

# **Lääketutkimuksen tohtoriohjelma / Doctoral Programme in Drug Research (DPDR), OPETUSSUUNNITELMA 2017 - 2020**

## **Opetussuunnitelma sisältää**

- 1. Tohtoriohjelman kuvauksen**
- 2. Tutkintorakenteen (opintokokonaisuuden tiedot)**
- 3. Opintojaksojen tiedot**
- 4. Yliopistotason tiedot (kuvataan keskitetysti ja julkaistaan Flammassa)**

## **Hyväksytty farmasian tiedekunnan tiedekuntaneuvostossa**

päivämäärä

## **Tohtoriohjelman kuvaus**

### **1. Degree programme title**

Doctoral Programme in Drug Research (DPDR)

### **2. Degree title to be awarded and the competence provided by it**

Doctor of Philosophy, Doctor of Philosophy in Pharmacy, Doctor of Medical Science, Doctor of Dental Science or Doctor of Veterinary Medicine.

### **3. Degree level (first-, second-, third-cycle/European Qualifications Framework (EQF) level)**

EQF level 8

### **4. Programme-specific admissions criteria**

Two application periods to pursue doctoral degree in DPDR will be organised annually, one in Spring and one in Autumn.

#### **FORMAL CRITERIA**

- Required background degree
- Thesis supervisor(s)
- A course/study plan for the formal training
- Language skills required by the University of Helsinki

#### **QUALITY CRITERIA**

- Scientific relevance and ambition of the research plan, use of relevant methodology
- Motivation and CV of the applicant, success in previous studies
- Thematic fit of the research plan with the doctoral programme profile
- Funding plan and feasibility of the thesis project within the intended timeframe (in 4 years' net time)

- Demonstration of adequate knowledge in relevant fields and potential of the applicant to develop into an independent researcher
- Supervisory and follow-up of progress arrangements, quality of the research environment

Application documents:

- Research plan, compiled according to University of Helsinki template
- Study plan
- Agreements of supervisor(s) and professor in charge
- Copies of degree certificate and transcript
- Certificate of language skills if needed (HY/117/00.00.06.00/2017)

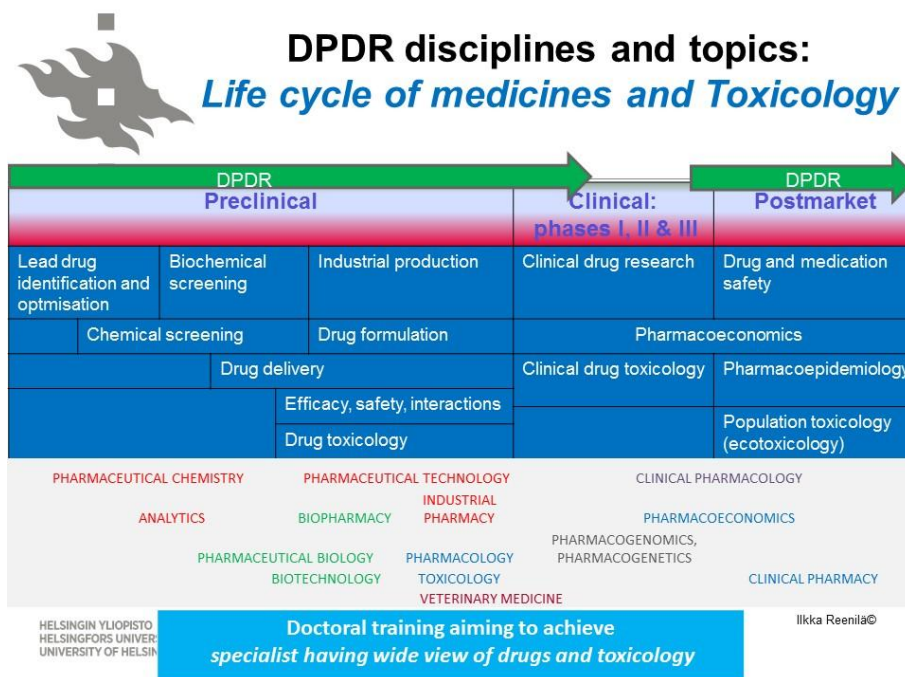
DPDR may use interview or assignments in addition to application by relevant documents.

### 5. Programme-specific procedures for the recognition and validation of prior learning

Based on earlier procedures performed in the faculties. University of Helsinki guidelines are followed.

### 6. Programme profile

The aim of DPDR is to educate experts having wide view of the whole life cycle of medicines and toxicology.



