**Санкт-Петербургский филиал федерального государственного
автономного образовательного учреждения высшего образования
"Национальный исследовательский университет**

**"Высшая школа экономики"**

Факультет Санкт-петербургская школа экономики и менеджмента

Департамент менеджмента

**Рабочая программа дисциплины**
Динамическая оптимизация для целей исследования в экономике и менеджменте

(Dynamic Optimization for Economics and Management Studies)

для направления 38.06.01 «Экономика»

подготовки научно-педагогических кадров в аспирантуре,

образовательная программа «Менеджмент», «Экономика»

Разработчик(и) программы:

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Санкт-Петербург, 2019

*Настоящая программа не может быть использована другими подразделениями университета и другими вузами без разрешения кафедры-разработчика программы.*

**Аннотация**

|  |  |
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| Название дисциплины | Динамическая оптимизация для целей исследования в экономике и менеджменте |
| Образовательная программа | Экономика, Менеджмент  |
| Тип дисциплины[[1]](#footnote-1) | По выбору |
| Требования к уровню знаний студентов, необходимых для освоения дисциплины (пререквизиты) | Эмпирические методы и их применение в экономике и менеджменте  |
| Объем з.е. | 3 |
| Объем в часах | Аудиторная работа | Самостоятельная работа | Всего |
| 36 | 78 | 114 |
| Краткое описание курса | Данный курс охватывает темы, связанные с динамическими методами оптимизации, которые могут иметь важное значения для прикладных исследований в области инвестиционных решений, ценообразования и т.д. В рамках курса рассматриваются случаи динамической оптимизации как с дискретным, так и непрерывным временем. Методологические подходы, рассматриваемые в курсе, касаются методов динамического программирования и оптимальных решений на бесконечных/конечных временных промежутках. Курс иллюстрирует полезность динамической оптимизации для разработки бизнес-стратегий на строгой аналитической основе. |
| Образовательные результаты по дисциплине | Знать разные виды моделей динамической оптимизации;Уметь выявлять ситуации, в которых целесообразно применять методы динамической оптимизации;Уметь применять методы динамической оптимизации для решения научных задач;Уметь оценивать уравнение Беллмана |
| Краткое содержание дисциплины | 1. Типы оптимизационных задач: непрерывное и дискретное время, конечный и бесконечный горизонт планирования, конечное и бесконечное число состояний.
2. Детерминированные и стохастические задачи оптимизации.
3. Методы решения задач различных типов на основе принципа оптимальности Беллмана.
4. Приложения динамической оптимизации в менеджменте.
 |
| Образовательные технологии | Лекции, семинары, разбор статей, презентации студентов, дискуссии. |
| Формы контроля | Итоговая оценка=0.5\* презентация статьи+0.5\*письменные задачи по материалам научной статьи |
| Литература | ОбязательнаяTaha, Hamdy A.. Operations Research: An Introduction, Global Edition, Pearson Education Limited, 2017. ProQuest Ebook Central, <https://ebookcentral.proquest.com/lib/hselibrary-ebooks/detail.action?docID=5185974>.ДополнительнаяAdda, Jerome, and Russell W. Cooper. Dynamic Economics : Quantitative Methods and Applications, MIT Press, 2003. ProQuest Ebook Central, https://ebookcentral.proquest.com/lib/hselibrary-ebooks/detail.action?docID=3338811.Chow. Dynamic Economics : Optimization by the Lagrange Method, Oxford University Press, Incorporated, 1997. ProQuest Ebook Central, <https://ebookcentral.proquest.com/lib/hselibrary-ebooks/detail.action?docID=271347>. |
| Преподаватель | Слоев Игорь Анатольевич, isloev@hse.ru |

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| --- | --- |
| Title of the course | Dynamic Optimization in Economics and Management  |
| Title of the Academic Programme  | Economics, Management  |
| Type of the course  | Elective |
| Prerequisites | Empirical Methods and Applications in Economics and Management |
| ECTS workload | 3 |
| Total indicative study hours | Directed Study | Self-directed study  | Total |
| 36 | 78 | 114 |
| Course Overview | This course covers topics in dynamic optimization methods which might be relevant for applied business research: investment decisions, pricing etc. It discovers and explores cases both in discrete and in continuous time. The methodological approaches address methods in dynamic programming and optimal solutions across infinite/finite time horizons. The course illustrates how dynamic optimization is useful for business strategies development on a rigorous analytical base. |
| Intended Learning Outcomes (ILO) | As a result of successful learning students are:1. to differentiate dynamic optimisation methods
2. to distinguish situations where dynamic optimisation methods can be used
3. to apply dynamic optimization techniques for different business problems

