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Training Activity - Modelling Workshop

ECTS: 3 ECTS

COORDINATOR: Luis López Bonilla

UNIVERSITY WHERE THE COORDINATOR IS: UC3M

HAVE YOU GIVEN PERMISSION TO RECORD YOUR CLASSES? No

LECTURER 1: Manuel Carretero

UNIVERSITY WHERE THE LECTURER 1 IS: UC3M

HAVE YOU GIVEN PERMISSION TO RECORD YOUR CLASSES? No

LECTURER 2: Filippo Terragni

UNIVERSITY WHERE THE LECTURER 2 IS: UC3M

HAVE YOU GIVEN PERMISSION TO RECORD YOUR CLASSES? No

LECTURER 3: María Higuera

UNIVERSITY WHERE THE LECTURER 2 IS: UPM

HAVE YOU GIVEN PERMISSION TO RECORD YOUR CLASSES? No

LECTURER 4: José Manuel Vega

UNIVERSITY WHERE THE LECTURER 2 IS: UPM

HAVE YOU GIVEN PERMISSION TO RECORD YOUR CLASSES? No

LECTURER 5: Fernando Varas

UNIVERSITY WHERE THE LECTURER 2 IS: UPM

HAVE YOU GIVEN PERMISSION TO RECORD YOUR CLASSES? No

SUBJECT CONTENTS

Propose and support simplified models for the analysis of relevant problems in industry.

Work plan programming in the framework of a R&D project and presentation to a potential client.

METHODOLOGY

The organization of the Modelling Workshop would be as follows:

1. An initial face-to-face session (during the first three weeks of the teaching period, and using the video-conference system) where a professional from the industry, a technological centre or a university department proposes a real problem whose resolution involves developing a mathematical model.
2. After the initial round of presentations, the students are divided in small groups (around four students each) and assigned one of these problems.
3. During six weeks, the groups of students meet every one or two weeks with a lecturer who will help them to overcome the difficulties they may find developing the model and extracting useful information from it. These meetings may be face-to-face or virtual, through video-voice chat software or the video-conference system.

4. At the end of these regular meetings, the students prepare a report describing the conclusions of their work (posing a preliminary mathematical model and extracting sufficient information to defend its validity) and advance a work plan to develop a more complete study of the proposed real problem.

5. In a final face-to-face session (during the last three weeks of the assigned teaching period), the students present their results to a professional from the industry, a technological centre or a university department. In this presentation, the students must answer the questions from the professional and support their proposal in a format as close as possible to the presentation of a R&D proposal to a client/ funding agency.

LANGUAGE USED IN CLASS:

It will be adapted taking into account both the speaker and the audience.

IS IT COMPULSORY TO ATTEND CLASS?

Yes. Using the video-conference system.

BIBLIOGRAPHY

SKILLS

Basic:

Specific:

WILL YOU BE USING A VIRTUAL PLATFORM?

No.

WILL YOU BE USING ANY SPECIFIC SOFTWARE?

No.

CRITERIA FOR THE 1ST ASSESSMENT OPPORTUNITY

Assessment will be based on the presentations by each group of students in the final sessions. In this assessment, the report, the oral presentation and the answers to the questions by the professional will be taken into account.

CRITERIA FOR THE 2ND ASSESSMENT OPPORTUNITY

Assessment will be based on the presentations by each group of students in the final sessions. In this assessment, the report, the oral presentation and the answers to the questions by the professional will be taken into account.

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Training Activity - Project methodology

ECTS: 2 ECTS

COORDINATOR: Carlos José Álvarez López (carlosjose.alvarez@usc.es)

UNIVERSITY WHERE THE COORDINATOR IS: USC

HAVE YOU GIVEN PERMISSION TO RECORD YOUR CLASSES? Yes

LECTURER 1: Francisco José González Diéguez (franciscojose.gonzalez@usc.es)

UNIVERSITY WHERE THE LECTURER 1 IS: USC

HAVE YOU GIVEN PERMISSION TO RECORD YOUR CLASSES? Yes

SUBJECT CONTENTS

Theoretical:

Conceptual Framework Project Management

Scope Management (What must do, and how do it).

Time Management (how long it will take to complete, and how we will ensure that we meet that deadline)

Risk Management (opportunities and threats that can affect the accomplishment of the objectives of the project and how we'll manage)

Project Management Integration (how we plan and control the project, taking into account all the areas).

Practical:

Comment: Expectations / Ex. Project

Creativity

SWOT

Risk Management

Multicriteria Analysis

Financial Evaluation of Projects

Project Schedule

METHODOLOGY

-Class attendance and Practice: Exhibition of contents by presentation or explanation by a teacher (including demonstrations). Problem-based learning. Oriented educational approach to learning and instruction in which students solve real problems.

-Practical works: Preparation for delivery activities in the practical sessions.

-Complementary activities are voluntary mentoring and training activities related to the course: readings, seminars, attendance at conferences, seminars, videos, etc..

All activities will be supported by the platform's Virtual USC, infromación supply, notices, submission of work, consultations etc.

LANGUAGE USED IN CLASS: Spanish

IS IT COMPULSORY TO ATTEND CLASS?