The main doctoral education is research, which is performed in the research groups under guidance of supervisor(s). During research work, also soft skills are learned. These skills can also be studied in the doctoral school's training events.

DPDR is a multidisciplinary doctoral programme and its strong fields include drug design and synthesis, bioactivity screening, pharmaceutical microbiology, drug formulation, industrial manufacturing, pharmacokinetics, pharmacodynamics, analytics, drug interactions, pharmacogenetics, pharmacology and clinical pharmacology, clinical drug research, pharmacoepidemiology, clinical pharmacy, pharmacoeconomics, toxicology and clinical toxicology and veterinary drug research.

Doctoral education in DPDR includes national and international courses, congresses and work visits outside own working place. DPDR has wide network of experts representing several fields in drug research and toxicology. DPDR is one core unit in the national FinPharmaNet network, which covers seven universities, representatives from national authorities and drug industry. FinPharmaNet organises various educational national events. In addition, cooperation with scientific societies and doctoral candidates' own activities (Student council) and peer support helps in networking. Research expertise, other skills and career planning are followed in annual thesis committee meetings where outside scientific experts support the progress of doctoral candidates.

## **7. Key learning outcomes/objectives of education**

According to Decree Statute 21 § of the government decree on university degrees (effective since 1.8.2005) and Government Decree 1039/2013 (unofficial translation), a person who has completed doctoral training has:

1. Become well-versed in his/her own field of research and its social significance
2. Gained knowledge and skills needed to apply scientific research methods independently and critically, and the ability to produce new scientific knowledge within his/her field of research
3. Become conversant with the development, basic problems and research methods of his/her own field of research
4. Gained such knowledge of the general theory of science and of other disciplines relating to his/her own field of research as enables him/her to follow developments in them
5. Acquired sufficient communication, language and other related general skills required for posts of high expertise and international collaboration

## **8. Job descriptions and labour market sectors (examples for graduates)**

All doctors graduated from DPDR are employed in expert positions in various fields in drug research and toxicology in academic, authority and industry as well as being independent entrepreneurs.

## **9. ~~Postgraduate study options/opportunities~~**

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## **10. Career orientation/compulsory or elective traineeship**

Research in doctoral education is team work in research groups which have national and international cooperation and networks. Practical research work has some transferable skills integrated in it and those can be strengthened by courses and activities provided by doctoral school. A period of work (two weeks at minimum) outside own research group is anticipated during doctoral education.

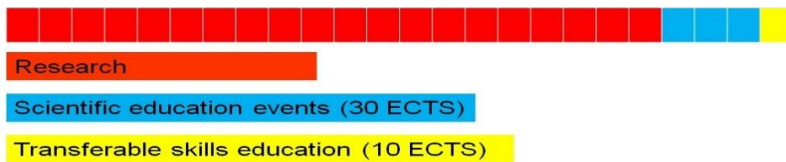
## 11. International mobility

Doctoral candidates are free to travel to participate suitable doctoral education events. DPDR provides travel grants by application for visits outside own working place, for participation to scientific courses, congresses and other events.

DPDR recommends that doctoral candidate participates at least in one international event every year and, if possible, and does scientific works outside own working place (more than two weeks) at least once during doctoral education.

## 12. Degree programme structure

PhD degree content



See details in DPDR degree content.

## 13. Assessment practices

Grade of doctoral thesis on a scale of Approved with distinction, approved or rejected. Other training graded as approved or rejected.

## 14. Graduation practices and criteria

All scientific doctoral education has to be finished before preview of the thesis dissertation. Evaluation of doctoral thesis process description will be decided by UH.

## 15. Criteria for full-time and part-time studies, opportunities for distance learning, if any

Research work can be accomplished outside the University under proper supervision full-time or part-time. Suitable courses and training can also be obtained outside of the University.

## 16. Practices for collecting and processing student feedback

Feedback is collected from all its courses and events. Additionally, DPDR accepts comments continuously. Anonymous feedback is open on line (<https://elomake.helsinki.fi/lomakkeet/69492/lomake.html>).

