

INSO 4116 - Course Syllabus

1. General Information:

Alpha-numeric codification: INSO 4116
Course Title: Software Design
Number of credits: 3
Contact Period: 3 hours of lecture per week

2. Course Description:

English: Fundamental principles and development of skills required for the effective design of complex software systems. Topics include: formal design methods, design specification standards, design patterns, design validation, and design metrics. Use of computer-aided software engineering (CASE) tools.

Spanish: Conceptos fundamentales y desarrollo de destrezas requeridas para el diseño efectivo de sistemas complejos de software. Los temas incluyen: métodos formales, estándares de especificaciones, patrones, validación y métricas de diseño. Uso de herramientas de diseño asistido por computadora (CASE).

3. Pre/Co-requisites and other requirements¹:

Prerequisites: INSO 4101 OR ICOM 4009

4. Course Objectives:

Students will learn techniques for software design and apply these by completing the design of an enterprise software system during the course of the semester. Students will present their project and justify the rationale for their design.

5. Instructional Strategies:

- conference discussion computation laboratory
- seminar with formal presentation seminar without formal presentation workshop
- art workshop practice trip thesis special problems tutoring
- research other, please specify:

6. Minimum or Required Resources Available:

Students will use the Departmental computer laboratories to complete course projects.

¹ Incorporates changes approved on Certification #18-02 of Academic Senate at UPRM.

7. Course time frame and thematic outline

| Outline | Contact Hours |
|--|---------------|
| Introduction | 1 |
| Software design process | 1 |
| Review of Object-oriented principles | 1 |
| Standard design notation | 8 |
| Design principles | 6 |
| Design patterns and software architectures | 4 |
| System design | 12 |
| Detailed design | 8 |
| Exams and discussions | 4 |
| Total hours: (equivalent to contact period) | 45 |

8. Grading System

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|--|
| <input checked="" type="checkbox"/> Quantifiable (letters) <input type="checkbox"/> Not Quantifiable |
|--|

9. Evaluation Strategies

| | Quantity | Percent |
|---|----------|-------------|
| <input checked="" type="checkbox"/> Exams | 2 | 35% |
| <input checked="" type="checkbox"/> Final Exam | 1 | 25% |
| <input checked="" type="checkbox"/> Short Quizzes | | |
| <input type="checkbox"/> Oral Reports | | |
| <input type="checkbox"/> Monographies | | |
| <input type="checkbox"/> Portfolio | | |
| <input checked="" type="checkbox"/> Projects | 1 | 40% |
| <input type="checkbox"/> Journals | | |
| <input type="checkbox"/> Other, specify: | | |
| TOTAL: | | 100% |

10. Bibliography:

| |
|---|
| 1. Hassan Gomaa, <i>Software Modeling and Design:UML, Use Cases, Patterns, and Software Architectures</i> , Cambridge University Press, 2011. |
|---|

2. Erik Klimczak, *Design for Software: A Playbook for Developers*, Wiley, 2013.
3. David Budgen, *Software Design*, 2nd ed. Addison-Wesley, 2003. [Classic Book]
4. Jason McC. Smith, *Elemental Design Patterns*, Addison-Wesley, 2012
5. Eddie Burris, *Programming in the Large with Design Patterns*, Pretty Print Press, 2012.
6. Erich Gamma, Richard Helm, Ralph Johnson, and John Vlissides, *Design Patterns: Elements of Reusable Object-Oriented Software*, Addison-Wesley, 1994. [Classic Book]

11. Course Outcomes

| Upon completion of this course the student will be able to: | Program Student Outcomes Impacted |
|--|-----------------------------------|
| 1. Apply industry standard software tools to assist in the design of a software systems | 6 |
| 2. Organize and architect the structure of a software system in terms of its main software components and their interactions | 6 |
| 3. Understand and apply software design patterns to the efficient design and development of software systems | 2 |
| 4. Apply best practices in agile software design in order to engineer reliable software systems that scale and evolve | 2 |

12. According to Law 51

Students will identify themselves with the Institution and the instructor of the course for purposes of assessment (exams) accommodations. For more information please call the Student with Disabilities Office which is part of the Dean of Students office (Office #4) at (787)265-3862 or (787)832-4040 extensions 3250 or 3258.

13. Academic Integrity

-The University of Puerto Rico promotes the highest standards of academic and scientific integrity. Article 6.2 of the UPR Students General Bylaws (Board of Trustees Certification 13, 2009-2010) states that academic dishonesty includes, but is not limited to: fraudulent actions; obtaining grades or academic degrees by false or fraudulent simulations; copying the whole or part of the academic work of another person; plagiarizing totally or partially the work of another person; copying all or part of another person answers to the questions of an oral or written exam by taking or getting someone else to take the exam on his/her behalf; as well as enabling and facilitating another person to perform the aforementioned behavior. Any of these behaviors will be subject to disciplinary action in accordance with the disciplinary procedure laid down in the UPR Students General Bylaws.—