THE COURSE OUTLINE (SYLLABUS)

COURSE NAME: Quantitative Research Methods

COURSE CODE: MTH 315

INSTRUCTOR: RNDr. Václav Novák
1. **Course Name and Code:** MTH 315, Quantitative Research Methods

2. **Day, Time, Semester:** Wednesday, 14:45, Spring 2007

3. **Instructor:** RNDr. Václav Novák

4. **Prerequisites:** MTH 180, MTH 222

5. **Credits:** 3

6. **Workload For An Average Student (weekly):**

<table>
<thead>
<tr>
<th>Task</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lecture</td>
<td>3 hours</td>
</tr>
<tr>
<td>Homework</td>
<td>1 hour</td>
</tr>
<tr>
<td>Project</td>
<td>4 hours</td>
</tr>
<tr>
<td>Reading (quizzes and tests)</td>
<td>1 hour</td>
</tr>
<tr>
<td>Other assignments</td>
<td></td>
</tr>
</tbody>
</table>

7. **Course Description:**

Malá Strana Campus, Lázeňská 4/287, 118 00 Praha 1, Czech Republic, Tel: +420 257 530 202 Fax: +420 257 532 911
www.aavs.cz
IČ 25 94 00 82, DIČ 228-25 94 00 82
Společnost je zapsána u MS v Praze, vložka O/289
This course can be viewed as a continuation of Business Mathematics courses and Statistics course. Therefore, firm knowledge of the mentioned courses is required. This course will try to open the doors into the area of modeling and simulation most commonly used in the world of business, economics and management. It consists of two parts: theoretical and practical. The theoretical part involves introduction to quantitative information, LP, graphs and networks, decision trees, measures of uncertainty, forecasting of time series, project planning, stock control, modeling and simulation. The practical part involves 'real-world', case-study, project(s) where the students will be given a chance to apply the theoretical knowledge acquired during their studies at AAC.

8. **Course Materials:**
A reader and a workbook compiled by Kiril Ribarov are available. The workbook includes a complete set of transparencies used during the course, while the reader consists of a copy of relevant chapters from item 1 listed in the section "Supporting Materials". Access to personal computer is required.

9. **Supporting Materials:**
10. **Learning Objectives:**

This course is general in the sense that it combines together the knowledge from Business Mathematics, Business Statistics and the basics from business, economics and management. It broadens the analytical sphere and enriches it with additional formal procedures. The basic objective is to introduce the 'engineering' tools most commonly used in business, economics and management and to allow students to experience the usefulness of the presented apparatus.

11. **Teaching Methodology:**

Lectures with interactive participation and individual and/or group student projects (case studies) and/or self study chapters.

Software packages may be demonstrated and used.

12. **Topics Covered:**

*(The order of the topics as listed below, does not necessarily correspond the the order of their elaboration in class)*

**Linear Programming**
1. Linear Programming, basic principles, graphical solution; sensitivity analysis, dual problem.

**Basic Predicting Using Probability**
2. Measures of uncertainty
3. Relating two or more variables, correlation
4. Predicting from the regression line

**Time Series Forecasting**
5. Forecasting and Time Series Analysis
6. Additive and Multiplicative model
Decision Theory
7. Criteria for decision making; decisions under certainty, decisions under strict uncertainty and decisions under risk
8. Expected values
9. Decision trees

Data and Information, Models and the Modeling Cycle
10. Introduction to Quantitative Techniques
11. Quantitative Information
12. Models and the modeling cycle

Networks and Projects
13. Network Analysis - critical paths
14. Planning and running projects
15. Including uncertainty in project planning
16. Optimization of project resources/time.

Stock Control
17. Stock control with and without production
18. Fixed Order Quantity, and Periodic Review System models

Queues and Simulation
19. Queue design and parameter analysis
20. The random process as a basis for simulation procedures

13. Course Schedule:
Homework load: approx. 6 hours a week.
During the course 3 to 5 case studies are usually given.
Both, theory and problems are examined on the final exam.
Please note that there is no midterm exam.
165 minutes; one 15 minutes break. Regular attendance is expected.

14. Assessment Procedures:
Grading Criteria (weights)

Final exam: 50 % or 55 % or 60 %
Depends on the number of assigned case studies (5, 4 or 3, respectively).

Case studies:
3: 40 %
4: 45 %
The grade is always kept in percentages and those are averaged. Cheating leads to immediate disqualification. Plagiarism or works being similar: disqualification of all of the similar works or significant grade reduction. Class attendance is strongly recommended. Late works will always be punished with a progressive (significant) grade reduction (usually 5% per day). Homework, unless otherwise stated, are corrected but not graded. The total grade is calculated as a weighted average. The weights that correspond to the percentages are stated above. The total grade expressed in percentages is transformed into a letter grade (A to F).

15. School Policies:

Cheating and Plagiarism
- Course lecturers will mark down or give a failing grade to any piece of work that they feel shows clear signs of having been plagiarized. The extent to which a piece of work is marked down will depend upon the lecturer’s judgment of the extent of the plagiarism involved.
- Students caught cheating in examinations will be expelled from the examination room and given a failing grade for the examination concerned. Cheating and plagiarism may also lead to course failure or expelling from the school.
- Students caught indulging in behavior which is suggestive of cheating (e.g. whispering or passing notes) must, at a minimum, be warned, and in the case of continued misbehavior must be expelled from the examination room and given a failing grade for the examination concerned.
- Plagiarism in a form of materials on the Internet, which can be cut and pasted into a paper or essay, will be treated in the same manner as in cases where the more traditional methods of cheating have been discovered.
- All Lecturers are expected to enforce AAVS policy on cheating and plagiarism.

To prevent any misunderstanding, plagiarism is defined:
PLAGIARISM – “the unauthorized use or close imitation of the language and thoughts of another author and the representation of them as one’s own original work.”

16. Grading:

<table>
<thead>
<tr>
<th>From, including</th>
<th>To, excluding</th>
<th>GRADE</th>
</tr>
</thead>
<tbody>
<tr>
<td>95</td>
<td>100</td>
<td>A</td>
</tr>
<tr>
<td>90</td>
<td>95</td>
<td>A-</td>
</tr>
<tr>
<td>87</td>
<td>90</td>
<td>B+</td>
</tr>
<tr>
<td>83</td>
<td>87</td>
<td>B</td>
</tr>
<tr>
<td>80</td>
<td>83</td>
<td>B-</td>
</tr>
<tr>
<td>77</td>
<td>80</td>
<td>C+</td>
</tr>
<tr>
<td>73</td>
<td>77</td>
<td>C</td>
</tr>
<tr>
<td>70</td>
<td>73</td>
<td>C-</td>
</tr>
<tr>
<td>65</td>
<td>70</td>
<td>D+</td>
</tr>
<tr>
<td>60</td>
<td>65</td>
<td>D</td>
</tr>
<tr>
<td>0</td>
<td>60</td>
<td>F</td>
</tr>
</tbody>
</table>