Curriculum of the course Technology transfer for students, academic, researchers and university staff

A search for existing training courses in the field of technology transfer and intellectual property issues yielded 14 relevant courses.

1.1 Czech Republic

1. **Innovation Management – University of Business and Law**

   ⓘ The basic goal of the course is to help future graduates and specialists understand and learn the procedures and methods necessary to transform university knowledge and understanding into market goods. At present, universities lack the training of experts dealing with the issue of innovation management and transfer of university knowledge to real economic practice. The basis of the „innovation economy" is the development of innovation processes using information technology and information processing and management in innovation projects. This applies to every phase of project implementation, from the initial product design to completion, i.e., the launch of an innovative product or technology to the market.

   🌐 Available at: https://is.vspp.cz/katalog/syllabus.pl?predmet=2746;lang=cz

2. **Investment Plans and Innovation Management – Mendel University in Brno**

   ⓘ The aim of the course is to present the issue of creating, implementing and financing innovations in the business process. After the course completion, the student will understand use of the basic available tools of intellectual property protection, as well as the internal and external possibilities of financing innovative activities.

   🌐 Available at: https://is.mendelu.cz/katalog/syllabus.pl?predmet=82337;lang=cz

3. **Management of Research, Development and Innovation – Mendel University in Brno**

   ⓘ The course was created with the aim to provide students with an overview of national documents for assistance with R&D&I, project planning and management, knowledge transfer and protection of intellectual property, as well as the acquisition of intellectual skills in creating project proposals for public tenders.

   🌐 Available at: https://is.mendelu.cz/katalog/syllabus.pl?predmet=107455;lang=cz

4. **Knowledge and Technology Transfer Center – University of Ostrava**

   ⓘ The course includes the following topics: introduction to technology and knowledge transfer, regulations of IP protection and commercialization of R&D, copyright protection, trademark, utility model, patent, industrial law information and industrial design.

   🌐 Available at: https://moodle.osu.cz/course/index.php?categoryid=64

5. **Technology Transfer with a Focus on Spin-off Companies – Palacký University Olomouc**

   - Course aims to be a highly innovative subject, which will enable its graduates to start business through implementation of outputs of some university workplaces and to employ not only themselves but possibly, other job seekers and, thus contribute to the economic growth of the region through their activities and with the use of specific university R&D.

   - Available at: https://www.psup.cz/realizovane-projekty-prihlasky-na-kurz-transferu-technologii/

6. **Innovation and Entrepreneurship in the Field of New Technologies – Technical University of Liberec**

   - The course comprises the following topics: technology transfer, introduction to innovation management, management of intellectual property, management of R&D and process of development of new products within innovation management in companies.

   - Available at: https://nanoed.tul.cz/course/view.php?id=42

7. **Excellence-in-ReSTI: Research, Social and Technological Innovation Project Management – Charles University in Prague**

   - Excellence-in-ReSTI project aims at removal of gaps in knowledge and skills in managing social and technological innovation (ReSTI) projects. The aim is to create an environment in which administrators in public and private organizations as well as young project managers within the Danube Region can find easy-to-use checklists, learning modules and advice with a specifically tailored content focusing on the management of ReSTI projects.

   - Available at: https://resti.academy/

1.2 Europe

8. **Skill-building in Technology Transfer in University Environment for University Managers – Technical University of Košice**

   - Webinar/university course

   - The goal of the course is to provide university managers with an overview of the key elements and concepts in the domains of technology transfer in R&D institution and intellectual property rights protection. Special attention is paid to risk management and financing of TT, resource management and university TT ecosystem in general.

   - Available at https://www.uvptechnicom.sk/sk/2021-01-15-az-06-14-akceleracny-program/

9. **Skill-building in Technology Transfer in University Environment for Know-How Owners – Technical University of Košice**

   📝 Webinar/university course

   ℹ️ The goal of the course is to provide university managers with an overview of the key elements and concepts in the domains of technology transfer in R&D institution and intellectual property rights protection. Special attention is paid to soft and marketing skills, creating and running business, project and product management skills.

   🌐 Available at: https://www.uvptechnicom.sk/sk/2021-01-15-az-06-14-akceleracny-program/

10. **E-learning Course on Knowledge Transfer – European Commission**

    ℹ️ The aim of this course is to introduce key elements and concepts in the domains of knowledge and technology transfer to scientists and researchers. The learner should be able to understand how to: protect a technical invention, exploit it, and bring it to market after the successful course competion.