## 17. Degree programme director

Professor Heikki Ruskoaho

## Tohtorihjelman tutkintorakenne

1. Väitöskirja / Doctoral thesis
2. Tieteenalaopinnot / Scientific content studies
3. Yleiset valmiustaidot / Transferable skills

Koulutusohjelman tutkintorakenne	Tunniste	Laajuus op	Kokonais/väliotsikko/valintaryhm	Pakollisuus	Valintasääntö
<b>Doctoral programme in drug research</b>			Doctoral degree		Complete thesis, scientific education 30 ECTS and transferable skills 10 ECTS
<b>Thesis</b>	DPDR-999		Module	Obligatory	
<b>Scientific education</b>	DPDR-998		Module	Obligatory	Complete scientific education 30 ECTS
<b>Follow up group meetings</b>			<b>Väliotsikko</b>	Obligatory	
Follow up group meeting 1	DPDR-101	0	thesis	Obligatory	
Follow up group meeting 2	DPDR-102	0	thesis	Obligatory	
Follow up group meeting 3	DPDR-103	0	thesis	Obligatory	
Follow up group meeting 4	DPDR-104	0	thesis	Obligatory	
<b>Research ethics</b>			<b>Väliotsikko</b>	Obligatory	Complete min 1 op
Research Ethics for Health Scientists	921180	1-2		Optional	
Research Ethics, online course	921181	1		Optional	
Other relevant courses				Optional	
<b>Scientific content education</b>			<b>Väliotsikko</b>		
FinPharmaNet Annual Meeting 1	DPDR-201	1		Optional	Recommended
FinPharmaNet Annual Meeting 2	DPDR-202	1		Optional	Recommended
FinPharmaNet Annual Meeting 3	DPDR-203	1		Optional	Recommended
FinPharmaNet Annual Meeting 4	DPDR-204	1		Optional	Recommended
Book examination	DPDR-105	1-5		Optional	Max 10 ECTS
Laboratory animal sciences	NEU-603	2-5		Optional/obligatory	Obligatory for all DS Health doctoral candidates working with lab animals (if not completed before)
<b>Lead drug identification, lead optimisation</b>			<b>Väliotsikko</b>		

Basic Course in Radiochemistry, radiation protection	55727	4		Optional	
Organic chemistry in molecular biosciences and pharmacy III	590173	3		Optional	
Other relevant courses					
<b>Chemical screening</b>			<b>Väliotsikko</b>		
Drug metabolism	590085	5		Optional	
Mass spectrometry in bioanalysis	590179	5		Optional	
Introduction to spectroscopy	PROV-	5		Optional	
Other relevant courses				Optional	
<b>Biochemical screening</b>			Väliotsikko		
Essentials of Molecular Biology in Pharmacy	590283	3		Optional	
Cells – Biomaterials interactions, Pharmaceutical and medical applications in biopharmacy	590284	3		Optional	
Other relevant courses				Optional	
<b>Biotechnology</b>			<i>Väliotsikko</i>		
Building Bridges 2018: P4 Medicine	DPBM-105			Optional	
Other relevant courses				Optional	
<b>Drug delivery</b>			Väliotsikko		
Introduction to Nanoscience	590296	5		Optional	
Nanoforum	590297	2		Optional	
Other relevant courses					
<b>Drug formulation</b>			Väliotsikko		
Microfluidics and nanotechnology for pharmaceutical applications (MiNaPharmA)	590370	5		Optional	
Other relevant courses					
<b>Industrial production</b>			Väliotsikko		
Pharmaceutical industry and wholesale operations	590704	3		Optional	
Quality management, GxP	590707	5+5		Optional	
Pharmaceutical development I+II	590712	5+5		Optional	

Pharmaceutical business and marketing	590714	5		Optional	
Eläinlääkkeiden kehityksen ja käytön erityispiirteet	PROV-207	5		Optional	
Other relevant courses					
<b>Efficacy, safety, interactions</b>			<b>Väliotsikko</b>		
Stereotaxis in neuropharmacological research	DPDR-120	2-3		Optional	
Other relevant courses					
<b>Drug toxicology</b>			<b>Väliotsikko</b>		
Relevant courses					
<b>Clinical drug research</b>			<b>Väliotsikko</b>		
Kliininen lääketutkimus	3757112			Optional	
Other relevant courses					
<b>Clinical drug toxicology</b>			<b>Väliotsikko</b>		
Relevant courses					
<b>Pharmacoeconomics</b>			<b>Väliotsikko</b>		
Critical appraisal of research evidence	590300	5		Optional	In Finnish only
Research methods in pharmacoeconomics	590311	5		Optional	In Finnish only
Lääketaloustieteen tutkimusmenetelmät	590372	5		Optional	In Finnish only
Literature in pharmacoeconomics	590376	1-6		Optional	In Finnish only
Other relevant courses					
<b>Pharmacoepidemiology</b>			<b>Väliotsikko</b>		
Relevant courses					
<b>Scientific activities</b>			<b>Väliotsikko</b>		
Nordic summit for doctoral candidates	Health-121	1		Optional	
<b>Scientific conference/meeting/symposium</b>			<b>Väliotsikko</b>	Optional	<b>max 6 ects</b>
Scientific conference/meeting/symposium 1	DPDR-106	2 ects / poster or talk		Optional	
Scientific conference/meeting/symposium 2	DPDR-107	2 ects / poster or talk		Optional	

