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**IMPLEMENTATION OF PRACTICAL LEARNING ACTIVITIES FOR SOFTWARE
PROJECT MANAGEMENT COURSE**

Diplomas thesis

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IMPLEMENTATION OF PRACTICAL LEARNING ACTIVITIES FOR SOFTWARE PROJECT MANAGEMENT COURSE

Summary: Topic of the thesis is to create and implement learning activities for “Software project management (P2NC.01.097)” course taught in Narva college of Tartu University. The main aim is to motivate students to introduce practical and hands-on activities to practice the Software Project Management principles and concepts. Thesis gives an overview of the similar course in different universities, describes course content from the previous year 2016/2017, describes practical material and implemented teaching/learning methodologies. At the end of the practical material implementation, students were asked to give their feedback. Possible improvements based on the feedback for the future year is also presented.

Keywords:

Project management, software, methodology

Resüme: Lõputöö teema seisneb õppetöö tegevuste loomises ja rakendamises tarkvara projektijuhtimine õppeaine jaoks (P2NC.01.097). See on kursus, mis õpetatakse Tartu Ülikooli Narva Kolledžis. Põhieesmärgiks on üliõpilaste motiveerimine praktiliste tegevuste esitamiseks, et harjutada tarkvara projektijuhtimise pritsiipe ning kontseptsioone. Töö annab erinevate ülikoolide sarnase kursuse ülevaadet, kirjeldab kursuse sisu eelmisest 2016/2017 aastast, kirjeldab praktilist materjali ja rakendusmetoodikat õppimises ja õpetamises. Praktilise materjali rakendamise lõpus üliõpilased kirjutasid tagasisidet. Võimalikud parandused tulevase aasta jaoks, mille aluseks on tagasiside on samuti lisatud.

Võtmesõnad:

Projektijuhtimine, tarkvara, rakendusmetoodika

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INTRODUCTION

Nowadays software development is much more organized and focused on the series of the processes and relations among them. The management involves a lot of activities like an interaction with clients, team building, the support and the development of processes and an activity-resource assignment. This diploma focuses on applying of modern practical parts for software project management.

Software project management is a basic course taught the second-year students according to the development of information technology systems learning program. It consists of weekly lectures, three interactive activities, an assignment, five quizzes and a final course project, which correspond to lectures. This year, the group interactive activities have been created to give more practical group work opportunity. The interactive activities were created upon the combination of modern teaching methodologies.

The purpose of the thesis is to offer students more efficient and motivating interactive activities for students to study the subject course of software project management with more interest. To achieve the learning outcomes the students have been given digital template files of interactive activities according to the lecture topics. The group activities have been introduced in the scope of this thesis the new interactive activities were applied those are corresponding with lectures topics. In the end the interactive activities have been applied and the Teachers and students feedback have been collected and analyzed to suggest the improvements of the course for the future college students.

Thesis is divided in four chapters. The background chapter introduces the list of learning and teaching methodologies, which have been used to make a combination of applied methodologies for software project management course. This part also introduces similar courses which were in the previous year in Narva college and Tartu university, and other international universities. The “prepared practical activities” chapter provides a general explanation of learning activities, gathered practical material, execution. The implementation chapter describes how practical material was provided to students and how work process was organized. The feedback chapter explains the strategy of the feedback collecting process, the types of question, the presentation of the results, feedback analysis and future practical material improvements. In the final chapter there is the summary of the feedback and outcomes about proposed materials.

1. BACKGROUND

1.1. Similar course in Tartu university and international universities

The software project management course (P2NC.01.097), which was taught in the spring semester of the year 2016/2017 in Narva college for students on the information technology systems development curriculum. The course, which gives 5 EAP, gave the overview of the software project management, presented newest tools and techniques such as ASANA and DAPULSE which are required to manage the software projects. Similarly, were discussed topics such as goals and dimensions of software project management, cost management, PM's nine knowledge area, development fundamental, organizational issues, analysis concepts and principles, processes, estimations, risk management, quality assurance activities, project planning, lifecycle, how to write good business plan and scheduling activities and so on. The course consisted of 26 lectures and tests (20%), assignments (30%), a project (30%) and an exam (20%). The course had less interactive activities and group work in class and was mainly focused on the activity of each student separately. (Course OIS page 2018)

In Tartu University there is a similar course called "Project management (MTAT.03.174)". The course takes place in the spring semester and it teaches major software management processes, principles of effort estimation, human resource management, risk management and resource allocation. It also helps master essential techniques to develop software project management contracts and to manage the quality of the developed software.

The outline of the course is built of the following topics:

- Introduction
- Process and activity planning
- Human resource management
- Effort estimation
- Risk management
- Resource management
- Contracts
- Quality management

The course assessments are built on exercises, seminars and an exam. In total seminar tasks and exercises give students 80% of the mark. It is important that actual participation is fundamental and the participation of seminars is compulsory. (Matulevičius 2014).

In order to create a qualified and modern content I have collected information from international universities and I have found that how their program of software project management course is made, what type of experience they can provide to students. For example, I have chosen university of St. Thomas in the USA and the university of southern Denmark.

Software project management in the university of St. Thomas provides students with the most relevant, practical, and applicable knowledge available in software engineering and software management. With the appropriate mix of technical and business skills, graduates of this program can systematically analyze business situations and propose, plan, and manage rigorous software development strategies and efforts to fulfill organizational objectives.

The program of this university focuses on both technical and developing management issues, so it helps advance experienced software engineers and project managers.

The successful degree candidate has to complete 10 graduate courses (30 graduate semester credits) with a GPA of 2.70. The whole courses have to be completed at the University of St. Thomas.

- SEIS 601 Foundations of Software Development
- SEIS 605 Technical Communication
- SEIS 610 Software Engineering
- SEIS 620 Systems Analysis and Design Tools
- SEIS 621 Software Process Management
- SEIS 630 Database Management Systems and Design
- 4 Electives
- Internships SEIS 779 and SEIS 778

(University of St. Thomas 2018)

This university provides a high education at a lower than average cost than other schools of similar quality. This results in a good value for the educational dollar, and earns UST MN a #502 ranking on the Overall Best Colleges for the Money list. (St Thomas Minnesota Value of an Education 2018)

Project management provided in the university of southern Denmark helps students obtain insight into the project management discipline and its concepts and assumptions and is able to use the knowledge independently obtained to work out a project mandate with matching analyses and plans and is able to evaluate project descriptions, analyses and plans worked out by other people. Furthermore, students are able to follow-up independently on analyses and plans, and in the light of these provide proposals for an appropriate management effort.

For admission it is required to pass at least two years of engineering studies.