    🌐 Available at: https://ec.europa.eu/jrc/communities/en/community/tto-circle-community/page/e-learning-course-knowledge-transfer

11. **Innovation Management – Rotterdam University**

    ℹ️ This course shows how firms bring in new business models and get new products and services to the market and thus answering the question of what innovation management truly is. The course is a nine-week journey, guided by world-class academics through innovation management concepts and theories. The course begins with the idea generation, selection, strategy formulation and implementation. Participants will develop an innovative mindset and expertise in how firms successfully generate new ideas for marketing new products and are also encouraged to organize innovation projects during the course. Further covered topics also include innovation strategy, idea management, and social networks.

    🌐 Available at: https://www.my-mooc.com/en/mooc/innovation-management/

12. **Corporate Innovation – MIT Sloan**

   The web course presents the following topics: an assessment of organization's capacity for innovation, in terms of both barriers and opportunities, tools to effectively engage with key stakeholders to overcome challenges and drive transformation in business, a tailored strategy for an organization. After the course completion, participants will be equipped with an action plan to maximize entrepreneurship and foster a culture of innovation in their company. The course costs 2,800$.

   Available at: https://executive-education-online.mit.edu/presentations/lp/mit-corporate-innovation-online-short-course/?ef_id=c:400233562056_d:c_n:g_ti:aud-733905065437:kwd-337436573495_p:_k:innovation%20course%20online_m:e_a:89129087687&gclid=Cj0KCQjwudb3BRC9ARIsAEa-vUv0rPCdxPKVf46N9nKBsdqSut-kL8GfthNvllZRYRfY75mfuaxVsa_oaAgJZEALw_wcB&gclsrc=aw.ds

13. **University of Leeds – Innovative Management**

   This course at Leeds University Business School will present to participants real-life examples provided by IBM to show how to manage innovation. Upon the course completion, students will be able to identify challenges in innovation management and develop an innovation strategy in their organization, they will also acquire knowledge regarding the latest design thinking and open innovation frameworks that help drive innovation effectively within an established company or a beginning start-up.

   Available at: https://www.futurelearn.com/courses/managing-for-innovation

14. **EPFL Innovation Park in Switzerland – Science2Market Startup Training**

   The course is aimed at students and workers at a Swiss university once a week, for a total period of 3 months. Course participants will familiarize themselves with the major challenges of launching a start-up company and learn how to deal with them. A focus is put on validating business ideas through intensive customer discovery process and interaction with industrial experts & coaches. Course participants also have one-day business concept workshops. The course specifically contains the following topics: technology transfer, IP protection, market analysis & value proposition, pitching and presenting, financing & funding of R&D, accounting and networking.

   Available at: https://www.science2market.ch/training

1.3 Summary

Table 1 below provides a comparison of the key aims and content of each course described above. The table also outlines the aim and content of the course that is currently being developed at the University of Hradec Kralove (UHK) as lines 15 and 16 demonstrate.

Table 1: A comparison of courses

Course		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Target group	**Student**	●	●	●	●	●	●			●	●	●	●	●	●		●
	Academician	●		●	●		●	●		●	●				●		●
	Professional in TT							●	●						●	●	
Content	**Copyright**	●		●	●	●	●		●	●					●	●	●
	Industrial property	●			●	●	●			●	●	●			●	●	●
	Contractual security						●	●	●							●	●
	Financing		●			●			●	●	●				●	●	●
	Business plan						●			●					●		
	Innovation process	●	●			●	●	●	●	●		●	●	●			
	R&D support			●		●	●	●			●					●	●
	Marketing	●								●		●			●		
	Proof of concept						●			●	●	●				●	
	TTO, Incubators, Accelerators		●				●	●		●	●				●		●
	Internal				●			●	●								●
	Case studies						●	●		●				●		●	

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Design Of A Technology Transfer Course

1.1 Target group

The future course foresees two versions; one for a non-expert in the field of transfer of the result creator (I – Innovator/advanced) and one for their supervisors (M – Management). The result creators are supposed to be mainly academics, PhD students and engineering students who would like to study the whole process of knowledge and technology transfer. The supervisors are supposed to be especially heads of departments, vice-deans and deans. Both versions of future courses will have the common ground necessary to understand the issues and context of knowledge and technology transfer. In other areas, study materials, the scope and depth of topics covered will differ, see Table 2 below.