Scientific conference/meeting/ symposium 3	DPDR-108	2 ects / poster or talk		Optional	
<b>Research/study visit</b>				<b>Optional</b>	
Research/study visit 1	DPDR-109	2 ects /week		Optional	
Research/study visit 2	DPDR-110	2 ects /week			
<b>Publications outside the thesis</b>			<b>Väliotsikko</b>		max 6 ects
Publication outside the thesis 1	DPDR-111	1/publi- cation		Optional	
Publication outside the thesis 2	DPDR-111	1/public- cation		Optional	
<b>Transferable skills</b>	DPDR-997	10	<b>Väliotsikko</b>		Complete 10 credits
DPDR doctoral candidate kick-off	DPDR-130	0		Optional	Recommended in early phase of doctoral education
Transferable skills courses (DSHealth)	DPDR-997				



## **DPDR - Module: doctoral thesis**

### **1. Module title:**

Doctoral thesis

### **2. Module code**

DPDR-999

### **3. Module status: compulsory**

Responsible degree programme: Doctoral programme in drug research.

### **4. Module level**

EQF level 8

### **5. Recommended time/stage of studies for completion**

Throughout the doctoral degree education

### **6. Term/teaching period when the module will be offered**

All.

### **7. Scope of the module in credits**

No credits. Corresponds to four year research work in full time.

### **8. Teacher coordinating the module**

Supervisor(s).

### **9. Module learning outcomes**

1. Become well-versed in his/her own field of research and its social significance
2. Gained knowledge and skills needed to apply scientific research methods independently and critically, and the ability to produce new scientific knowledge within his/her field of research
3. Become conversant with the development, basic problems and research methods of his/her own field of research
4. Gained such knowledge of the general theory of science and of other disciplines relating to his/her own field of research as enables him/her to follow developments in them

5. Acquired sufficient communication, language and other related general skills required for posts of high expertise and international collaboration

#### **10. Prerequisites**

Second level degree in higher education.

#### **11. Module content**

Research and scientific work.

Follow-up / thesis committee meetings annually.

#### **12. Module grading**

Accepted, accepted with distinction or failed based on reviewers and opponent of the dissertation.

#### **13. Language of instruction**

English

### **Scientific education**

#### **1. Module title:**

Scientific education

#### **2. Module code**

DPDR-998

#### **3. Module status:**

- compulsory (min. 30 ECTS)
- Responsible degree programme: Doctoral programme in drug research.

#### **4. Module level**

EQF level 8

#### **5. Recommended time/stage of studies for completion**

Throughout the doctoral degree education, preferentially in early phase of doctoral education.

#### **6. Term/teaching period when the module will be offered**

Courses will be offered every 1-4 years. See 9.

## **7. Scope of the module in credits**

Minimum 30 ECTS. Collected from different courses and activities.

## **8. Teacher coordinating the module**

Coordinator of DPDR?

## **9. Module learning outcomes**

General learning outcomes – doctoral candidates:

1. Become well-versed in his/her own field of research and its social significance
2. Gained knowledge and skills needed to apply scientific research methods independently and critically, and the ability to produce new scientific knowledge within his/her field of research
3. Become conversant with the development, basic problems and research methods of his/her own field of research
4. Gained such knowledge of the general theory of science and of other disciplines relating to his/her own field of research as enables him/her to follow developments in them
5. Acquired sufficient communication, language and other related general skills required for posts of high expertise and international collaboration

Additionally, doctoral candidates will:

- have thorough knowledge and comprehensive understanding of their research fields
- have the skills and competencies for critical thinking and for applying scientific knowledge and theories in their own research
- know the research methods and related developments in their field
- be capable of applying scientific research methods independently and critically

Learning outcomes in research ethics: doctoral candidates will be able to follow the principles of research ethics and good scientific practice

Learning outcomes in International scientific activities - doctoral candidates will gain:

- up-to-date information on current research trends, research techniques and methodologies in their fields
- a broad perspective and understanding in research carried out in fields relevant to their research
- opportunities for multi-/interdisciplinary research
- integration into the international scientific community
- international contacts and networking

## **10. Prerequisites**

Second level degree in higher education.

