**Lviv Ivan Franko National University**

**Faculty of International Relations**

**Department of International Economic Analysis and Finance**

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| --- | --- |
| Course title | **Financial analysis** |
| Lecturer | Ihor Hurnyak  https://orcid.org/0000-0003-0926-2456 |
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| Course web-page | https://intrel.lnu.edu.ua/course/finansovyj-analiz |
| Lecturer advice and technological support | The time and place of offline meetings will be announced later.  Social networks |

**Short annotation to the course**

*This course is designed for students of economic specialties. The course does not require prior preparation or study of any introductory subjects including programming languages or statistical packages.*

*The peculiarity of the course is its practice-oriented approach. All proposed models are being tested using programming tools (Python, R).*

*The course is designed using modern approaches to the study of economic problems, including modern institutional and behavioral economics, information economy, public sector positioning, stock market maneuvering.*

*The course is interactive about the courses: microeconomics, game theory, programming, accounting, and audit.*

**Aim and goals of the course -**

*to acquaint students with the basic models and applied nature of financial analysis;* learn to apply the most friendly programmable tools;to encourage students to apply the studied methods in future professional activities;to improve students' teamwork skills and possess programming experience

**The main task** of the course is to provide students with practical skills in the field of financial analysis.

**Competences of the educational program provided by the course**

*Ability to critically independent creative and innovative thinking, analysis and synthesis, detection of methodological errors, distinguishing facts from subjective assumptions and evaluative judgments.*

*Ability to collect and process information and facts from a variety of sources and to be able to interpret in context.*

*Ability to work in a team, effectively using its time, material and human resources.*

*Ability to apply modern information and communication technologies in professional activities.*

*Ability to identify problems, the ability to sort them by priority, to be able to develop ways and mechanisms of their practical solution.*

*Ability to critically evaluate processes based on quantitative and qualitative indicators and thus to make optimal decisions for development.*

*Ability to explain economic and social processes and phenomena basing on theoretical models analyse and meaningfully interpret the results.*

*Ability to predict on the basis of standard theoretical and econometric models the socio-economic processes.*

**Course information**

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| --- | --- | --- | --- | --- |
| *Year* | *Semester* | *Specialty* | *Studying year* | *Normative /*  *selective* |
| *2022-2023* | *8th* | *International Economic Relations* | *4th* | *N* |

**Volume of the course**

|  |  |
| --- | --- |
| *Type of lesson* | *Total number of hours* |
| *Lectures* | *30* |
| *Seminars* | *40* |
| *Home work* | *70* |

**Course format** *- blended.*

**Evaluation***:*

*The total number of points per course is 100.*

*Of them: work in the auditorium (or online) at the discussions, team completions, home project presentations – 70, exam (creative questions) – 30.*

**Hardware and software**: *a computer and a multimedia projector in the classroom. Sometimes the group or part of group will be asked to come to the lecture with own laptops.*

**Course policies** - *the student is obliged to read the required literature, to be active during discussions and to participate properly in a team work, not to use plagiarism during practical work (!).*

**Learning Outcome***:*

*Influence the business unity ability to involve resources, to analyse current state and to predict future misbalances.*

**COURSE SCHEME**

**Lecture – introduction “Finance + Python + R”**

**To read and watch additionally:**

Python for Finance by Yves Hilpisch

<https://www.sea-stat.com/wp-content/uploads/2021/05/Yves-Hilpisch-Python-for-Finance_-Mastering-Data-Driven-Finance-Book-OReilly-2018.pdf>

Data analysis in R: <https://www.youtube.com/watch?v=6hjNwMkNlpA&list=WL&index=440>

Finance with R: <https://www.youtube.com/watch?v=vUVAaDqz4cs&list=WL&index=538>

**Basic material:**

Install Anaconda Python, Jupyter Notebook and Spyder on Windows 10

<https://www.youtube.com/watch?v=5mDYijMfSzs&list=WL&index=121>

Use pip for Installing:

<https://packaging.python.org/en/latest/tutorials/installing-packages/#use-pip-for-installing>

**Lecture 1 How to get necessary data?**

Yahoo\_fin, Investing.com, and others

get\_balance\_sheet, get\_cash\_flow, get\_company\_info, get\_currencies, get\_data, and others

**Discussion** “What are the signs of an approaching financial crisis?”

**To read and to watch additionally**:

[*https://theautomatic.net/yahoo\_fin-documentation/*](https://theautomatic.net/yahoo_fin-documentation/)

**Home work**: return to Axelrod code (interaction with course “Game theory”)

*Axelrod, R. (1980). Effective Choice in the Prisoner’s Dilemma. Journal of Conflict Resolution, 24(1), 3–25.*

*Wu, J. and Axelrod, R. (1995). How to cope with noise in the Iterated prisoner’ s dilemma, Journal of Conflict Resolution, 39(1), pp. 183–189. DOI: 10.1177/0022002795039001008.*

*Documentation for the Axelrod Python library*

[*https://axelrod.readthedocs.io/en/stable/*](https://axelrod.readthedocs.io/en/stable/)

**Home work*:*** *to get data and to analyze financial ratios for the chosen company.*

**Lecture 2 Market analysis**

Main features of financial markets

Approaches to risk assessment

Cumulative return analysis

Cases of Japan and China markets, CEE markets, Cryptocurrency market.

Packages application: numpy, pandas, pandas\_datareader, matplotlib.pyplot, yahoo\_fin.stock

**To read additionally**:

Yuri Biondi, Qiusheng Zhang 2007. Accounting for the Chinese context: a comparative analysis of international and Chinese accounting standards focusing on business combinations// Socio-Economic Review, Volume 5, Issue 4, Pages 695–724, https://doi.org/10.1093/ser/mwm015

Jennifer Carpenter, Fangzhou Lu, and Robert Whitelaw 2015.