Table 2: An overview of the structure of individual designed course chapters for researchers (I)

Lesson	Scope and depth in the given area		Contents
	Time allocation per Module		
	I Innovator	M Management	
Technology transfer – Introduction	2 h	2 h	Motivation for technology and knowledge transfer, key concepts, actors, role in the whole process at the university and beyond.
Output of creative activity and its financing	2 h	2 h	Specification of the outputs of creative activity, the conditions determining whether it is an output of R&D, the method of their financing from public and private sources.
Protection of the output under copyright	2 h	2 h	Definition of the scope of copyright, specification of the duality of property rights, limitations and exceptions to copyright, combination of protection.
Assessment of feasibility	2 h	1 h	Characteristics of Proof of Concept, assessment of criteria for its processing, its cost.
Commercialization with an external partner	1 h	2 h	Explanation of the concept and possibilities of commercialization, pre-contractual documents, contractual assurance of commercialization.
Basic characteristics and establishment of the company, start-up	2 h	2 h	Approaches to developing a business plan, characteristics of the required input data, methods of market analysis, potential target groups and pricing.
Establishment of a legal entity, spin off	2 h	1 h	Purpose and reason for establishment, participation of the research organization, legal form.
Business plan – marketing mix	2 h	1 h	Description of the development of a product, pricing, distribution and communication policies. Consideration of the differences between marketing for the period of market entry and market establishment and then marketing for the successful operation of an established business.

	Scope and depth in the given area		
Business plan – financial plan	2 h	X	Presentation of financial indicators and procedures for the development of financial plans, determination of input data. Introduction of statistical and dynamic methods.
Business plan – valuation	2 h	X	Introduction to two valuation approaches: intrinsic and relative. In the case of intrinsic valuation, the intrinsic value of the asset (corporate share or IP) is determined by the cash flows that are expected. In a relative valuation, it will be based on how the market values other similar assets.
Project management and management of risks	2 h	X	A description of a process consisting of a series of coordinated and controlled activities with start and end dates, performed to achieve a predetermined objective that meets specific requirements, including constraints imposed by time, costs and resources.
Technology transfer process at UHK	1 h	2 h	Specification of the steps for reporting R&D outputs, introduction to the possibilities of support in this process, roles of key persons, responsibilities.

1.2 Teaching methods

The starting point for the choice of methods is the awareness of the so-called Pyramid of Learning and the importance of different methods. S. Shapiro (1992) created a model of the so-called learning pyramid in which he illustrated the percentage of knowledge retention using selected teaching methods (Shapiro in Kalhous, Obst, 2002, p. 308).

lecture	5%
reading	10%
audiovisual methods	20%
demonstration	30%
group discussions	50%

Thus, the course will combine lecture, audiovisual methods and discussion, or other forms, such as coaching, training or case studies, with a strong emphasis on and space for discussion. Considering the target group of the course, i.e. scientists, young researchers or other carriers of innovative ideas, space will be given for discussion on the topics described above in relation to the issue and topic of the participant himself/herself.

Lectures will be delivered by experts in the domain, all supported by materials in an e-learning environment, and discussions will be organized in a group, with all participants, and individually in relation to the needs of individual participants.

Coaching is generally a process where an experienced professional helps resolve a problem or perform a task. It involves a clearly defined and set goal the client wants to achieve, followed by finding a suitable path to achieve it. This method is considered when developing the sub-tasks of a business plan.

Training is a form of experiential learning, which is based on the fact that people learn faster when they try something out for themselves. The training process is aimed at increased participation of participants, and providing feedback to evaluate the activities is an essential part of the training. We expect to use this method for independent work on patent searches or filling out an application for intellectual property protection.

The last method mentioned is a case study, which is implemented on the basis of a written problem statement accompanied by questions for its solution in discussion. The trainer discusses the whole study with the participants, as well as its different options and variants. Here, the method would be used in the overall understanding of the topic by each participant to address intellectual property protection and commercialization.

All the stated teaching methods will be supported with standard classroom equipment, i.e. personal computer with projection, flipchart, sufficient space for group work/discussion.

1.3 Teaching (training) competences/experience

We divide teaching (training) competences in two basic groups; the first group is general, related to the ability to transfer experience and knowledge, the second group includes the competences focused on knowledge in the given topic.

A teacher (trainer) will be provided with practical knowledge, the ability to engage people and teach them the necessary knowledge and skills, to teach them how to apply theory to practice, but also to objectively evaluate their performance and give them feedback.