## **11. Module content**

Scientific education module contains:

- § Obligatory annual follow up group meetings
- § Obligatory research ethics education
- § Scientific content education in several topics and themes
- § International scientific activities

Courses, events and activities are listed in DPDR Degree content page. Other training outside the list can also be included in the Scientific education module.

## **12. Module grading**

Accepted or failed.

## **13. Language of instruction**

English/Finnish

# **Follow up group meeting 1**

### **1. Course title**

Follow up group meeting 1

### **2. Course code**

DPDR-101

### **3. Course status**

The course is obligatory. The degree programme responsible of the unit is DPDR. The course unit belongs to the module of Scientific content studies. The course unit is available to DPDR members only.

### **4. Course level (first-, second-, third-cycle/EQF levels 6, 7 and 8)**

Doctoral level = third-cycle (doctoral) degree/EQF level 8

## **5. Recommended time/stage of studies for completion**

The course must be completed within twelve months after receiving the right to pursue a doctoral degree in DPDR. Future meetings must be arranged annually.

## **6. Term/teaching period when the course will be offered**

Continuously.

## **7. Scope of the course in credits**

0 cr.

## **8. Teacher coordinating the course**

Doctoral programme coordinator

## **9. Course learning outcomes**

In the meeting the doctoral candidate presents the research plan, study plan and career prospects to the committee. The follow-up group gives the doctoral candidate:

- feedback on the clarity, feasibility and relevance of the research plan
- feedback of the future plans, including career prospects
- recommendations on research and studies supporting candidates progress.

In case there are problems and/or issues that need to be addressed the Follow up group should take it up and bring to the doctoral programme coordinator's attention, if needed.

## **10. Course completion methods**

- Chairing the meeting
- Completion of a follow-up report based on the meeting
- Informing DPDR coordinator of having the meeting

At least one week prior to the scheduled meeting the student must update her/his information in the University of Helsinki research data base TUHAT

In the meeting the research plan, study plan and career prospects to the committee should be discussed.

## **11. Prerequisites**

None.

## **12. Recommended optional studies**

None

## **13. Course content**

Doctoral candidate at the University of Helsinki is required to meet annually the Follow up group (Rector's decision 82/2013) until the thesis defense. The overall goals of the Follow up group are to support doctoral candidates scientific education including other suitable knowledge, skills and other plans in addition to monitor the progress toward the doctoral degree.

## **14. Recommended and required literature**

-

## **15. Activities and teaching methods in support of learning**

-

## **16. Assessment practices and criteria, grading scale**

Grading: pass/fail

## **17. Language of tuition**

Finnish, Swedish, English

# **Follow up group meeting 2-4**

### **1. Course title**

Follow up group meeting 2

### **2. Course code**

DPDR-102, 103, 104

### **3. Course status**

The course is obligatory. The degree programme responsible of the unit is DPDR. The course unit belongs to the module of Scientific content studies. The course unit is available to DPDR members only.

### **4. Course level (first-, second-, third-cycle/EQF levels 6, 7 and 8)**

Doctoral level = third-cycle (doctoral) degree/EQF level 8

## **5. Recommended time/stage of studies for completion**

The course must be completed annually.

## **6. Term/teaching period when the course will be offered**

Continuously.

## **7. Scope of the course in credits**

0 cr.

## **8. Teacher coordinating the course**

Doctoral programme coordinator

## **9. Course learning outcomes**

After completing the course doctoral candidate has met the Follow up group and presented the research plan, study plan and career prospects to the committee. The follow-up group gives the doctoral candidate:

- feedback on the clarity, feasibility and relevance of the research plan
- feedback of the future plans, including career prospects
- recommendations on research and studies supporting candidates progress.

The Follow up group should also take up problems and/or issues that need to be addressed and bring them to the doctoral programme coordinator's attention.

## **10. Course completion methods**

- Chairing the meeting
- Completion of a follow-up report based on the meeting
- Informing DPDR coordinator of having the meeting

At least one week prior to the scheduled meeting the student must update her/his information in the University of Helsinki research data base TUHAT

In the meeting the research plan, study plan and career prospects to the committee should be discussed.

## **11. Prerequisites**

None.

## **12. Recommended optional studies**

None

### **13. Course content**

Doctoral candidate at the University of Helsinki is required to meet annually the Follow up group (Rector's decision 82/2013) until the thesis defense. The overall goals of the Follow up group are to support doctoral candidates scientific education including other suitable knowledge, skills and other plans in addition to monitor the progress toward the doctoral degree.

