<table>
<tr><td colspan="2">Annex No. 3</td><td colspan="4">First Cycle Studies Course Programme</td></tr>
<tr><td>1.</td><td>Course Title</td><td colspan="4">Time Series Analysis</td></tr>
<tr><td>2.</td><td>Code</td><td colspan="4">MST 310</td></tr>
<tr><td>3.</td><td>Study programme</td><td colspan="4">E-business, Economy, Marketing, Management and entrepreneurship, International trade, Accounting and Auditing, Finance</td></tr>
<tr><td>4.</td><td>Organizer of the study programme (university unit i.e. institute, chair, department)</td><td colspan="4">Ss. Cyril and Methodius University in Skopje
Faculty of Economics - Skopje
Chair of Mathematics and Statistics</td></tr>
<tr><td>5.</td><td>Level (first, second, third cycle)</td><td colspan="4">First cycle</td></tr>
<tr><td>6.</td><td>Academic year / semester</td><td>2022-2023
6th (Summer semester)</td><td>7.</td><td>Number of ECTS credits</td><td>7.5</td></tr>
<tr><td>8.</td><td>Professor</td><td colspan="4">Prof. Marija Trpkova-Nestorovska, PhD</td></tr>
<tr><td>9.</td><td>Preconditions for enrolment</td><td colspan="4">None</td></tr>
<tr><td>10.</td><td colspan="5">Course Objectives (Competencies):
After taking this course and passing the exam, students should be able to:
▪ Identify and recognize time series and their essential characteristics;
▪ Develop time series decomposition models;
▪ Create exponential smoothing models;
▪ Understand the idea of stationarity of time series, white noise processes with and without drift, application of unit root tests and interpretation of correlograms;
▪ Apply the Box-Jenkins model for building ARIMA models and create seasonal ARIMA models;
▪ Access to national and international databases to select times series for analysis and model creation to describe and forecast specific variables of interest;
▪ Work with data analysis software, advanced modelling with Microsoft Excel and working with statistical software Minitab and Eviews.</td></tr>
<tr><td>11.</td><td colspan="5">Course content:
Time series analysis is one of the primary tools available to economists for analysing and conclusions making regarding economic problems. This subject enables the students to perform empirical analysis regarding business and economics by using time series. Students gain theoretical knowledge of the time series models while the lectures are taught in a laboratory with active usage of the statistical software Minitab and Eviews. Analysed examples in the textbook contain real-time series from business and economy in the Republic of North Macedonia. They also expand on the current trends from the neighbouring countries, countries from the European Union, and the World.
Contents of the subject include:
• Introduction
• Decomposition of time series
• Exponential smoothing
• Time series and stochastic processes
• Autoregressive integrated moving averages models</td></tr>
<tr><td>12.</td><td colspan="5">Learning methods: Lectures with presentations and up-to-date examples from the national economy, interactive lectures using computers and access to population data, homework tasks and their evaluation, team projects with a presentation, guest lecturer, and case studies.</td></tr>
<tr><td>13.</td><td>Total hours</td><td colspan="4">7.5 ECTS x 30 classes = 225 classes</td></tr>
<tr><td>14.</td><td>Allocation of hours per activity</td><td colspan="4">60+30+30+15+90 = 225 classes</td></tr>
<tr><td rowspan="2">15.</td><td rowspan="2">Types of teaching activates</td><td>15.1.</td><td colspan="2">Lectures</td><td>60 classes</td></tr>
<tr><td>15.2.</td><td colspan="2">Exercises (Seminars)</td><td>30 classes</td></tr>
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<tr><td rowspan="3">16.</td><td rowspan="3">Other types of activities</td><td>16.1.</td><td>Written projects with oral presentation, laboratory classes</td><td>30 classes</td></tr>
<tr><td>16.2.</td><td>Individual tasks</td><td>15 classes</td></tr>
<tr><td>16.3</td><td>Home studying</td><td>90 classes</td></tr>
<tr><td rowspan="4">17.</td><td colspan="4">Grading method: 60+30+10=100 points</td></tr>
<tr><td>17.1.</td><td colspan="2">Tests (Domain, Essay, Multiple choice exam, Case)</td><td>60%</td></tr>
<tr><td>17.2.</td><td colspan="2">Written projects with oral presentation, laboratory classes</td><td>30 %</td></tr>
<tr><td>17.3.</td><td colspan="2">Attendance and class participations</td><td>10 %</td></tr>
<tr><td rowspan="6">18.</td><td colspan="2" rowspan="6">Grading scale</td><td>less than 50 points</td><td>5 (five) (F)</td></tr>
<tr><td>from 51 to 60 points</td><td>6 (six) (E)</td></tr>
<tr><td>from 61 to 70 points</td><td>7 (seven) (D)</td></tr>
<tr><td>from 71 to 80 points</td><td>8 (eight) (C)</td></tr>
<tr><td>from 81 to 90 points</td><td>9 (nine) (B)</td></tr>
<tr><td>from 91 to 100 points</td><td>10 (ten) (A)</td></tr>
<tr><td>19.</td><td colspan="2">Preconditions for taking the final exam</td><td colspan="2">Realized activities from points 15 and 16</td></tr>
<tr><td>20.</td><td colspan="2">Language</td><td colspan="2">Macedonian (or English)</td></tr>
<tr><td>21.</td><td colspan="2">Evaluation method</td><td colspan="2">Internal evaluation and survey</td></tr>
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<tr><td rowspan="11">22.</td><td colspan="6">Literature</td></tr>
<tr><td rowspan="4">22.1.</td><td colspan="5">Compulsory literature</td></tr>
<tr><td>No.</td><td>Author</td><td>Title</td><td>Publisher</td><td>Year</td></tr>
<tr><td>1.</td><td>Risteski, S., Tevdovski, D. and Trpkova, M.</td><td>Voved vo analizata na vremenskite serii</td><td>University “Ss. Cyril and Methodius”, Faculty of Economics - Skopje</td><td>2012</td></tr>
<tr><td>2.</td><td>Brooks, C.</td><td>Introductory Econometrics for Finance</td><td>University Printing House, Cambridge CB2 8BS, United Kingdom</td><td>2014</td></tr>
<tr><td rowspan="4">22.2.</td><td colspan="5">Additional literature</td></tr>
<tr><td>No.</td><td>Author</td><td>Title</td><td>Publisher</td><td>Year</td></tr>
<tr><td>1.</td><td>Agung, I.G.N</td><td>Time Series Data Analysis Using Eviews</td><td>John Wiley & Sons (Asia), Pte Ltd, 2, Clementi Loop, Singapore.</td><td>2009</td></tr>
<tr><td>2.</td><td>Enders, W.</td><td>Applied Econometric Time Series</td><td>John Wiley & Sons, Inc.</td><td>2014</td></tr>
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		3.	Cryer, J.D and Chan, K.	Time Series Analysis With Applications in R	Springer Science + Business Media, LLC	2008