The Faculty of Engineering at the University of southern Denmark has adopted a student-centered approach to learning and teaching is based on problem-based project work. Students participate significantly in class and carry out their project work in small teams. The experimental work, data analysis and reporting are done in teams with maximum 4 people. (The University of southern Denmark 2018)

The main reason why I have chosen the university of southern Denmark is that university encourages students to express their opinion. Students experience innovative teaching methods, which help to acquire new set of skills and knowledges and become more independent. (Study in Denmark 2018)

In conclusion, I can say the collected information about the software project management courses from different universities helped me to understand the concept of the course, as well as the main topics used to shape the curriculum. The clear vision of the program helped create modern interactive program to increase the motivation of students, to study this program and achieve desirable results.

1.2. Teaching methodologies

A teaching method is characterized by a set of principles, procedures or strategies to be implemented by teachers to achieve desired learning outcomes. For a teaching method, it is important to be efficient and related to the topic of learning. The selection of variety of teaching methods should be taken not only by the nature of the subject but how students can use learning methodologies. (Westwood 2008)

Lecturing methodology. The most effective method for colleges has bigger audience. A lecturer gives the material verbally, so a student can hear the information and write down notes. This method always works because the teacher can expose material, which is not always available. (Udemy 2018)

Collaborating methodology is more active process to gain knowledge. Students can talk in small groups and listen to their partners. The teacher(s) can use this method to estimate students possibilities to work in a team, their leadership skills and presentation abilities. Every student is important. The purpose of the task can be achieved by sharing thoughts and experiences. (Spence, Muneera 2006)

Classroom discussion methodology is the most democratic way of handling a class because each student is equal. A student is given an equal opportunity to interact and discuss him/her point of view. The discussion could be followed by a video material. It could be presentation,

videos or demonstrations. Class discussions can enhance student's understanding, add context to academic content, broaden student's perspectives, highlight opposing viewpoints, reinforce knowledge, build confidence, and support community in learning. (Petrina 2007)

Case study methodology usually makes a detailed analysis of some specific, compelling event or series events, which are related to the topic of the subject so that learners understand its nature better and what might be done about it. For example, the students on the software project management might investigate occurring events in real companies. (Petrina 2007)

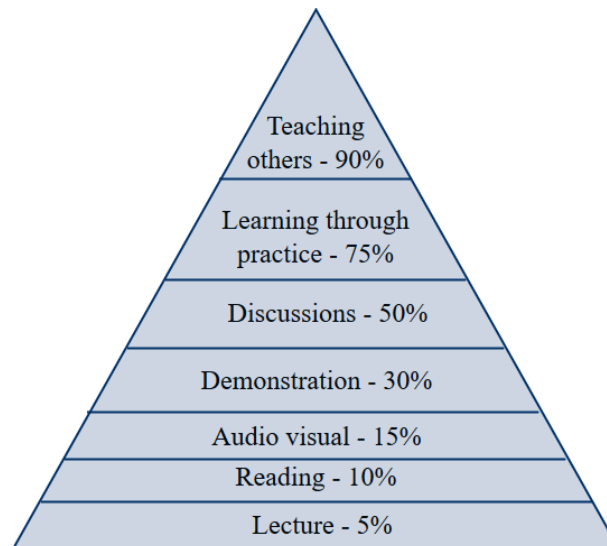
Independent study methodology or it is also called supervised methodology occurs when students are assigned on a common task to be accomplished at their desk in groups, or alone, or as a home assignment. The main point in this methodology is that students do research to finish the task by themselves. (Petrina 2007)

Online instruction methodology is a self-directed and automated approaching that uses hypermedia (like internet browser) for communication that provides the independence from architectural constraints of the auditorium. (Petrina 2007)

1.3. Learning Methodologies

Learning is a process of acquiring new set of skills, knowledge, behaviors or modifying already existing. (Gross 2000) This chapter uncovers how students understand material and can apply it on practice in learning activities and in future projects.

Active learning occurs when students take control their learning experience. It is important for learners to understand the information and recognize it. Active learning encourages learners to have an internal dialogue in which they verbalize understanding. It is a key characteristic of student-centered learning. (Gross 2000)



Learning Pyramid

Picture 1. Pyramid of Retention of Learning. (Huang 2005)

Experimental learning is the process of gaining knowledge, skill through experience and it is specifically called “learning through reflection on doing”. (Felicia 2011) Hands-on learning is a new form of experimental learning which involves students reflecting on their product. This method of learning helps develop students leadership skills and apply auditory learnings to management challenges not only in software project management course but in organizations around the world. (George Lucas educational foundation 2014)

To apply hands-on learning successfully, it requires an “active phase of learning”, “intention to learn” and self-initiative. (Moon 2004). Emotions and feelings play a big role in the experimental learning. Emotions are vital when they come to involve learners in gaining experience and then reflect on their experience using analytical skills, in order to understand new knowledge and retain it for a long period of time. (Kompf, M., & Bond, R 2001)

2. PREPARED PRACTICAL ACTIVITIES

The following section describes the structure of practical activities and the material used to guide both the students and the teacher. This chapter contains detailed information about interactive activities (learning activities), assignment and implemented methodology.

2.1. Implemented Teaching methodology in the course

The material for this course has been made for achieving the combination of two methodologies - classroom discussion methodology and interactive performance. For these methodologies the teacher can use the combination of theoretical lectures built on modern books on software project management, presentations, and topics related videos with student interactions in the form of the dialogue where the audience ask questions, discuss opinions. The main feature of this combination is that not only the teacher exposes the material, but students can share their personal views and practical opinion on provided topics. New learning activities have been used equally with lectures along with lectures and corresponding videos.

2.2. Interactive Activities (Learning Activities)

The following practical activities are meant for the students to spend two calendar weeks every one of activity. Each one activity is introduced in class and the students start to work from the first day and later continue with a group at home. This period is required because of the combination of team work, completion and analysis of chapters in every learning activity. Assignment takes the same amount of time, even though it is mentioned for each student separately still it requires a lot of effort to complete the set of provided tasks successfully.

The purpose of the learning activities is to document all managerial aspects of a project that are required to execute it successfully within its constraints. If some aspects are defined in separate plans (e.g. Project Planning, Quality Assurance Plan, Configuration Management Plan, Risk Management Plan, Project Schedule), the interactive activities (learning activities) should refer to these documents. interactive activities (learning activities) provides the detailed project work plan, timescale and resourcing requirements, on the contrary the Project Board or Sponsor can monitor and control project progress effectively. Where a separate business case is not required, the Project Plan also provides the business justification for the project, which is reviewed as the project progresses to ensure it remains valid.

Interactive activities (learning activities) require from 3 to 4 students in a group to accomplish the list of sections.

2.2.1. Interactive activities (learning activities) I

The first part of the interactive activities is built on the material from 3 lectures where the fundamentals are introduced. The material gives detailed explanation of the software project management. Similarly, project planning and possible project failure reasons are also covered in these lectures.