### **14. Recommended and required literature**

-

### **15. Activities and teaching methods in support of learning**

-

### **16. Assessment practices and criteria, grading scale**

Grading: pass/fail

### **17. Language of tuition**

Finnish, Swedish, English

## **FinPharmaNet Annual Meeting (Helsinki/Turku/Kuopio/ Tampere/ Oulu) I-IV**

### **1. Course title**

FinPharmaNet Annual Meeting I-IV

### **2. Course code**

DPDR-201, 202, 203, 204

### **3. Course status: optional**

DPDR degree programme is responsible for the course. This course belongs to Scientific education module. The course is available to students from other degree programmes.

### **4. Course level (first-, second-, third-cycle/EQF levels 6, 7 and 8)**

EQF level 8



## 5. Recommended time/stage of studies for completion

Annual participation is recommended.

## 6. Term/teaching period when the course will be offered

- The course is usually offered in the autumn term (mid August).
- The course is not necessarily offered every year.
- Most likely in teaching period II.

## 7. Scope of the course in credits

Usually 1 ECTS, will be defined annually.

## 8. Teacher coordinating the course

DPDR and FinPharmaNet networks Coordinators and Student councils.

## 9. Course learning outcomes

Doctoral candidate:

1. Becomes well-versed in his/her **own** field of research and its social significance
2. Gains **knowledge** and **skills** needed to apply scientific research methods independently and critically, and the ability to produce new scientific knowledge within his/her field of research
3. Becomes **conversant** with the development, basic problems and research methods of **his/her own field of research**
4. Gains such knowledge of the **general theory of science** and of **other disciplines** relating to his/her own field of research as enables him/her to follow developments in them
5. Acquires sufficient **communication, language and other related general skills** required for posts of high expertise and international collaboration.

These outcomes are strengthened by networking with peer doctoral candidates, supervisors and experts.

## 10. Course completion methods

- Participation of the program (lectures, workshops etc.) : yet undefined ECTS
- Presentation of own research work: 1.0 ECTS.
- Participation to Student council organiser network acquires credits decided case wise.
- Amount of ECTS credits may vary at any year.

## 11. Prerequisites

No prior doctoral education is required.

## **12. Recommended optional studies**

Transferable skills courses in writing, presentation, popularisation and teaching in addition to courses in language skills.

## **13. Course content**

Two day symposium with a current and relevant topic related of drug research and/or toxicology and/or career development. Typically the Annual Meeting includes lectures and poster or oral presentations of the recent research work performed by doctoral candidates.

Social program, organised partly by FinPharmaNet networks Student council, is included.

FinPharmaNet Annual Meeting web site: <http://finpharmanet.fi/?s=3-joint-meeting>

## **14. Recommended and required literature**

Additional literature is not typically included but not excluded either.

## **15. Activities and teaching methods in support of learning**

Participation to Student council activities as organiser enhances leadership and management skills.

## **16. Assessment practices and criteria, grading scale**

Pass/fail

Presentation: yes/no

## **17. Language of instruction**

English

# **Book examination**

### **1. Course title**

Book examination.

### **2. Course code**

DPDR-105

### **3. Course status: compulsory or optional**

The course is voluntary. The degree programme responsible of the unit is DPDR. The course unit belongs to the module of Scientific content studies. The course unit is available to DPDR members only.

**4. Course level (first-, second-, third-cycle/EQF levels 6, 7 and 8)**

Doctoral level = third-cycle (doctoral) degree/EQF level 8

**5. Recommended time/stage of studies for completion**

Any stage.

**6. Term/teaching period when the course will be offered**

Continuously.

**7. Scope of the course in credits**

1-5 cr.

**8. Teacher coordinating the course**

Supervisor.

**9. Course learning outcomes**

- After completing the course doctoral candidate has received knowledge and or skills which support candidates progress in doctoral education.
- Several book examinations can be done.

**10. Course completion methods**

Written exam.

**11. Prerequisites**

None.

**12. Recommended optional studies**

None

**13. Course content**

Doctoral candidate and supervisor/examiner agree on the literature. Candidate takes the examination which is evaluated by the supervisor/examiner.

**14. Recommended and required literature**

Doctoral candidate and supervisor agrees with the literature

## **15. Activities and teaching methods in support of learning**

-

## **16. Assessment practices and criteria, grading scale**

Grading: pass/fail

## **17. Language of tuition**

Finnish, Swedish, English

# **Stereotaxis methods in brain research**

## **1. Course title**

Stereotaxical methods in brain research

## **2. Course code**

DPDR-120

## **3. Course status: compulsory or optional**

DPDR degree programme is responsible for the course. This course belongs to Transferable skills module. The course is available to students from other degree programmes.

