

## COURSE OUTLINE: FINANCIAL TECHNOLOGY (FinTech)

### GENERAL

|                                                                                                                                                                                                                                                                       |                                                                 |                              |                |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------|------------------------------|----------------|
| <b>SCHOOL</b>                                                                                                                                                                                                                                                         | ECONOMICS AND BUSINESS                                          |                              |                |
| <b>ACADEMIC UNIT</b>                                                                                                                                                                                                                                                  | ECONOMICS                                                       |                              |                |
| <b>LEVEL OF STUDIES</b>                                                                                                                                                                                                                                               | UNDERGRADUATE                                                   |                              |                |
| <b>COURSE CODE</b>                                                                                                                                                                                                                                                    | OE806                                                           | <b>SEMESTER</b>              | 7th (Major B)  |
| <b>COURSE TITLE</b>                                                                                                                                                                                                                                                   | FINANCIAL TECHNOLOGY (FinTech)                                  |                              |                |
| <b>INSTRUCTOR(S)</b>                                                                                                                                                                                                                                                  | Assoc. Professor V. Vlachos                                     |                              |                |
| <b>INDEPENDENT TEACHING ACTIVITIES</b><br><i>if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits</i> |                                                                 | <b>WEEKLY TEACHING HOURS</b> | <b>CREDITS</b> |
|                                                                                                                                                                                                                                                                       |                                                                 | 3                            | 6              |
|                                                                                                                                                                                                                                                                       |                                                                 |                              |                |
|                                                                                                                                                                                                                                                                       |                                                                 |                              |                |
| <i>Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).</i>                                                                                                                                              |                                                                 |                              |                |
| <b>COURSE TYPE</b><br><i>general background,<br/>special background,<br/>specialized general<br/>knowledge, skills development</i>                                                                                                                                    | Special background, skills development                          |                              |                |
| <b>PREREQUISITE COURSES:</b>                                                                                                                                                                                                                                          | NO                                                              |                              |                |
| <b>LANGUAGE OF INSTRUCTION<br/>and<br/>EXAMINATIONS:</b>                                                                                                                                                                                                              | GREEK                                                           |                              |                |
| <b>IS THE COURSE OFFERED TO<br/>ERASMUS STUDENTS</b>                                                                                                                                                                                                                  | NO                                                              |                              |                |
| <b>COURSE WEBSITE (URL)</b>                                                                                                                                                                                                                                           | <a href="https://www.econ.uth.gr/">https://www.econ.uth.gr/</a> |                              |                |

### LEARNING OUTCOMES

#### Learning outcomes

*The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.*

*Consult Appendix A*

- *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*
- *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*
- *Guidelines for writing Learning Outcomes*

*Upon successful completion of the course, students will be able to:*

- *Gain an in-depth understanding of Financial Technology (FinTech) applications in modern financial services.*
- *Design and program algorithmic trading strategies.*
- *Apply Artificial Intelligence and Machine Learning techniques and algorithms to solve business and financial problems.*
- *Utilize available financial market data to evaluate and measure the performance of their investment strategies.*
- *Understand the inner workings and operation of blockchain-based systems.*

### **General Competences**

*Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?*

|                                                                                                             |                                                                    |
|-------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------|
| <i>Search for, analysis and synthesis of data and information, with the use of the necessary technology</i> | <i>Project planning and management</i>                             |
| <i>Adapting to new situations</i>                                                                           | <i>Respect for difference and multiculturalism</i>                 |
| <i>Decision-making</i>                                                                                      | <i>Respect for the natural environment</i>                         |
| <i>Working independently</i>                                                                                | <i>Showing social, professional and ethical responsibility and</i> |
| <i>Team work</i>                                                                                            | <i>sensitivity to gender issues</i>                                |
| <i>Working in an international environment</i>                                                              | <i>Criticism and self-criticism</i>                                |
| <i>Working in an interdisciplinary environment</i>                                                          | <i>Production of free, creative and inductive thinking</i>         |
| <i>Production of new research ideas</i>                                                                     | <i>.....</i>                                                       |
|                                                                                                             | <i>Others...</i>                                                   |
|                                                                                                             | <i>.....</i>                                                       |

- *Search for, analysis and synthesis of data and information, with the use of the necessary technology*
- *Working in an interdisciplinary environment*
- *Project planning and management*
- *Production of free, creative and inductive thinking*

## **SYLLABUS**

### **Course Description:**

The course aims to familiarize students with modern Financial Technology (FinTech). It focuses on algorithmic trading (algotrading) utilizing computer systems and the internet. Students will learn to leverage modern software libraries for financial data analysis, developing their own algorithms for investment strategies. They will be able to evaluate the performance of these strategies through backtesting, thereby optimizing portfolio management. Practical skills will be developed through implementations in Python and R. Furthermore, advanced Artificial Intelligence and Machine Learning methods applied to economic and business problems will be examined in depth. The course concludes with a brief introduction to cryptoeconomics and cryptocurrencies, outlining the operation of blockchains and their significance in modern financial transactions.

