

MAHARISHI INTERNATIONAL UNIVERSITY



**CS 525**  
**ADVANCED SOFTWARE DEVELOPMENT**

*Design Patterns*  
*Elements of Reusable Object-Oriented Software*

Professor:  
Payman Salek, M.S.

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**March 2022**

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# ADVANCED SOFTWARE DEVELOPMENT

“Knowledge has organizing power”

## *Design Patterns* *Elements of Reusable Object Oriented Software*

Payman Salek, M.S.

### SYLLABUS

“Know That, by knowing which, everything can be known.”

—*The Upanishads*

“The regular practice of Transcendental Meditation is the direct way of rising to the state of transcendental Being and stabilizing it in the very nature of the mind, so that irrespective of the mind’s engagements in the conflicts inherent in the diversities of life, the structure of Unity in eternal freedom is naturally maintained and life is not lost to itself”

—*Maharishi’s Commentary on the Bhagavad Gita*

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### GOAL OF THE COURSE

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"Once you understand the design patterns and have had an “Aha!” experience with them, you won’t ever think about object-oriented design in the same way. You’ll have insights that can make your own designs more flexible, modular, reusable, and understandable– which is why you’re interested in object oriented technology in the first place...."

“The key to maximizing reuse lies in anticipating new requirements and changes to existing requirements, and in designing your systems so that they can evolve accordingly.”

*Design Patterns - Elements of Reusable Object-Oriented Software*

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COURSE OBJECTIVES, ACTIVITIES, AND ASSESSMENTS

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<b>Objectives</b> <b>This is what you'll learn*</b>	<b>Learning Activities</b> <b>This is how you'll learn it</b>	<b>Assessments</b> <b>This is what will show you've learned it</b>
1) Gain a deeper understanding of OO principles (3, 5, 7)	By participating in class lessons and discussions, programming assignments, and readings.	Results from daily assignments, quizzes, project and exams.
2) Understand common Software Design Patterns (3, 5, 7)	By participating in class lessons and discussions, programming assignments, and readings.	Results from daily assignments, quizzes, project and exams.
3) Improve critical thinking, and ability to analyze systems using abstract concepts for a good design (3, 4, 5, 7)	By participating in class lessons and discussions, programming assignments, and readings.	Results from daily assignments, quizzes, project and exams.
4) Ability to work well in a team (6, 7, 8, 9)	By participation in a course project with your team	Classroom group activities and the coherence of your final project presentation.
5) Understand the relationship of principles and patterns of software design, and the more general principles of Natural Law as described in SCI (1, 3, 4, 5)	By deeply understanding the in class lessons and discussions,	Short Essay Exam Question

\*The numbers in parentheses refer to the MUM Essential Learning Outcomes that are best supported by this course objective; they appear in **boldface** in the list below.

1. Development of consciousness
2. Health
3. Holistic thinking
4. Creativity
5. Critical thinking
6. Communication
7. Problem solving
8. Teamwork and leadership
9. Local and global citizenship

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## OFFICE HOURS, CONTACT INFORMATION AND BIOGRAPHICAL SKETCH

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Payman Salek, M.S.

Email: psalek@miu.edu

Phone: 515-661-4870 (Cell)

Office: Virtual – Reach me on Microsoft Teams

Office hours: Call or email for appointment

Payman Salek has over 30 years of programming experience (8 years of C/C++ and Assembly and more than 22 years of Java). Before turning to programming, Payman's main area of interest was Antennas/Waveguides and Electromagnetic Radiation.

Most recently, from 2010 - 2015, he has worked for large financial corporations and fortune 500 companies such as Principal Financial Group, Vanguard, Bank of America, Ally Bank and Uline as a Senior Java Developer/Designer/Architect.

Payman's main area of interest is Core Java, Web Application Development and OOAD.

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## EVALUATION PLAN

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### Grading components

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Attendance and Contribution ..... 5 points

Labs ..... 5 points

Quizzes ..... 10 points

Exam 1 ..... 35 points

Exam 2 ..... 25 points

Project ..... 20 points

**Total ..... 100 points**

~~Meditation Extra Credit.....up to 1.5 points~~

### Meaning of grades

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**A (90–100)**      Excellent — meets the course objectives at an exceptionally high level

**B (80–89.9)**      Good — meets the course objectives at the expected level

**C (73–79.9)**      Fair — meets the course objectives at a basic level

**NC (below 73)**      No credit — does not meet the course objectives

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## RECOMMENDED DAILY SCHEDULE

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The daily schedule of all courses is designed to give students mastery of specific fields of knowledge and to cultivate higher states of consciousness for success and fulfillment in life. I recommend that you aim to be in bed by 10 PM, so that you are rested and fresh in the morning. If you have not finished your homework by then, then instead of staying up late to finish it, get a good night's rest and finish your homework in the morning before class.