Overview section describes a management summary and provide essential information like

- What the motivation for this project is (e.g. to fill in a gap in the product portfolio)
- Who the customer is
- What the project delivers. If it is a new product or an extension of an existing one
- What it costs
- How long it takes
- What organizations are involved
- Which other projects depend on the project result
- Which other projects contribute with their results

The project goals define the expected project results together with the required development constraints.

2.2.2. Interactive activities (learning activities) II

The second interactive activity is built on the lectures of:

- Configuration management – quality assurance management
- Estimation for Software Projects
- Project schedules
- Design and programming
- Life cycle models and organization

The schedule and budget chapter is based on project goals and scope. At first must be defined a Work Breakdown Structure (WBS) and work packages and project activities. After the estimation the of the effort for the project activities and plan the activity sequencing follow. Then it is required to prepare the schedule that supports all the required activities and complies with the resource plan.

The development process chapter explains the selection of the development process. It contains the description of the selected development process and is tailored to the needs of the project, takes learnings from previous projects into account and how it is mapped to the milestone process.

In the risk management chapter, the procedure should specify who is responsible for risk management, when risk situation is regularly considered (e.g. at each project status meeting), and which roles risks are communicated to, etc.

In Sub-contract management there is a list which is a part of work out-sourced to which sub-contractor.

2.2.3. Interactive activities (learning activities) III

The final chapter of the interactive activities sums up all three chapters together and also includes the last main lectures of the course such as:

- Project cost management
- Project execution and further issue management
- Analysis concept and principles
- Software project management tools
- PRINCE2 method for Project Management
- Risk Management

The communication and reporting chapter is built upon the principles for reporting and distributing information within the project for the different groups of internal and external stakeholders. It includes the details such as, for example, how often the reporting takes place, the type of reports or information, the type of media in which it is presented, and the type of meetings that take place.

1. Internal communication and reporting: ensure that all the information is available to those who need it.

1.1. How often they take place and the participation

1.2. How the project information makes available to the internal stakeholders (e.g. project library)

1.3. How and how often sub-projects and sub-contractors report to the project manager

- 1.4. Who participates milestone meetings
- 1.5. How events are communicated
2. External communication and reporting:
 - 2.1. What information is provided to which stakeholders
 - 2.2. How and how often the information is provided to which stakeholders often (e.g. project report)
 - 2.3. Planning regular meetings with external stakeholders

2.3. Assignment

Assignment activity is a list of questions and every student has to answer them. The assignment consists of 5 questions which require explained answers. These questions test student knowledges about team-resource management, project development process adoption and technical fundamentals. The question can be found in Appendix 3.

3. IPLEMENTATION OF PRACTICAL ACTIVITIES

3.1. Organization of learning process on the lectures

Organizing the work process before lectures key element is to check functionality the prepared material. Students have been presented lectures with implemented video and text material according to the weekly course program. During the lectures students are allowed to take notes and ask questions corresponding to the topic of the lectures. Combining lecturing and collaborative methodologies allow the lecturer not only to present material by himself but, it gives the opportunity to students to share their knowledges on certain topics and be closer to the studying process. Provided strategy of learning makes students more active, cooperative and willing to learn. The combination of methodologies helps to set up the mood for interacting with teach, as well as with students and increases the number of gained knowledges and comprehension of the lecture topic.

3.2. Application of interactive activities

At the end of the lecture students are divided in groups of 3 or 4 people. The aim is to complete the set of tasks successfully using prepared template file with guidelines to document aspects of the software project plan. At the end of the lectures (last 30 min), an interactive activity is introduced and at the beginning students start working on the task in groups of tasks and later they continue a group work and submit the given task. This kind of approaching gives them the basic understanding about the task and starter earlier instead of waiting the last minutes/last day to submit the task. For this methodology a set of learning activities with instructions for students has been made. In the set of learning activities students are provided with the presentations of the topics of activities, then the teacher discusses the details with the students using the form of interactive performance and in the last part the students use provided explanation in the templates of learning activities to complete a set of tasks. With this methodology students feel involved in the process of learning. While students are in groups, they can teach each other. Applying this method gives positive results and the reception “a student in the role of a teacher”, when they can have discussion on how to answer questions and solve problems in learning activities.

3.3. Application of the Assignment

The assignment is a set of questions that should be answered by every student individually. The questions are made according to the material that has been given to students during the course. However, the answers depend on how students understand the topics of lectures and how students are capable to use lecturing material to answer all the questions. The assignment develops set of skills, such as:

- Self-reflection
- Problem solving
- Effective decision-making
- Strategic approach
- Creativity

By the submission of the results, the students have been given personal feedback, considering their answers and decisions, which have been made in the assignment, as well as overall knowledge evaluation on the lectures material.

4. FEEDBACK

This chapter presents the process of feedback collection, collecting method, analysis and further improvements. The material is evaluated with the help of the questionnaire. The feedback questionnaire has been provided to the lecturer and students. The evaluation from students is anonymous and supposed to provide constructive feedback on materials, interactive activities, assignment, positive and negative aspects found during the course. The participation in the questionnaire has not affected students grades. The summarized questionnaire with the answers can be found in Appendix 6.

4.1. Collection of feedback

At the one of the lectures students were asked to fill an online questionnaire using Google forms (Google 2018). Final results of the statements were made using “SurveyMonkey” software (SurveyMonkey 2018). In total 15 students provided feedback. Evaluation was based on the Likert scale (McLeod, S. A. 2008), which allows people to express their attitude towards provided statements. Questionnaire consisted of 6 statements about learning procedure, teaching material and practical exercises:

1. “Weekly course plan was clearly defined and useful”;
2. “The grading scheme was transparent and appropriate”;
3. “The materials were appropriate and useful”;
4. “Interactive activities were interesting and useful”;
5. “Communication with team members was informative and productive”;
6. “The support and feedback received from teacher was appropriate”;

Students had 5 options to choose from to evaluate each of 6 statements: “Entirely agree”, “Somewhat agree”, “Average”, “Somewhat disagree” and “Entirely disagree”.

4.2. Analysis

Feedback which was collected from students was mostly positive, however there were some negative aspects on certain statements.