BIBLIOGRAPHY

Basic:

IPMA. Bases para la competencia en dirección de proyectos. NCB 3.1.

PMI Standards Committee. Guía de los Fundamentos de la Dirección de Proyectos Tercera Edición (Guía del PMBOK). Project Management Institute (USA)

Further:

Amándola, L.J.. Estrategias y tácticas en la dirección y gestión de proyectos Valencia : Editorial de la UPV

Chu, M., Altwies, D., Walker, E. Achieve PMP exam success. J. Ross Publishing, USA

de Cos, M. Teoría general del proyecto. Síntesis, España.

Frame, J. D.. La nueva dirección de proyectos : herramientas para una era de cambios rápidos.Barcelona : Granica

Ibbs, C.W., Kwak, Y.H. Assessing project management maturity. Project Management Journal, Vol. 31, No. 1, pp. 32-43, Project Management Institute, USA.

Kerzner, H. Project management case studies, Wiley

Kerzner, H. Project management, Wiley

Lewis, J.P. Planificación, programación y control de proyectos. Ediciones S.

Lewis, James P. Las claves de la gestión de proyectos. GESTION 2000.

Lock, D. Project Management. Gower Publishing.

Meredith, J.R., Mantel, S.J. Project management. A managerial approach. John Wiley, New York, USA.

Morris, P.W.G. The Management of Projects. Thomas Telford Publications, London.

Morris, Peter W.G., Pinto, Jeffrey K. The Wiley guide to managing projects. John Wiley.

Pereña, J.. Dirección y gestión de proyectos. Madrid : Díaz de Santos.

Phillips, J. PMP study guide. McGraw-Hill.

PMI Standards Committee. Guide to the Project Management Body of Knowledge 5th Edition (PMBOK Guide). Project Management Institute (USA).

Turner, J.R. The handbook of project-based management: improving the processes for achieving strategic objectives. The Henley Management Series, McGraw Hill.

SKILLS

Basic:

CG1: To have knowledge that provide a basis or opportunity for originality in developing and / or applying ideas, often within a research context, knowing how to translate industrial needs in terms of R & D in the field of mathematics Industrial.

CG2: To be able to apply the acquired knowledge and abilities to solve problems in new or unfamiliar environments within broader contexts, including the ability to integrate multidisciplinary R & D in the business environment.

CG3: To be able to integrate knowledge in order to state opinions using information that even incomplete or limited, include reflecting on social and ethical responsibilities linked to the application of their knowledge.

CG4: To have the ability to communicate the findings to specialist and non-specialist audiences in a clear and unambiguous way.

CG5: To have the appropriate learning skills to enable them to continue studying in a way that will be largely self-directed or autonomous, and also to be able to successfully undertake doctoral studies.

Specific:

CE2: To model specific ingredients and make appropriate simplifications in the model to facilitate their numerical treatment, maintaining the degree of accuracy, according to previous requirements.

CE3: To determine if a model of a process is well made and well mathematically formulated from a physical standpoint.

CE4: To be able to select a set of numerical techniques, languages and tools, appropriate to solve a mathematical model.

CE5: To be able to validate and interpret the results, comparing them with visualizations, experimental measurements and functional requirements of the physical engineering system.

WILL YOU BE USING A VIRTUAL PLATFORM? No.

WILL YOU BE USING ANY SPECIFIC SOFTWARE? Si. Microsoft Project.

CRITERIA FOR THE 1ST ASSESSMENT OPPORTUNITY

Students will be evaluated in each of the case studies and their qualification will be computed based on the evaluations obtained in them.

Exam. The students who fail continuous assessment shall be entitled to a final exam.

CRITERIA FOR THE 2ND ASSESSMENT OPPORTUNITY

Based on the results obtained in the 1st opportunity.

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Training Activity - Software Engineering

ECTS: 3 ECTS

COORDINATOR: Javier Andrade Garda (javier.andrade@udc.es)

UNIVERSITY WHERE THE COORDINATOR IS: UDC

HAVE YOU GIVEN PERMISSION TO RECORD YOUR CLASSES? No

LECTURER 1: Francisco José Pena Brage (fran.pena@usc.es)

UNIVERSITY WHERE THE LECTURER 1IS: USC

HAVE YOU GIVEN PERMISSION TO RECORD YOUR CLASSES? No

SUBJECT CONTENTS

Theoretical content:

1. Software Engineering. Development paradigms
2. Main paradigms: structured and OO
3. OO paradigm
    - 3.1. Introduction and basic concepts
    - 3.2. Analysis, design and development aspects in OO
    - 3.3. UML basic annotation
    - 3.4. Recommended analysis and design process in OO
4. Design patterns in OO
    - 4.1. Introduction
    - 4.2. Examples

Practical content:

1. Application of the OO for small examples/exercises

2. Application of the OO to generic real cases

3. Application of the OO to real development projects in Mathematics

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METHODOLOGY

Theoretical classes and laboratory classes.

LANGUAGE USED IN CLASS: Spanish

IS IT COMPULSORY TO ATTEND CLASS? Students can attend via conference system.