<b><i>MORNING</i></b>	
	<del>Group practice of the Transcendental Meditation and TM-Sidhi programs</del>
10:00 AM – 12:00 PM	Class lecture, discussion, activities, labs
12:00 – 12:15 PM	Group meditation
12:15 – 1:15 PM	Lunch and walk
<b><i>AFTERNOON</i></b>	
1:15 – 3:00 PM	Continuation of morning class, projects, exercises in-class reading, labs
3:00 – 3:05 PM	Stretch break
3:05 – 3:30 PM	In-class group practice of the Transcendental Meditation program for Meditators and Rising Sidhas
	Group practice of the Transcendental Meditation and TM-Sidhi program for Citizen Sidhas and Governors
3:30 – 6:30 PM	Finish Labs, Review Course Material, Exercise, ...
<b><i>EVENING</i></b>	
6:30 – 7:30 PM	Dinner
7:30 – 9:00 PM	Homework
9:30 PM	Rest

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## TEXTS AND OTHER REQUIRED CLASS MATERIALS

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***Head First Design Patterns: Building Extensible and Maintainable Object-Oriented Software***

Publisher: O'Reilly Media; 2nd edition (December 29, 2020)

ISBN: 978-1492078005

Notebook, pencil and eraser for in-class exercises.

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## OPTIONAL REFERENCES

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***Design Patterns: Elements of Reusable Object-Oriented Software,***

by Erich Gamma, John Vlissides, Ralph Johnson, and Richard Helm

Publisher: Addison Wesley

ISBN: 978-0-201-63361-0 (Originally published: October 21, 1994)

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## END-OF-COURSE FEEDBACK

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Please give us your feedback about the course. Near the end of the course, you should receive an email from Dr. Marie Loiselle, Director of Evaluations, which gives you a one-step login link. If you do not receive this email, you can request access by emailing Dr. Loiselle at [evaluations@miu.edu](mailto:evaluations@miu.edu) or go to [Smartevals.com](http://Smartevals.com) and log in there.

- Your Username: your student ID in 000-00-0000 format.
- Your Password: your birth date in MM/DD/YY format.

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### How it works

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1. The information that you fill in on the online form is collected and sorted by an outside company, Gap Technologies
2. Gap Technologies prepares a report for each class that averages the numerical scores and lists your text responses anonymously.
3. Your instructor receives the report only after turning in grades. In other words, your comments remain anonymous.

**We are committed to continuous improvement of the curriculum. We value and need your feedback.**

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## MAJOR ASSIGNMENTS

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### **Project • 20 points • due on last day of course**

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The project is meant to allow students to incorporate the knowledge of design patterns into designing a software project.

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## REVIEW ACTIVITY

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**The following activity will be used frequently at the end of a class to review the new lesson:**

1. At the end of the lesson, please write down in your own words what you consider to be the most important point of the lesson. (one sentence)
2. Relate this main idea to the growth of your own creative potential—or to the knowledge of full development of consciousness that you have gained. (one sentence)
3. Draw a diagram or illustration that integrates the two points.
4. One participant: Draw your picture on the board and present your review to the large group.  
Others: Share your review with a neighbor.

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## DEVELOPMENT OF CONSCIOUSNESS

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The Development of Consciousness component in each class includes:

- A 15-minute group meditation in the classroom before lunch Monday–Saturday.
- At the end of class Monday–Friday:
  - **Meditators** stay for a 20-minute group meditation with class. This is part of each class — five group meditations per week. *Late minutes will be monitored for anyone who doesn't stay.*
  - **Sidhas** are excused at 2:45 pm to attend early or evening program in the Domes or flying halls on campus at least 5 times a week. This is part of the homework for each class.
- A group TM checking before lunch sometime during the course.

All students are encouraged to do their 20-minute morning meditation each day before they come to class. The 15-minute group meditation before lunch is a special bonus available to students



here. Students who practice the TM-Sidhi program are encouraged to join group practice in the Golden Domes as often as possible.

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## COURSE POLICIES

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The following list of policies is meant to remind you of the policies in effect for this course. Most of these are University-wide policies explained in more detail in the University catalog, available online at [www.miu.edu/catalog](http://www.miu.edu/catalog). If you are unsure how the policy works, feel free to discuss it with me after class.

**Late homework** (department policy) — Unless you are ill or prevented from turning in work by a family emergency, all assignments should be handed in on the day they are due. You may turn in homework one day late for a slightly reduced grade, but not after that. Please do not turn in assignments after the end of the course without prior arrangement (see “Incompletes” below).

**Punctuality and attendance** — Much of the value of a university class lies in the experience you have in class. For this reason, punctuality and attendance are highly valued at M.U.M. A class grade will be reduced at the rate of one percentage point for every 20 cumulative minutes late (up to two points per session), and three percentage points for an unexcused absence for a whole session (morning or afternoon). This policy also applies to leaving class early.

**NOTE: If you do arrive late, please mark the number of minutes late on the Attendance/Punctuality Registry that is posted in the classroom.**

An excused absence is defined as absence due to bona fide illness or family emergency. You are responsible for all readings and all written assignments whether you are able to attend class or not, and, in the interest of efficiency, please arrange to find out adjustments in assignments and other announcements from other classmates rather than from me if possible. I will be happy to give you any handouts you missed while absent.

Repeated unexcused absences are a violation of the M.U.M. Code of Student Behavior. In addition to academic consequences, students with repeated unexcused absences are subject to disciplinary actions.

**Contact me** — In the rare event you must miss class or are sick, please contact me as soon as possible using the contact information above (email or phone) or send a message or note to class with a friend. If you keep me informed, I will know how you are doing and how to plan for each class.