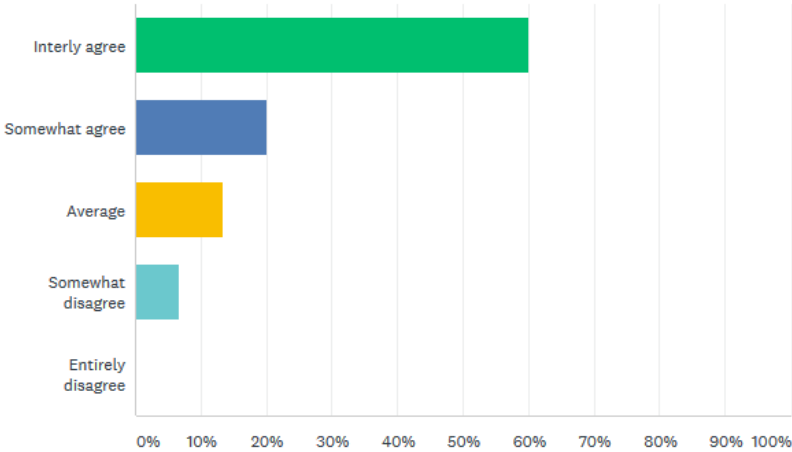
Positive aspects

Positive aspects based on the qualitative feedback showed that the course plan was defined clearly and helped students to coordinate lectures time as well as to track practical activities schedule. Students were mostly agreeing, that grading scheme was simple yet appropriate and fair for everyone. Participants found the provided lecturing material useful and effective. Mostly all students enjoyed completing interactive-learning activities. Some of them even

mentioned that there are useful in the software project management sphere for the future projects and that activities give a good example about how to build a structure of most important aspects that require management. According to the feedback statement, three of fourth of the students had a profitable connection with their project team members which helped to successfully complete group tasks.

Weekly course plan was clearly defined and useful

Answered: 15 Skipped: 0

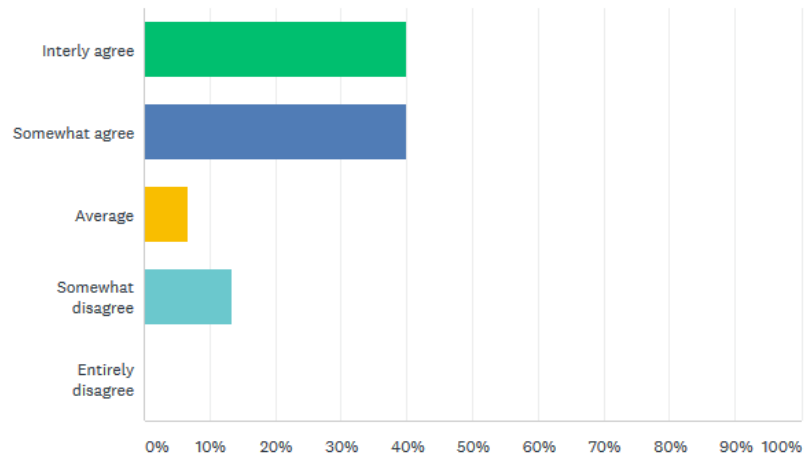


ANSWER CHOICES	RESPONSES
Interly agree	60.00% 9
Somewhat agree	20.00% 3
Average	13.33% 2
Somewhat disagree	6.67% 1
Entirely disagree	0.00% 0
TOTAL	15

Picture 2. Results for the statements “Weekly course plan was clearly defined and useful”.

The grading scheme was transparent and appropriate

Answered: 15 Skipped: 0

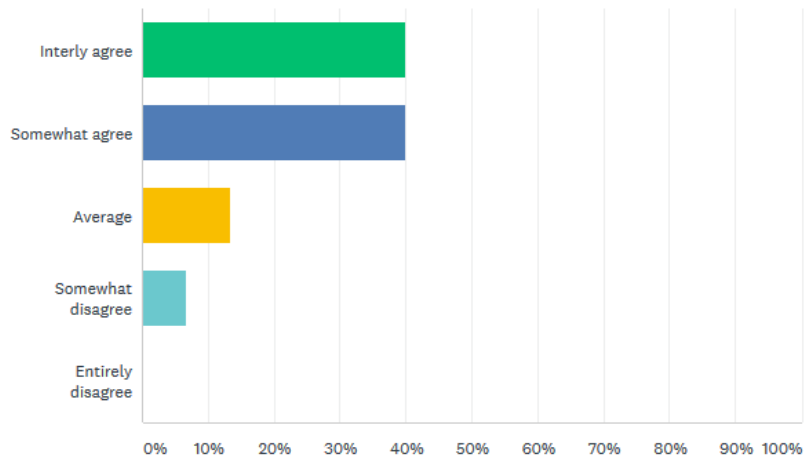


ANSWER CHOICES	RESPONSES
▼ Interly agree	40.00% 6
▼ Somewhat agree	40.00% 6
▼ Average	6.67% 1
▼ Somewhat disagree	13.33% 2
▼ Entirely disagree	0.00% 0
TOTAL	15

Picture 3. Results for the statements “The grading scheme was transparent and appropriate”.

The materials were appropriate and useful

Answered: 15 Skipped: 0

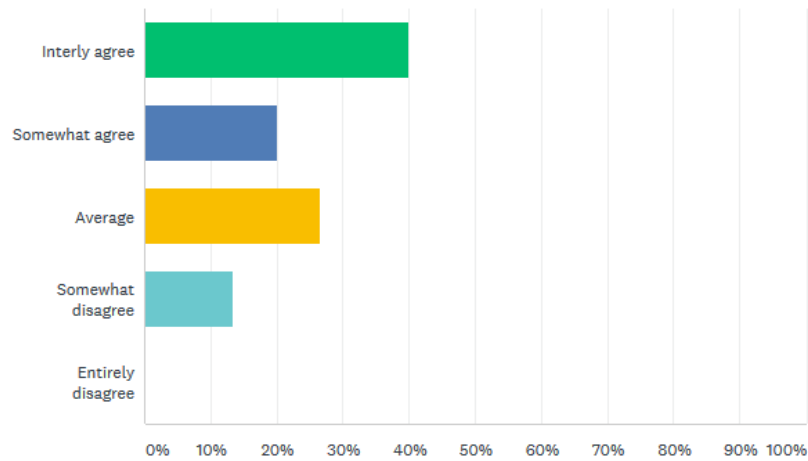


ANSWER CHOICES	RESPONSES
▼ Interly agree	40.00% 6
▼ Somewhat agree	40.00% 6
▼ Average	13.33% 2
▼ Somewhat disagree	6.67% 1
▼ Entirely disagree	0.00% 0
TOTAL	15

Picture 4. Results for the statements “The materials were appropriate and useful”.