BIBLIOGRAPHY

Basic bibliography:

"Software Engineering. A Practitioner's Approach". Roger S. Pressman. Mc-Graw Hill

"Unified Modeling Language". Grady Booch, James Rumbaugh and Ivar Jacobson. Addison Wesley

"Design Patterns". Erich Gamma, Richard Helm, Ralph Johnson and John Vlissides. Addison Wesley

Complementary bibliography:

"Unified Development Process". Ivar Jacobson, Grady Booch and James Rumbaugh. Addison Wesley

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SKILLS

Basic:

CG1: To have knowledge that provide a basis or opportunity for originality in developing and / or applying ideas, often within a research context, knowing how to translate industrial needs in terms of R & D in the field of mathematics Industrial.

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CE3: To determine if a model of a process is well made and well mathematically formulated from a physical standpoint.

CE4: To be able to select a set of numerical techniques, languages and tools, appropriate to solve a mathematical model.

CE5: To be able to validate and interpret the results, comparing them with visualizations, experimental measurements and functional requirements of the physical engineering system.

WILL YOU BE USING A VIRTUAL PLATFORM?

Yes, the Google group named "Ingeniería del Software (M2I)". Each student must enter in his Google account and click "Solicitar pertenencia al foro" in the webpage https://groups.google.com/d/forum/ingenieria-del-software. In the application, a public name and the rest of the required information must be indicated.

WILL YOU BE USING ANY SPECIFIC SOFTWARE? No.

CRITERIA FOR THE 1ST ASSESSMENT OPPORTUNITY

Effective learning of the explained theoretical concepts: 40%. The evaluation of this aspect will be carried out through a theoretical exam about the concepts explained.

Capacity to put into operation those concepts: 60%. A practical essay putting into operation the concepts explained in a mathematical context will be carried out by students.

Both aspects (exam and work) are mandatory and should be passed by the student.

CRITERIA FOR THE 2ND ASSESSMENT OPPORTUNITY

The same as in the 1st assessment opportunity.

FURTHER COMMENTS:

Course objectives:

1. Basic understanding of the main paradigms in software development.

2. Study of the Object Oriented (OO) paradigm.

3. Capacity to put in operation the OO.

The subject is oriented to develop the following technical capacities:

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6. Capacity for abstraction and synthesis.

7. Ability to implement the theoretical knowledge in the phases of analysis, design and development in OO.

8. Ability to understand the OO models obtained for a software development project.

Training Activity - Workshop on Industrial Problems

ECTS: 6 ECTS

COORDINATOR (USC): Alfredo Bermúdez de Castro (alfredo.bermudez@usc.es)

LECTURER 1(UDC): Carlos Vázquez Cendón (carlosv@udc.es)

LECTURER 2 (UVigo): José Durany Castrillo (durany@dma.uvigo.es)

LECTURER 3 (UDC): Ana Ferreiro Ferreiro (aferreiro@udc.es)

LECTURER 4 (UVigo): Fernando Varas Mérida (curro@dma.uvigo.es)

LECTURER 5 (USC): Francisco Pena Brage (fran.pena@usc.es)

SUBJECT CONTENTS

Analysis, modelling and simulation of industrial and business problems.

METHODOLOGY

A set of problems will be presented by staff of collaborating companies and / or PhDs related to the industry or business environment.

A list of the problems proposed by the collaborating companies will be elaborated according to the choices of students in the first year of M2i, the proposals made by the students themselves and ensuring that the offer is wide enough to choose for the Master's projects.

For each problem there will be a presentation by the company or teachers, followed by a discussion on the choice of models and calculation techniques most suitable to carry out the numerical simulation.

Students must mathematically formulate the problems, suggest a solution and choose one for their master project.

LANGUAGE USED IN CLASS: Spanish

IS IT COMPULSORY TO ATTEND CLASS? Students can attend via conference system.

SKILLS

Basic:

CG1: To have knowledge that provide a basis or opportunity for originality in developing and / or applying ideas, often within a research context, knowing how to translate industrial needs in terms of R & D in the field of mathematics Industrial.

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CG5: To have the appropriate learning skills to enable them to continue studying in a way that will be largely self-directed or autonomous, and also to be able to successfully undertake doctoral studies.

Specific:

CE2: To model specific ingredients and make appropriate simplifications in the model to facilitate their numerical treatment, maintaining the degree of accuracy, according to previous requirements.

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CE4: To be able to select a set of numerical techniques, languages and tools, appropriate to solve a mathematical model.

CE5: To be able to validate and interpret the results, comparing them with visualizations, experimental measurements and functional requirements of the physical engineering system.

CRITERIA FOR THE 1ST ASSESSMENT OPPORTUNITY

It is a compulsory activity for all students enrolled in the M2i.

80% of attendance is required. Each student will submit, by the deadline set by the teachers two problems summaries:

• One problem selected by the student following a defined scheme (70% of the score) .

• A summary of a second problem selected by the student from 3 problems proposed in a raffle (30% of score).

FURTHER COMMENTS:

Only the classes where the companies give their permission will be recorded. The company staff will connect from one of the participant universities or from their own headquarters.