4. to construct Bellman equation and find close-form solution if possible5. to estimate Bellman equation |
| Teaching and Learning Methods | Teaching methods: lectures, problem-solving discussions, workshops. |
| Content and Structure of the Course |
| **№** | **Topic / Course Chapter** | **Total** | **Directed Study** | **Self-directed Study** |
| **Lectures** | **Tutorials** |
| 1 | Types of dynamic optimization problems: discrete/continuous time, finite/infinite horizon of planning, finite/infinite number of states, stochastic/deterministic problems | 39 | 4 | 9 | 26 |
| 2 | Principle of optimality and Bellman equation. Solutions for different types of problems | 39 | 4 | 9 | 26 |
| 3 | Applications of dynamic optimization in Management | 36 | 2 | 8 | 26 |
| **Total study hours** | 114 | 10 | 26 | 78 |
| Indicative Assessment Methods and Strategy  | Final grade=0.5\* in class presentation+0.5\*written assignment on analysis of an academic paperList of possible assignments:In-class Presentation: each student has to choose an academic article that uses dynamic optimization technics with application to management field. Sources for discussion are top publications in business field where these methods of analysis are used. Also, students may discuss how real companies can use these methods and techniques to tackle their business tasks. The article should be analyzed and presented in class. Time for presentation is about 25 min.Written assignment: Each student has to write a summary of choosen paper (up to 2 pages) that summarize main idea and aims of the paper and describe how they were realized by authors with help of dynamic optimization techniques.**List of possible assignments:**In-class Presentation: each student has to choose an academic article that uses dynamic optimization technics with application to management field. Sources for discussion are top publications in business field where these methods of analysis are used. Also, students may discuss how real companies can use these methods and techniques to tackle their business tasks.The article should be analyzed and presented in class. Time for presentation is about 25 min.Written assignment: Each student has to write a summary of choosen paper (up to 2 pages) that summarize main idea and aims of the paper and describe how they were realized by authors with help of dynamic optimization techniques. |
| Readings / Indicative Learning Resources | Mandatory Taha, Hamdy A.. Operations Research: An Introduction, Global Edition, Pearson Education Limited, 2017. ProQuest Ebook Central, <https://ebookcentral.proquest.com/lib/hselibrary-ebooks/detail.action?docID=5185974>.ДополнительнаяAdda, Jerome, and Russell W. Cooper. Dynamic Economics : Quantitative Methods and Applications, MIT Press, 2003. ProQuest Ebook Central, https://ebookcentral.proquest.com/lib/hselibrary-ebooks/detail.action?docID=3338811.Chow. Dynamic Economics : Optimization by the Lagrange Method, Oxford University Press, Incorporated, 1997. ProQuest Ebook Central, <https://ebookcentral.proquest.com/lib/hselibrary-ebooks/detail.action?docID=271347>. |
| Indicative Self- Study Strategies | **Type** | **+/–** | **Hours** |
| Reading for seminars / tutorials (lecture materials, mandatory and optional resources) | + | 20 |
| Assignments for seminars / tutorials / labs | + | 26 |
| E-learning / distance learning (MOOC / LMS) | + | 14 |
| Preparation for the exam | + | 18 |
| **Recommendations for students about organization of self-study**Self-study is organized in order to:·     Systemize theoretical knowledge received at lectures;·     Extending theoretical knowledge;·     Learn how to use legal, regulatory, referential information and professional literature;·     Development of cognitive and soft skills: creativity and self-sufficiency;  ·     Enhancing critical thinking and personal development skills;·     Development of research skills;·     Obtaining skills of efficient independent professional activities.Self-study, which is not included into a course syllabus, but aimed at extending knowledge about the subject, is up to the student’s own initiative. A teacher recommends relevant resources for self-study, defines relevant methods for self-study and demonstrates students’ past experiences.  Tasks for self-study and its content can vary depending on individual characteristics of a student. Self-study can be arranged individually or in groups both offline and online depending on the objectives, topics and difficulty degree. Assessment of self-study is made in the framework of teaching load for seminars or tests.In order to show the outcomes of self-study it is recommended:·     Make a plan for 3-5 presentation which will include topic, how the self-study was organized, main conclusions and suggestions and its rationale and importance.·     Supply the presentation with illustrations. It should be defined by an actual task of the teacher.   |
| Academic Support for the Course | Academic support for the course is provided via LMS, where students can find: guidelines and recommendations for doing the course; guidelines and recommendations for self-study; samples of assessment materials |
| Facilities, Equipment and Software | Windows, Power Point.  |
| Special conditions for organization of learning process for students with special needs  | The following types of comprehension of learning information (including e-learning and distance learning) can be offered to students with disabilities (by their written request) in accordance with their individual psychophysical characteristics:1. *for persons with vision disorders:* a printed text in enlarged font; an electronic document; audios (transferring of learning materials into the audio); an individual advising with an assistance of a sign language interpreter; individual assignments and advising.
2. *for persons with hearing disorders: a* printed text; an electronic document; video materials with subtitles; an individual advising with an assistance of a sign language interpreter; individual assignments and advising.
3. *for persons with muscle-skeleton disorders: a* printed text; an electronic document; audios; individual assignments and advising.
 |
| Course Instructor | Igor Sloev, isloev@hse.ru |

**AssessmentCriteria**

**In-class Presentation**

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| --- | --- |
| **Grades** | **Assessment Criteria** |
| «Excellent» (8-10) | A critical analysis which demonstrates original thinking and shows strong evidence of preparatory research and broad background knowledge.  |
| «Good» (6-7) | Shows strong evidence of preparatory research and broad background knowledge. Excellent oral expression.  |
| «Satisfactory»(4-5) | Satisfactory overall, showing a fair knowledge of the topic, a reasonable standard of expression. Some hesitation in answering follow-up questions and/or gives incomplete or partly irrelevant answers. |
| «Fail» (0-2) | Limited evidence of relevant knowledge and an attempt to address the topic.  Unable to offer relevant information or opinion in answer to follow-up questions.  |

**Written Assignments (Essay, Test/Quiz, Written Exam, etc.)**

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| --- | --- |
| **Grades** | **Assessment Criteria** |
| «Excellent» (8-10) | Has a clear argument, which addresses the topic and responds effectively to all aspects of the task. Fully satisfies all the requirements of the task; rare minor errors occur;  |
| «Good» (6-7) | Responds to most aspects of the topic with a clear, explicit argument. Covers the requirements of the task; may produce occasional errors. |
| «Satisfactory» (4-5) | Generally addresses the task; the format may be inappropriate in places; display little evidence of (depending on the assignment): independent thought and critical judgement include a partial superficial coverage of the key issues, lack critical analysis, may make frequent errors. |
| «Fail» (0-2) | Fails to demonstrate any appropriate knowledge. |

1. ***Notes:***

Обязательный/повыбору [↑](#footnote-ref-1)