Interactive activities were interesting and useful

Answered: 15 Skipped: 0

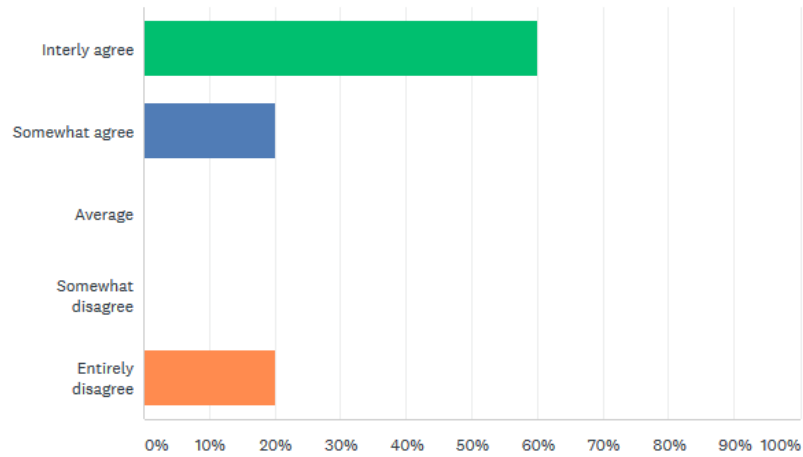


ANSWER CHOICES	RESPONSES
▼ Interly agree	40.00% 6
▼ Somewhat agree	20.00% 3
▼ Average	26.67% 4
▼ Somewhat disagree	13.33% 2
▼ Entirely disagree	0.00% 0
TOTAL	15

Picture 5. Results for the statements “Interactive activities were interesting and useful”.

Communication with team members was informative and productive

Answered: 15 Skipped: 0

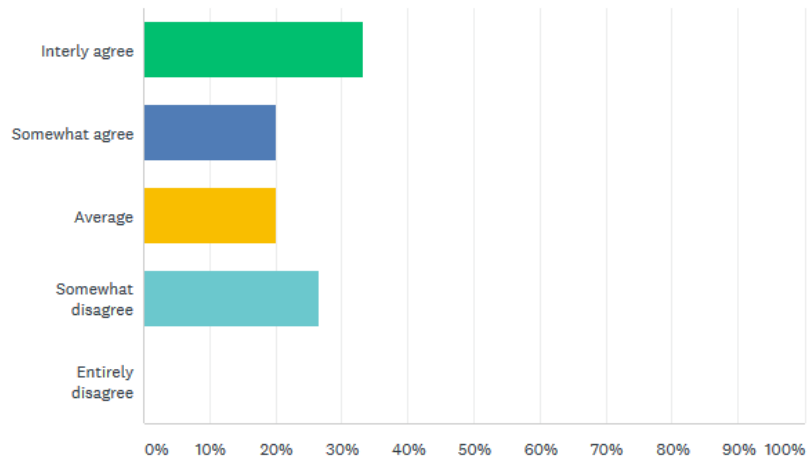


ANSWER CHOICES	RESPONSES
▼ Interly agree	60.00% 9
▼ Somewhat agree	20.00% 3
▼ Average	0.00% 0
▼ Somewhat disagree	0.00% 0
▼ Entirely disagree	20.00% 3
TOTAL	15

Picture 6. Results for the statements “Communication with team members was informative and productive”.

The support and feedback received from teacher was appropriate

Answered: 15 Skipped: 0



ANSWER CHOICES	RESPONSES
▼ Interly agree	33.33% 5
▼ Somewhat agree	20.00% 3
▼ Average	20.00% 3
▼ Somewhat disagree	26.67% 4
▼ Entirely disagree	0.00% 0
TOTAL	15

Picture 7. Results for the statements “The support and feedback received from teacher was appropriate”.

Negative aspects

Only few of students claimed that interactive learning activities were hard follow the idea and concept of the tasks and some of the questions in the activities were not sufficiently explained. Some of the students had problems with the communication in the project teams, which sometimes lowered efficiency of the work.

4.3. Future improvement

One of the possible improvements mentioned by the students was adding more guiding instructions in the learning activities, as well as the opportunity to make an auditorium version for practical work on the lectures. An improvement can also be made within the learning activities to modify questions and make them more clear and understandable for the students.

CONCLUSION

The main purpose of the thesis is to create modern, learning-interactive activities which correspond with lecture materials for the “Software project management course (P2NC.01.097)” at the Narva college of Tartu University. All the practice material (learning activities I-III) and assignment has been built upon combination of modern teaching methodologies.

In the scope of the thesis, lecture materials and collaborating interactive activities have been introduced. During the course students were built up in teams to solve all tasks provided in learning activities. The students had an opportunity to begin answering questions in learning activities at the end of the lectures and finish them at home with their group members.

In order to create qualified practical material, it was necessary to study the variety of teaching and learning methodologies. With that knowledge I have been able to create a collaboration of methodologies and use it in the process of development of the practical material.

In the end of the course feedback was asked from the students to analyze the practice material and make improvements for the future students. The overall feedback was positive and students liked the concept learning activities.

As a result, the practical material given was satisfactory, however students pointed out some confusing details and they suggested improvements. Finally, all material was improved. Some of the lectures were completely reorganized and interactive-learning activities were updated with a new set of questions with instructions.

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APPENDICES

Appendix 1. Interactive activity part 1 (Project management docs 2018)

*Note: Text displayed in blue italics is included to provide guidance to the author and should be deleted or hidden before publishing the document.
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Project Plan for <project name> Interactive activity part 1

Distribution:

<Organization., Name>

Appendices:

<Appendix 1>

Help: The purpose of the Project Plan is to document all managerial aspects of a project that are required to execute it successfully within its constraints. If some aspects are defined in separate plans (e.g. Quality Assurance Plan, Configuration Management Plan, Risk Management Plan, Project Schedule), the Project Plan should refer to these documents.

*It is important, that also non-applicability of a section is agreed on by the responsible manager.
Therefore:*

- *Don't remove headlines level 1 and level 2 headlines (Heading1 and Heading2)*
- *Reasons why a section is not applicable shall be documented under the respective headline*

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1. Overview

Help: This section describes a management summary. Provide essential information like

- What the motivation for this project is (e.g. to fill a gap in the product portfolio)
- Who the customer is
- What the project will deliver. Is it a new product or an extension of an existing one?
- What it will cost
- How long it will take
- Which organizations are involved
- Which other projects depend on the project result
- Which other projects contribute with their results

Refer to the Project Proposal [1] or other documents (e.g. Feasibility Study Report) containing information on the project background like market, technology, profitability, and competitor evaluation.

2. Goals and Scope

2.1 Project Goals

Help: The project goals define the expected project results together with the required development constraints. Information may be extracted from the Project Proposal [1] (or the Feasibility Study Report) and the Project Requirements Specification and completed, if required.

Identify the various categories of project goals (list the major project goals only and refer to the Project Requirements Specification or other documents for details). Consider the following categories:

- Functional goals
- Strategic goals
- Business goals (e.g.: time-to-market, cost)
- Technological goals
- Quality goals
- Organizational goals (e.g. competence development, testing of new methods, techniques, or tools, application of new processes, etc.)
- Other goals, e.g.: usability, portability, etc. (these goals, and what is specifically expected, should be clearly specified in the Project Requirements Specification)
- Constraints (e.g.: environmental constraints, application specific standards, national standards, cultural relationships, etc.)