## **4. Course level**

EQF level 6

## **5. Recommended time/stage of studies for completion**

The recommended time for completion is in the beginning of the doctoral education

## **6. Term/teaching period when the course will be offered**

The course is usually offered in the spring term in period 4.

The course is offered every 3 years.

## **7. Scope of the course in credits**

Lectures and examination 2 etcs. Lectures, examination and practical course 3 etcs

## **8. Teacher coordinating the course**

Doc. T. Petteri Piepponen

## **9. Course learning outcomes**

Students are expected to learn the basic principles of stereotaxis, anatomy of rat brain and significant nerve tracts, anesthesia and post-operative care of experimental animals, microinjections and selective lesions of the brain and intracranial administration techniques of experimental drugs. Those attending to the practical will have basic skills for stereotaxic operations.

## **10. Course completion methods**

One day of contact teaching (lectures). For those attending the practical part two additional days of hands-on practice and demonstrations. A written exam for completion.

## **11. Prerequisites**

No specific prerequisites, course in care and use of experimental animals are strongly recommended, also courses in neurobiology and neuropharmacology are recommended.

## **12. Recommended optional studies**

Courses in neurobiology and neuropharmacology

## **13. Course content**

- Anatomy of rat brain - significant nerve tracts.
- Anesthesia and post-operative care of experimental animals.
- Stereotaxic apparatus and instrumentation, how to interpret Atlas information
- Microinjections and selective lesions of the brain.
- Intracranial administration techniques of experimental drugs
- Rodent models of Parkinson's disease
- Principal and applications of microdialysis

## **14. Recommended and required literature**

Supporting materials (articles, case studies etc) will be distributed through Moodle-area.

## **15. Activities and teaching methods in support of learning**

All the course material and supporting materials (videos etc.) will be collected to the Moodle-area.

## **16. Assessment practices and criteria, grading scale**

A written exam, scale pass/fail.

## **17. Language of instruction**

English

## **Scientific conference/meeting/symposium 1-3**

### **1. Course title**

Scientific conference/meeting/symposium.

### **2. Course code**

DPDR-106, 107, 108

### **3. Course status: compulsory or optional**

The course is optional. The degree programme responsible of the unit is DPDR. The course unit belongs to the module of Scientific content studies. The course unit is available to CVM members only.

### **4. Course level (first-, second-, third-cycle/EQF levels 6, 7 and 8)**

Doctoral level = third-cycle (doctoral) degree/EQF level 8

### **5. Recommended time/stage of studies for completion**

Any stage.

### **6. Term/teaching period when the course will be offered**

Continuously.

### **7. Scope of the course in credits**

2 ECTS / poster or talk.

### **8. Teacher coordinating the course**

DPDR Coordinator.

### **9. Course learning outcomes**

- Doctoral candidate becomes conversant with the development, basic problems and research methods of his/her own field of research
- Doctoral candidate becomes well-versed in his/her own field of research and its social significance
- Doctoral candidate gains such knowledge of the general theory of science and of other disciplines relating to his/her own field of research as enables him/her to follow developments in them

- Acquires communication, language and other related general skills in addition to (inter)national collaboration.

#### **10. Course completion methods**

- Attendance and presentation at an international scientific conference/ meeting/ symposia
- Writing a short report (max 1 page) after the conference/meeting/symposium

#### **11. Prerequisites**

None.

#### **12. Recommended optional studies**

None

#### **13. Course content**

- Attendance and presentation at an international scientific conference/ meeting/ symposia
- Written report

#### **14. Recommended and required literature**

-

#### **15. Activities and teaching methods in support of learning**

-

#### **16. Assessment practices and criteria, grading scale**

Grading: pass/fail

#### **17. Language of tuition**

Finnish, Swedish, English

### **Publications outside the thesis 1 ja 2**

#### **1. Course title**

Publications outside the thesis.

#### **2. Course code**

DPDR-111, 112

### **3. Course status: compulsory or optional**

The course is optional. The degree programme responsible of the unit is DPDR. The course unit belongs to the module of Scientific content studies. The course unit is available to CVM members only.

### **4. Course level (first-, second-, third-cycle/EQF levels 6, 7 and 8)**

Doctoral level = third-cycle (doctoral) degree/EQF level 8

### **5. Recommended time/stage of studies for completion**

To be completed at any time during doctoral studies

### **6. Term/teaching period when the course will be offered**

According to the schedule of the doctoral candidate's own research

### **7. Scope of the course in credits**

1 credit per publication

### **8. Teacher coordinating the course**

DPDR Coordinator.