The Real Value of China's Stock Market NBER Working Paper No. 20957. Achievable from <https://www.nber.org/system/files/working_papers/w20957/w20957.pdf>

Jamdee Sutthisit, Wu Shengxiong and Yu Bing 2012. Positive Feedback Trading in Chinese Stock Markets: Empirical Evidence From Shanghai, Shenzhen, and Hong Kong Stock Exchanges (February 9, 2011). Journal of Financial and Economic Practice, Vol. 12, Issue 1, p. 35-58, Achievable at SSRN: <https://ssrn.com/abstract=3121229>

Lili Chen, Stan Vinson 2016. An Overview of the Chinese Banking System: Its History, Challenges and Risks// Journal of Business and Economics, ISSN 2155-7950, USA, Volume 7, No. 10, pp. 1613-1617 <https://doi.org/10.15341/jbe(2155-7950)/10.07.2016/004>

Soyoung Ho 2020. Trump Administration Seeks to Delist U.S.-Listed Chinese Companies for Blocking Audit Inspections/ Thomson Reuters Tax & Accounting. Achievable from <https://tax.thomsonreuters.com/news/trump-administration-seeks-to-delist-u-s-listed-chinese-companies-for-blocking-audit-inspections/>

Stephen Clapham and Kyle Bass: Accounting Schemes at Chinese Tech Giants. Achievable from [www.realvision.com/rv/media/Video/fd7db5b2541b4c3e974ead3f91781e0c/transcript](http://www.realvision.com/rv/media/Video/fd7db5b2541b4c3e974ead3f91781e0c/transcript)

***Discussion****: What to expect from the Chinese tech companies?*

***Home work****: analysis of the chosen market using proper Python code.*

**Lecture 3 Portfolio analysis**

Ratio between profitability and risk as criterion of choice.

Optimal portfolio.

Case of China and Japan.

**Team work:** create optimal portfolio for concrete market

To read additionally:

The Sharpe Ratio William F. Sharpe The Journal of Portfolio Management Fall 1994, 21 (1) 49-58; DOI: <https://doi.org/10.3905/jpm.1994.409501>

<https://jpm.pm-research.com/content/21/1/49>

Efficient frontier method: <https://www.youtube.com/watch?v=yWz5Kqn_D4c&list=WL&index=410>

<https://www.youtube.com/watch?v=pchqBhof62U&list=WL&index=528&t=60s>

**Lecture 4 Long – term strategies**

Fama – French 5 factors model for developed and emerging markets

Description of strategy. When R2 of such model is the highest?

When the model could be defined as working?

**Home work**: use Fama – French 5-factors model for concrete company

**To pay attention and to read additionally**:

<https://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html>

<https://papers.ssrn.com/sol3/cf_dev/AbsByAuth.cfm?per_id=1455>

**Lecture 5 Machine learning methods for short term prediction**

**Compare:** Linear regression, Decision tree and Machine learning regressor

**Discussion***: How do machine and human learn …?*

**Team work***: making price dynamics prediction for concrete company*

**To watch additionally**:

<https://www.youtube.com/watch?v=ydvnVw80I_8&list=WL&index=159>

<https://www.youtube.com/watch?v=3kYujfDgmNk&list=WL&index=372>

**Lecture 6** ARIMA - model

Time series. Stationarity.

Best choice of p, d, q.

**Team work**: prediction based on ARIMA - model

**To watch additionally***:*

*Time Series Talk: ARIMA Model* [*https://www.youtube.com/watch?v=3UmyHed0iYE*](https://www.youtube.com/watch?v=3UmyHed0iYE)

**Lecture 7 Neural networks based approach**

How to use NN in finance?

Case of bankruptcy prediction

**Team work***: own choice of ratios and usage of code (R)*

**To watch additionally***:*

[*https://www.youtube.com/watch?v=g1Pgo5yTIKg&list=WL&index=348*](https://www.youtube.com/watch?v=g1Pgo5yTIKg&list=WL&index=348)

[*https://www.youtube.com/watch?v=Ih5Mr93E-2c&list=WL&index=427&t=1510s*](https://www.youtube.com/watch?v=Ih5Mr93E-2c&list=WL&index=427&t=1510s)

[*https://www.youtube.com/watch?v=9bTag9cO2Co&list=WL&index=526*](https://www.youtube.com/watch?v=9bTag9cO2Co&list=WL&index=526)

**Lecture 8** New human and stock market**.**

Formation of technological portraits of modern person and modern stock market.

Prevailed strategies. Result of cooperation based on Axelrod tournament and different theoretical approaches.

**Home work***: choice of strategies in Axelrod tournament for market – human cooperation*

**To read additionally:**

*Hurnyak I., Pardal P., Horák J., Machová V. Competitiveness of Human and Business in Terms of Stock Market Analysis/ Scientific Papers of the University of Pardubice, Series D: Faculty of Economics and Administration 2022, 30(2), 1557. DOI: 10.46585/sp30021557,* [*https://editorial.upce.cz/1804-8048/30/2/1557*](https://editorial.upce.cz/1804-8048/30/2/1557)

**Lecture 9** Clustering (R)

Team work: segmentation of the chosen group of tech companies

**To watch additionally:**

<https://www.youtube.com/watch?v=5mlth-yM2NE&list=WL&index=391&t=529s>

**Lecture 9** WARA – analysis for IT companies

Problem of intangible assets. Influencing factors choice. NN potential usage

**To read additionally:**

*Crane, M. (2018). The Legend of WARA and Benchmarking in Purchase Price Allocation Data. Jack Welch College of Business dissertation, Sacred Heart University, Fairfield, CT.*

**Lecture 10 Creative** task (Python or R)

Optimal portfolio based on team industries basket.