Prioritize the project goals:

Functional, business, and quality goals should be prioritized at least.

Project Goal	Priority	Comment/Description/Reference
Functional Goals:	2	For details see the Project Requirements Specification [2]
<functional goal #1>		
<functional goal #2>		
Business Goals:		
<Time-to-market>		
<efficiency, cost, quality>		
Technological Goals:		
<technical goal #1>		
Quality Goals:	2	
<quality goal #1>		
Constraints:		
<environmental>		
<appl. specific standards>		

Project Goal	Priority	Comment/Description/Reference
<national standards>		

2.2 Project Scope

Help: Clarify what the project will (and will not) deliver, in order to avoid future shifts in the level of ambition.

2.2.1 Included

The deliverables of this project and their receivers are listed in detail in the delivery plan in chapter 10.

2.2.2 Excluded

Help: State what is specifically excluded from the project but what the customer may expect to be included. This could, for example, be clarifying that training of end-users is excluded.

This project will exclude ...

3. Organization

Help: Describe the internal project organization and all organizational issues affected by the project result or the project is dependent on. You may extract information from the Project Proposal [1] (or Feasibility Study Report).

3.1 Organizational Boundaries and Interfaces

*Help: Describe the environment that the project is embedded in. Identify external **stakeholders** the project is dependent on and who are affected by the project result. Describe the administrative and managerial boundaries between the project and each of the following entities: the parent organization, the customer organization, subcontracted organizations, and any other organizational entities that interact with the project.*

3.1.3 Resource Owners

Resource Owners are defined in the Resource Plan in section 5.1.

3.1.4 Receivers

Receivers are defined in the Delivery Plan in section 10.

3.1.5 Sub-contractors

*Help: A **Sub-contractor** is an external organization that is contracted to provide the project with a specified product, knowledge or service.*

Sub-contractors are defined in the sub-contract management in section 8.

3.1.6 Suppliers

*Help: A **Supplier** is an external organization contributing to the project with an existing product (COTS = Commercial Off The Shelf) that is incorporated into a project deliverable (e.g. a database system) or used for project support (e.g. tool, equipment). Identify all external suppliers and their deliverables. State any special arrangements or procedures that will be used in contacts with the suppliers. Name contacts, if applicable.*

Company: Contact	Deliverable	Comment

3.1.7 Cross Functions

Help: Identify all functions within the organization that are involved in/contribute to the project.

Function	Dept.: Contact	Responsibility/Comment
Product Mgmt		
Marketing		
Sales		
Service		
Training		
Manufacturing		
Quality		
Technology		
Supply Mgmt		

3.1.8 Other Projects

Help: Specify the interface to other projects. Identify the relevant dependencies in terms of deliveries to or from the project, and usage of the same resources.

Project	Org.: Project Mgr	Dependency	Comment

3.2 Project Organization

Help: Describe how the project is organized. Describe what subprojects and other areas of responsibility are planned. Identify and staff all steering functions, project management functions, and execution functions.

Graphical illustrations such as hierarchical organization charts or matrix diagrams may be used to depict the lines of authority, responsibility, and communication within the project.

3.2.1 Project Manager

Help: Identify the Project Manager who has the overall responsibility of the project. If the Project Manager has appointed a Technical Project Manager (syn.: Development Project Manager), who is only responsible for the technical project execution, this should also be specified.

Example:

Role	Organization: Name
Project Manager	
Technical Project Mgr.	

3.2.2 Project-internal Functions

Help: Since the project manager has the overall project responsibility, he /she is also responsible for the project-internal functions. But he/she can delegate the management of these functions to project team members. In this case list the functions and individuals responsible for

Example:

Function	Organization: Name	Comment
Quality Assurance		

Function	Organization: Name	Comment
System Test Lead		
Validation Lead		
Configuration Mgmt		
Change Mgmt		
etc.		

3.2.3 Project Team

Help: List all project team members here and ensure that the time they spend on the project is accounted for in the project budget.

Organization: Name	Availability	Comment

3.2.4 Steering Committee

Help: Identify the committed individuals composing the project steering committee, and its responsibility and authority within the project.

The Steering Committee (SteCo) of the project is responsible for

The SteCo consists of the following members:

Organization	Name	Comment

Appendix 2. Interactive activity part 2 (Project management docs 2018)

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Project Plan for <project name>

Interactive activity part 2

Distribution:

<Organization., Name>

Appendices:

<Appendix 1>

Help: The purpose of the Project Plan is to document all managerial aspects of a project that are required to execute it successfully within its constraints. If some aspects are defined in separate plans (e.g. Quality Assurance Plan, Configuration Management Plan, Risk Management Plan, Project Schedule), the Project Plan should refer to these documents.

*It is important, that also non-applicability of a section is agreed on by the responsible manager.
Therefore:*

Don't remove headlines level 1 and level 2 headlines (Heading1 and Heading2)

Reasons why a section is not applicable shall be documented under the respective headline

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Schedule and Budget

Work Breakdown Structure

Help: Based on project goals and scope, define a Work Breakdown Structure. Define work packages and project activities. It is normally a separate document, therefore list it in References and refer to it.

The Work Breakdown Structure (WBS) is documented in [6].

Schedule and Milestones

Help: Estimate the effort for the project activities and plan the activity sequencing. Then prepare the schedule that supports all of the required activities and complies with the resource plan.

Define project milestones based on the chosen development strategy (see section 6) and on critical events in the project schedule.

List the milestones and define clear milestone criteria to make milestones measurable.

Milestones	Description	Milestone Criteria	Planned Date
M0	Start Project	Budget Release	<yyyy-mm-dd>
	e.g.: Project goals and scope defined	PRS or SRS reviewed Stakeholders identified Impl. Proposal reviewed	<yyyy-mm-dd>
M1	Start Planning		<yyyy-mm-dd>
	<milestone description, e.g. Life Cycle Objectives LCO defined>	Scope and concept described	<yyyy-mm-dd>
M2	Start Execution		<yyyy-mm-dd>
	<milestone description, e.g. Life Cycle Architecture LCA defined>	Requirements agreed, project plan reviewed, resources committed	<yyyy-mm-dd>
M3	Confirm Execution		<yyyy-mm-dd>
	<milestone description, e.g. alpa version>	Architecture reviewed and stable	<yyyy-mm-dd>
M4	Start Introduction		<yyyy-mm-dd>
	<milestone description, e.g. system test passed>	Coding of new functionality finished, Draft documentation	<yyyy-mm-dd>
M5	Release Product		<yyyy-mm-dd>
	<milestone description>	Product system tested, documentation reviewed	<yyyy-mm-dd>
M6	Close Project		<yyyy-mm-dd>

A detailed Project Schedule is available in [4]. The Project Schedule is monthly updated by the Project Manager.

