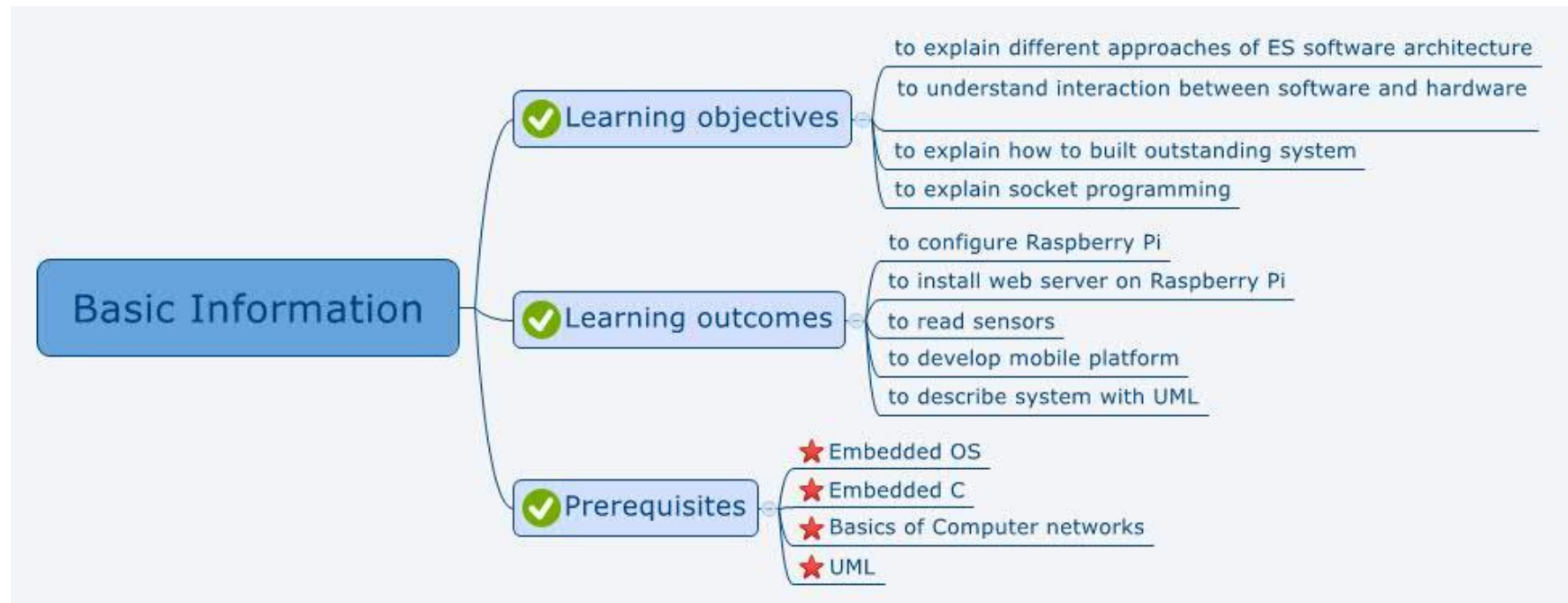Galyna TABUNSHCHYK ,
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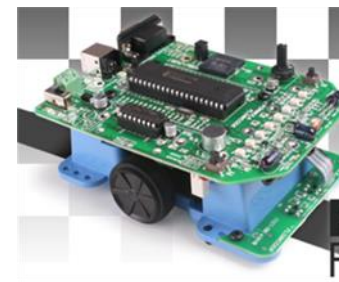| Week	Subject
1	Introduction
2-3	Modelling of software for Embedded Systems
3-4	Standard component models
5-6	Architecture of the software for Embedded Systems
6-8	Templates for Software Architecture for Embedded Systems
9-10	Socket programming
11-12	Programming Linux Socket

Experiments, Projects, Lab Works	Subject
Lab work 1	Configuring Raspberry Pi
Lab work 2	Installing Web-server at Raspberry Pi
Lab work 3	Developing QT application at Raspberry Pi
Lab work 4	Reading sensors from extension board
Lab work 5	Developing Project on Raspberry Pi

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Project FC Buggy

Tasks

1. To develop software for moving the maze
2. Do develop software for follow the line
3. Do develop software for rout search, following the line
4. To develop software for rout search in maze
5. To make musical dancing car
6. To control the car with smartphone

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Thank You for Your Attention