### **9. Course learning outcomes**

- Doctoral candidate becomes conversant with the development, basic problems and research methods of his/her own field of research
- Doctoral candidate gains such knowledge of the general theory of science and of other disciplines relating to his/her own field of research as enables him/her to follow developments in them
- Acquires communication, language and other related general skills in addition to (inter)national collaboration.

### **10. Course completion methods**

Writing a publication or performing other tasks not included in the thesis.

### **11. Prerequisites**

None.

### **12. Recommended optional studies**

None



### **13. Course content**

Writing a publication or performing other tasks not included in the thesis.

### **14. Recommended and required literature**

-

### **15. Activities and teaching methods in support of learning**

-

### **16. Assessment practices and criteria, grading scale**

Grading: pass/fail

### **17. Language of tuition**

Finnish, Swedish, English

## **Research/study visit 1 ja 2**

### **1. Course title**

Research/study visit abroad.

### **2. Course code**

DPDR-109, 110

### **3. Course status: compulsory or optional**

The course is optional. The degree programme responsible of the unit is DPDR. The course unit belongs to the module of Scientific content studies. The course unit is available to DPDR members only.

### **4. Course level (first-, second-, third-cycle/EQF levels 6, 7 and 8)**

Doctoral level = third-cycle (doctoral) degree/EQF level 8

### **5. Recommended time/stage of studies for completion**

Any stage.

### **6. Term/teaching period when the course will be offered**

Continuously.

## **7. Scope of the course in credits**

2 ECTS/week (min. 5 working days)

## **8. Teacher coordinating the course**

DPDR Coordinator.

## **9. Course learning outcomes**

Doctoral candidate:

1. Becomes well-versed in his/her own field of research and its social significance
2. Gains knowledge and skills needed to apply scientific research methods independently and critically, and the ability to produce new scientific knowledge within his/her field of research
3. Becomes conversant with the development, basic problems and research methods of his/her own field of research
4. Gains such knowledge of the general theory of science and of other disciplines relating to his/her own field of research as enables him/her to follow developments in them
5. Acquires sufficient communication, language and other related general skills required for posts of high expertise and international collaboration.

These outcomes are strengthened by networking with peer doctoral candidates, supervisors and experts.

## **10. Course completion methods**

Working outside own working place for minimum of 5 days.

## **11. Prerequisites**

None.

## **12. Recommended optional studies**

None

## **13. Course content**

Working outside own working place for minimum of 5 days.

## **14. Recommended and required literature**

-

## **15. Activities and teaching methods in support of learning**

-

## **16. Assessment practices and criteria, grading scale**

Invitation letter of the hosting laboratory is required. It is recommended that doctoral candidate shares the knowledge and skills obtained in the visit at own research group and others interested in the topic.

Grading: pass/fail

## **17. Language of tuition**

Finnish, Swedish, English

# **Module: Transferable skills**

### **1. Module title**

Transferable skills

### **2. Module code**

DPDR-997

### **3. Module status**

Obligatory. Responsible degree programme: Doctoral programme in drug research.

### **4. Module level**

EQF level 8

### **5. Recommended time/stage of studies for completion**

Throughout the doctoral degree education, preferentially in early phase of doctoral education.

### **6. Term/teaching period when the module will be offered**

Courses will be offered every 1-4 years.

### **7. Scope of the module in credits**

Minimum 10 ECTS. Collected from different courses and activities.

## **8. Teacher coordinating the module**

Coordinator of DPDR and DSHealth.

## **9. Module learning outcomes**

A person who has completed doctoral training has:

- Gained knowledge and skills needed to apply scientific research methods independently and critically, and the ability to produce new scientific knowledge within his/her field of research
- Become conversant with the development, basic problems and research methods of his/her own field of research
- Acquired sufficient communication, language and other related general skills required for posts of high expertise and international collaboration

Doctoral candidates gain the general competencies and skills that are important for performing both as a scientist and as a highly qualified expert outside of the academia

## **10. Prerequisites**

Second level degree in higher education.

## **11. Module content**

Transferable skills module contains education in:

- Communication and teaching
- Management
- Entrepreneurship
- Legislation
- Career planning and development
- Basic research tools and skills

Courses, events and activities listed below and in DPDR Degree content page. Other training outside the list can also be included in the Transferable skills education module.

## **12. Module grading**

Accepted or failed.

## **13. Language of instruction**

English/Finnish