Budget

Help: Calculate the required project budget based on cost estimates for project activities, sub-contracts, COTS (Commercial Off The Shelf), training, etc. Present the distribution of the budget over the whole project life.

Category	Budget for Period in kUS\$					
	M0- M1	M1- M2	M2- M3	M3- M4	M4- M5	M5- M6
Human Resources (internal)						

Category	Budget for Period in kUS\$					
	M0- M1	M1- M2	M2- M3	M3- M4	M4- M5	M5- M6
Human Resources (external)						
Purchases (COTS)						
Equipment						
Premises						
Tools						
Travel costs						
Training						
Review activities						
Other						
Total	1	1	2	5	2	1
Total cumulated	1	2	4	9	11	12

For a detailed list of costs of all resources see <document> [x].

Help: Prepare a resource plan specifying the project's need for human resources, as well as for other resources (equipment, tools, licenses, etc.).

Development Process

Help: If available and applicable refer to the **organizational development process** and describe deviations from this standard process. Otherwise describe the development process applied in this project. Explain why this development process has been selected. Describe how the selected development process is tailored to the needs of the project, takes learnings from previous projects into account, and how it is mapped to the milestone process.

Development Environment

Help: Define methods, tools, languages, etc. to be employed for design, implementation, test, and documentation, and when they (or knowledge) should be available.

Example:

Item	Applied for	Availability by
Methods		
Use Case	Requirements capturing	M0
Tools		
Rational Rose	Design	M2
Languages		
UML	Design	M2
Java	Web interface	M2
C++	...	M2

Measurements Program

Help: If available refer to the **organizational measurements program** and document deviations from this program. Otherwise define which project specific data should be collected, e.g. to assess the achievement of the project goals.

Examples:

Type of data	Purpose	Responsible
<# changed requirements>		Q-Responsible
<# defects found before M4>		Q-Responsible
<performance data>	to assess the achievement of project requirements	Test lead

Risk Management

Help: Describe the procedure to be used for managing risks in the project. The procedure should specify who is responsible for risk management, when risk situation is regularly considered (e.g. at each project status meeting), and which roles risks are communicated to, etc.

Also refer to the Risk Management Plan (or Risk Sheet) where the risks are listed, assessed, and mitigation and contingency is defined.

Example:

All identified risks are documented, assessed and prioritized in the Risk Management Plan [5] by the Project manager. The plan also defines the mitigation and contingency measures and who is responsible for. The Risk Management Plan is updated monthly or on event and communicated to all affected stakeholders by the Project Manager. The risk status is reported to the line management in the monthly Project Report.

Sub-contract Management

Help: List which part of work is out-sourced to which sub-contractor.

Refer to the sub-contractor's agreement that should include or refer to the statement of work, the execution process, milestones, quality assurance, configuration management, communication structure, hand-over procedure, acceptance criteria, and quality audits.

Company	Sub-contractor		Sub-contracted Work	Ref. to sub-contract
	Contact			

Communication and Reporting

Help: State the principles for reporting and distributing information within the project for the different groups of internal and external stakeholders. Include, for example, how often the reporting will take place, the type of reports or information, the type of media in which it is presented, and the type of meetings that will take place.

- a) *Internal communication and reporting: ensure that all information is available to those who need it.*
 - Plan project meetings, how often they take place, and who will participate
 - Define how project information will be made available to the internal stakeholders (e.g. project library)
 - Define how and how often sub-projects and sub-contractors report to the project manager
 - Define who participates milestone meetings
 - Define how events will be communicated

b) *External communication and reporting:*

- Define what information will be provided to which stakeholders
- Define how and how often information will be provided to which stakeholders often (e.g. project report)
- Plan regular meetings with external stakeholders (e.g. SteCo meetings)

Example:

Type of Communication	Method / Tool	Frequency/ Schedule	Information	Participants / Responsibles
Internal Communication:				
Project Meetings	Teleconference	Weekly and on event	Project status, problems, risks, changed requirements	Project Mgr Project Team
Sharing of project data	Shared Project Server	When available	All project documentation and reports	Project Mgr(s) Project Team Members
Milestone Meetings	Teleconference	Before milestones	Project status (progress)	Project Mgr Sub-project Mgr
Final Project Meeting	Teleconference	M6	Wrap-up Experiences	Project Mgr Project Team
External Communication and Reporting:				
Project Report	Excel sheet	Monthly	Project status - progress - forecast - risks	Project Manager Sub-Project Managers
SteCo Meetings	Teleconference	Monthly		Project Manager, SteCo

Appendix 3. Interactive activity part 3 (Project management docs 2018)

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Project Plan for <project name> Interactive activity part 3

Distribution:

<Organization., Name>

Appendices:

<Appendix 1>

Help: The purpose of the Project Plan is to document all managerial aspects of a project that are required to execute it successfully within its constraints. If some aspects are defined in separate plans (e.g. Quality Assurance Plan, Configuration Management Plan, Risk Management Plan, Project Schedule), the Project Plan should refer to these documents.

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Reasons why a section is not applicable shall be documented under the respective headline

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Delivery Plan

Deliverables and Receivers

Help: List here all deliverables from the project and who the receivers of the deliverables are. Indicate also the planned delivery date. Take in consideration both strategic and technical aspects.

Examples for non-technical deliverables are: marketing and sales material, training material, management presentations, publications, bullets, etc.

Ident.	Deliverable	Planned Date	Receiver
D1			
D2			

Etc.	
------	--

Quality Assurance

Configuration and Change Management

Security Aspects

Help: State how to deal with security matters, for instance:

- Classification of the project information with regard to requirements for integrity, availability and confidentiality, in accordance with the organization's group directives on security,*
- Specific action that must be taken to fulfill security requirements, such as security agreements with suppliers and partners, security check of project team members, security audits of equipment, usage of coded information, etc.*
- Authorization of information distribution and publishing, that is, who should decide which information will be distributed to whom,*
- Procedure for monitoring security,*
- Procedure for reporting security incidents.*

Abbreviations and Definitions

Help: List all abbreviations and definitions used within this document.

- CCB Change Control Board
- CI Configuration Item
- CM Configuration Management
- COTS Commercial Off The Shelf
- CR Change Request
- CRM Change Request Management
- ID Identification, Identifier
- IP Intellectual Property

QA	Quality Assurance
SteCo	Steering Committee
V&V	Verification and Validation

References

Help: List all other documents this document refers to.