### **Key Course Topics:**

- Introduction to Financial Technologies (FinTech).
- Core applications of Python and R programming languages in financial markets.
- Utilization of Artificial Intelligence and Data Mining in finance.
- Design and implementation of algorithmic trading strategies (algotrading).
- Optimization of algorithmic trading through technical analysis using programming tools.
- Performance evaluation of algorithmic trading in portfolio management via backtesting.
- Application development in Python and R integrating Machine Learning into business and financial markets.
- Overview of Blockchain technology, focusing on cryptoeconomics, cryptocurrencies, and crypto-assets.

## TEACHING and LEARNING METHODS - EVALUATION

| <p><b>DELIVERY</b><br/><i>Face-to-face, Distance learning, etc.</i></p>                                                                                                                                                                                                                                                                                                                                                                                                                                           | <p>Face-to-face</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                 |                          |          |    |                               |    |                                    |    |          |    |                                            |   |       |   |              |            |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|--------------------------|----------|----|-------------------------------|----|------------------------------------|----|----------|----|--------------------------------------------|---|-------|---|--------------|------------|
| <p><b>USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY</b><br/><i>Use of ICT in teaching, laboratory education, communication with students</i></p>                                                                                                                                                                                                                                                                                                                                                               | <ul style="list-style-type: none"> <li>• Use of the e-class electronic platform for posting (a) lecture materials, (b) announcements, and (c) exercises, case studies, and relevant articles.</li> <li>• Use of electronic audiovisual media for lecture presentations (PowerPoint).</li> </ul>                                                                                                                                                                                                                 |                 |                          |          |    |                               |    |                                    |    |          |    |                                            |   |       |   |              |            |
| <p><b>TEACHING METHODS</b><br/><i>The manner and methods of teaching are described in detail. Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc. The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS</i></p>               | <table border="1"> <thead> <tr> <th><i>Activity</i></th><th><i>Semester workload</i></th></tr> </thead> <tbody> <tr> <td>Lectures</td><td>39</td></tr> <tr> <td>Laboratory practice (at home)</td><td>93</td></tr> <tr> <td>Study and analysis of bibliography</td><td>46</td></tr> <tr> <td>Lectures</td><td>39</td></tr> <tr> <td>Meetings and examination of essay progress</td><td>0</td></tr> <tr> <td>Exams</td><td>2</td></tr> <tr> <td>Course total</td><td><b>180</b></td></tr> </tbody> </table>      | <i>Activity</i> | <i>Semester workload</i> | Lectures | 39 | Laboratory practice (at home) | 93 | Study and analysis of bibliography | 46 | Lectures | 39 | Meetings and examination of essay progress | 0 | Exams | 2 | Course total | <b>180</b> |
| <i>Activity</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <i>Semester workload</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                 |                          |          |    |                               |    |                                    |    |          |    |                                            |   |       |   |              |            |
| Lectures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 39                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                 |                          |          |    |                               |    |                                    |    |          |    |                                            |   |       |   |              |            |
| Laboratory practice (at home)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 93                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                 |                          |          |    |                               |    |                                    |    |          |    |                                            |   |       |   |              |            |
| Study and analysis of bibliography                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 46                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                 |                          |          |    |                               |    |                                    |    |          |    |                                            |   |       |   |              |            |
| Lectures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 39                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                 |                          |          |    |                               |    |                                    |    |          |    |                                            |   |       |   |              |            |
| Meetings and examination of essay progress                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                 |                          |          |    |                               |    |                                    |    |          |    |                                            |   |       |   |              |            |
| Exams                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                 |                          |          |    |                               |    |                                    |    |          |    |                                            |   |       |   |              |            |
| Course total                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <b>180</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                 |                          |          |    |                               |    |                                    |    |          |    |                                            |   |       |   |              |            |
| <p><b>STUDENT PERFORMANCE EVALUATION</b><br/><i>Description of the evaluation procedure</i></p> <p><i>Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other.</i></p> <p><i>Specifically-defined evaluation criteria are given, and if and</i></p> | <p>The final course grade is determined by:</p> <ul style="list-style-type: none"> <li>• Written final exam at the end of the semester (50% of the final grade), consisting of short-answer questions.</li> <li>• Assessment of a laboratory assignment (50% of the final grade).</li> </ul> <p>The aforementioned assessment criteria are announced to students during the first lecture, and this information remains continuously accessible to them via announcements on the course's e-class platform.</p> |                 |                          |          |    |                               |    |                                    |    |          |    |                                            |   |       |   |              |            |

|                                               |  |
|-----------------------------------------------|--|
| <i>where they are accessible to students.</i> |  |
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**ATTACHED BIBLIOGRAPHY**

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|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"><li>• Angelos Kanas, Fintech and Machine Learning. Papazisis Publications (Eudoxus code: 122079105)</li><li>• Nikos Daskalakis, Panagiotis Georgitseas, FinTech and Cryptoeconomics. Propompos Publications (Eudoxus code: 112693991)</li><li>• Additional bibliography/literature will be recommended during the lectures.</li></ul> |
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