The key competences of a teacher (trainer) should be as follows:

- Ability to teach
- Activity and engagement
- Clear definition of the objectives of a learning event/activity
- Comprehensibility
- Communicative skills
- Presentation and self-presentation
- Ability to resolve conflicts
- Empathy
- Individual approach
- Creativity and innovativeness
- Accepting differences
- Working under pressure

The course is prepared with an awareness of the main motivational factors for adults, which include: flawless organization of training and course work, positive and sustained motivation during the course – the teacher (trainer) is expected to have a client-oriented approach to course participants, to avoid making participation in training compulsory and leading to formality and disengagement, monitoring of educational motives and their possible change, setting realistic pedagogical goals.

Expertise on each topic will be key in selecting the person for that topic, and we expect to address the following details:

1. Introduction to technology transfer: a CTT worker – to introduce key concepts and key processes at the university

2. Outcome of creative activity: a CTT worker – for the purpose of introducing the different types of IP outcomes, project disbursement advisor – for the purpose of introducing IP funding opportunities at the university in relation to projects

3. Protection of the creative output: a copyright lawyer

4. Feasibility assessment: proven originator, equity investor – to share good practice and own experience, consulting originators' cases, assistance and coordination in developing a case study on their own product

5. Commercialization: CTT staff member – to share theoretical options, researcher with experience in commercialization at the university

6. Development of a business plan for a start-up: proven originator – to share good practice and own experience

7. Establishment of a legal entity: proven originator – to share good practice and own experience

8. Project management: certified project manager – to share good practice and own experience

9. Marketing plan: certified originator, equity investor – to share good practice and own experience

10. Financial plan: corporate economist – for consultations in preparing own financial plan for the output

11. Schedule: certified project manager

1.4 Knowledge and skills of course participants

A participant who completes the technology transfer course will gain knowledge, skills and competencies that will give him/her a clear understanding of the university intellectual property protection options, commercialization opportunities, knowledge of internal process setups, and the ability to decide what type and how s/he prefers to protect in terms of intellectual property.

Specifically, s/he will acquire the following knowledge:

- after completing the course, the student will have an overview of the possibilities of financing the creation of R&D outputs from public and private sources, s/he will be able to distinguish aspects of the types of protection of the R&D output, and in addition s/he will gain knowledge of the requirements for the output,

- s/he will know the different forms of intellectual property protection,

- during the course, the student will gain knowledge of the process of commercialization of the R&D output from various forms of cooperation with the private sphere to aspects of establishing a spin-off company,

- s/he will be familiar with the process of technology transfer at home university,

- s/he will know possible forms of commercialization, possible options for establishing a company and creating business plans, the necessary steps that lead to this,

- s/he will know the possible business models that could be considered for their product,

- s/he will gain an overview of the basic methods of valuation of the R&D output (or company) in relation to its market potential as a guidance for choosing a suitable option for transfer and commercialization.

S/he will acquire the following skills and competencies:

- s/he will be able to distinguish and decide on the potential type of legal protection of intellectual property,

- s/he will be able to deal with the basic legal documents relating to the establishment and operation of different legal forms of business,

- s/he will be able to develop a business plan,

- s/he will be able to evaluate an investment based on the use of relevant methods,

- s/he will be able to complete an application for IP, as well as to address competent persons at UHK for further solution of the given question,

- s/he will be able to clearly present the essence of their innovative project, discuss the risks of the selected form of IP and commercialization options,

- s/he will be able to detect and deal with the project weaknesses, strengths, opportunities and risks.

1.5 Literature

Compulsory

Beneš, M., Čada, K., Korver, Z. de, Jakl, L., Vojčík, P., & Metropolitní univerzita Praha. (2016). Práva k duševnímu vlastnictví a jejich uplatňování.

Čada, K. (2014). Chránit / nechránit to je otázka. alevia.

Marcolongo, M. (2017). Academic entrepreneurship: How to bring your scientific discovery to a successful commercial product. John Wiley & Sons.

Jansa, L., & Otevřel, P. (2018). Softwarové právo (3. aktualizované a rozšířené vydání). Computer Press.

Optional

Damodaran, A. (2011). The little book $ of valuation: How to value a company, pick a stock, and profit. John Wiley & Sons.

Gray, C. F., & Larson, E. W. (2014). Project Management: The managerial process (Sixth edition). McGraw-Hill Education.

Kofman, F. (2010). Vědomý business. Portál.

Schwalbe, K. (2011). Řízení projektů v IT: Kompletní průvodce. Computer Press.