- [1] <Doc. No.> Project Proposal for <project name>
- [2] <Doc. No.> Project Requirements Specification for <project name>
- [3] <Doc. No.> Implementation Proposal for <project name>
- [4] <Doc. No.> Project Schedule for <project name>
- [5] <Doc. No.> Risk Management Plan for <project name>
- [6] <Doc. No.> Work Breakdown Structure for <project name>
- [7] <Doc. No.> Quality Assurance Plan (if it is a separate plan)
- [8] <Doc. No.> Configuration Management Plan (if it is a separate plan)
- [9] <Doc. No.> <Sub-contract #1>
- [10] <Doc. No.>

Revision

Rev. ind.	Page (P) Chapt. (C)	Description	Date Dept./Init.
-	---	original version	

Appendix 4. Assignment

University of Tartu, Narva College, Estonia

P2NC.01.097

Software Project Management

Assignment

10 Marks

Instructions:

- Assignment will get 50% penalty after one day late submission and will not get any point if assignment submitted after one day.***
- The solution(s) you submit must be your own written. Plagiarize of submitted solution(s) from other student(s) are not allowed. As a penalty student(s) get negative points, automatic fail in the assignment and possibly other academic discipline.***

Q1. A software company has 60 workers. From total 60 workers, 20% for example 12 workers are associated in a specific project. The remaining workers are not directly associated in that project. The given estimated cost of the project, the company is giving benefit/support 80% of company total workers, those are 48 workers and giving them extra support and benefits. In relation with the project, the company is working on a deployment. It has been concluded at the end of implementation that the complete project gives less profit as it was expected. The original budget on that specific project is more as it was estimated budget.

Figure out for which factor(s) reasons the budget goes higher and why the company higher management is unable to succeed the project get profit out of the allocated cost? Also advice and comments to higher management of company to take some measures that how could be possible to control the budget on that given specific project? (4 points).

Q2. You are working in a weak matrix organization. You are having problems acquiring the project human resources you were promised earlier during the planning phase of the project. The substitute resources being offered to you do not have the skills required to perform the project work. What should you do to resolve this problem? (1 point)

Q3. According to the Herzberg's Motivation Hygiene Theory, which of the following is a hygiene factor? (1 point)

- Achievement
- Good Working Conditions
- Recognition
- Career Advancement

And give explanation

Scenario for Q4 and Q5:

Hospital management decided to develop a computerize system for doctors and patients. The system assists doctors to book the appointments and see the patients' medical progress. The System permits doctor to insert and schedule time slots online, insert, examination and maintain patient record. As well as System permits patient to find a doctor, book online appointment and check those appointments are booked with his/her name. Every time a patient visits a doctor his/her medical record is kept in the database by doctor. Whenever a user logs in, may see his/her complete medical record and when needed similarly a doctor may see patient's medical record even before the patient visits him.

Q4. In the project based on above scenario it is essential to clarify the background characteristics of the Users at the starting of the project. How the Ambiguous users will affect the project. Based on above scenario, the project requirements are clear? If not give the answer along with an example based on above mentioned project scenario? (3 points)

Q5. The Stakeholders are the important people who effect and get affected by the project. In this question based on above scenario identify the Stakeholders (1 point).

Appendix 5. Weekly course plan

P2NC.01.097 Software Project Management

About Info. Software Project Management

This course gives you the overview about what Software Project Management actually is? What tools and techniques you will use to manage your project? How do modern companies manage their project? Similarly, risk management, quality assurance activities, and project planning, scheduling activities will also be covered in this course.

Course Contents and Weekly Schedule Spring 2018			
Week	Date	Contents	Deliverables
24	13/2/2018	Module I - Overview of Project Management and planning Lecture # 1: Introduction and Fundamentals	
	15/2/2018	Lecture # 2: Why do software project fail?	
25	20/2/2018	Lecture # 3: Software Project Planning 1/3	Int. Task Nr 1 due to 4.03.2018
	22/2/2018	Lecture # 4: Project planning(cont)	
26	27/2/2018	Module II - Software Development Fundamentals Lecture # 5: Configuration Management Quality Assurance Management	Quiz Nr 1
	01/3/2018	Lecture # 6: Estimation	
27	06/3/2018	Lecture # 7: Project schedules	Int. Task Nr 2 due to 25.03.2018
	08/3/2018	Lecture # 8: Design and programming	
28	Free Day		
	Free Day		
29	20/3/2018	Lecture # 9: Life Cycle Models and Organization	Quiz Nr 2
	22/3/2018	Lecture # 10: Lifecycle Models	
30	27/3/2018	Lecture # 11: Project cost management part 1	
	Free Day		
31	Free Day		Int. Task Nr 3 due to 22.4.2018
	05/3/2018	Lecture # 12: Organization	

32	10/4/2018	Lecture # 13: Workshop # 1 : PRINCE2 method for Project Management	Quiz Nr 3
	12/04/2018	Lecture # 14: Workshop # 2 : Risk Management	Final Project
33	Free Day		
	Free Day		
34	24/4/2018	Lecture # 15: Organizational Issues and Project Management, What to Manage?; Project Execution	Assignment Nr 1 due to 3.05.2018
	26/04/2018	Lecture # 16: Analysis Concepts & Principles	
35	Free Day		Quiz Nr 4
	03/5/2018	Lecture # 17: ASANA GUIDE	
36	Free Day		
	10/5/2017	Lecture # 18: TRELLO GUIDE	
37	15/5/2018	Lecture # 19: BITRIX24 Introduction	
	17/5/2018	Lecture # 20: Requirements and use cases	
38	22/5/2018	Lecture # 21 Client cases management in companies	
	24/5/2018	Lecture #22 Understanding changes	Quiz Nr 5
39	29/5/2018	Lecture # 23: PM's nine Knowledge Areas Team Leader Course Project Presentation	
	31/5//2018	Lecture # 24: Revision/Discussion Exam Pattern/ Rewrite Quizzes	
40	05/6/2018		Exam # 1
	07/6/2018		Exam # 2

Reference Book:

1. **Applied Software Project Management, 1st Edition by Andrew Stellman, Jennifer Greene**
2. **Software engineering project management book of London University by D. Murray and N. Sandford**
3. **MANAGING AND LEADING SOFTWARE PROJECTS by Richard E. (Dick) Fairley**

Recommended Websites:

4. <http://www.maxwideman.com>
5. <http://www.4pm.com>
6. <http://michaelgreer.biz>
7. <http://www.e-programme.com>
8. <http://managementhelp.org>

Grading Points:

Activity	Description	Total Points
Quizzes	5* 4	20
Assignment	One Assignment	10
Project	Final Course Project	20
Final Exam		20
Intr. Activities		30
Bonus	Interactive Participation in Class	5
Total		105

Deliverable Submission:

Assignments: 1 day late 50% penalty. After 1 day 100% penalty.

Quizzes: No reattempt is possible.

Minimum for the quizzes: 8 points out of 20 to get

Minimum for all interactive activities, assignment and project: 34 out of 60 points to get

Minimum for exam: 7 points out of 20 to get

Appendix 6. Feedback form

Statements of the feedback form, pdf-document

feedback_form.pdf

Appendix 7. License

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