

2024/2025. ACADEMIC YEAR	
PROGRAM OF STUDY	
Full (Hungarian) name of the subject: GYÓGYNÖVÉNY- ÉS DROGISMERET I.	
Program: Undivided program (pharmaceutical)	
Schedule: full-time	
Short name of the subject: Drogismeret I.	
English name of the subject: Pharmacognosy I.	
German name of the subject: Pharmakognosie I.	
Type of registration: <u>obligatory</u> /obligatory elective/elective/criteria requirement	
Neptun code of the subject: GYKFMG130G1A	
Responsible Department: Department of Pharmacognosy	
Responsible tutor Dr. Ágnes Alberti Contact information: - phone: +3620/825-8389 - email: alberti.agnes@semmelweis.hu	Title, academic degree: associate professor, Ph.D.
Name of the persons responsible for the teaching of the subject: Ágnes Alberti Orsolya Csernák Ida Fejős Csege Anna Felegyi-Tóth Nóra Gampe Ákos Rácz Eszter Riethmüller Attila Ványolós	Title, academic degree: associate professor, Ph.D. assistant professor, Ph.D. assistant professor, Ph.D. assistant lecturer, Ph.D. assistant professor, Ph.D. assistant professor, Ph.D. assistant professor, Ph.D. associate professor, Ph.D.
Class per week: 2 lectures 4 practices	Credit point(s): 5 credits
Professional content, intent of acquirement and its function in order to implement the goals of the program: The aim of the course is to acquaint pharmacy students with medicinal plants, herbal drugs and the analytical methods applied in their quality assurance. By doing so, it contributes to the education of pharmacy students to become key experts in herbal medicines. It contributes to the training of students with modern knowledge of pharmacognosy at a time when the knowledge about natural substances and herbs has come to the fore and has expanded with new aspects due to European harmonization.	

Short description of the subject:

The topics of the classes follow the biogenetic system of plant materials. It represents a shift in proportion and, in part, selection in the curriculum that sufficiently emphasizes the importance of knowledge of herbal drugs and their active ingredients that are important in therapeutic practice. At the same time, it provides knowledge in the context of structure-activity relationships for the sufficient processing of newly emerging herbal drugs, possibly of foreign origin, based on their chemical groups. It also introduces the requirements of the European Pharmacopoeia (Ph. Eur.) regarding herbal drugs and preparations. Thus, it provides knowledge of all herbal drugs and active substances that serve as raw materials for phytopharmaceuticals (including those that will soon become traditional OTC medicines) and preventive products (dietary supplements).

Knowledge of plant material: drug recognition; macroscopic and microscopic examination
 Detection of active ingredients and constituents of herbal drugs (preparation, extraction and purification techniques, general and specific chemical reactions, chromatographic methods), quantitative evaluations (pharmacopoeial and standard methods) and isolation of individual components or selective determination by complex chromatographic and spectroscopic methods. Application of herbal drugs based on their positive effects in prevention, phytotherapy and improving quality of life.

Course data

Recommended term	Contact hours (lecture)	Contact hours (practice)	Contact hours (seminar)	Individual lectures	Total number of contact hours/semester	Normal course offer	Consultations
6th semester	28	56	-	-	84	Autumn semester* <u>Spring semester</u> Both semesters (* Please underline)	--

Program of semester**

Topics of theoretical classes (pro week):

Week 1: Introductory lecture, the concept and history of pharmacognosy. The place of the subject Herbal and Drug Knowledge in the curriculum. From herbal medicine to the production of herbal drugs, herbal medicines.
Historical overview.

Week 2: Cultivation and processing of medicinal plants. Biogenetic system of plant materials.

Week 3: Saccharides, carbohydrates.

Monosaccharides: Honey, and other bee products.

Oligosaccharides: cyclodextrins

Homopolysaccharides and their drugs: Glucans (starches, cellulose). Fructans: Taraxaci officinalis radix, Cichorii intybi radix, Graminis rhizoma, Arctii radix

Heteropolysaccharides and their drugs

Pectins, gums: Acaciae gummi, Tragacantha

Mucilages, plant fibers: Lichen islandicus, Althaeae radix, Althaeae folium, Malvae folium,

Malvae sylvestris flos, Lini semen, Verbasci flos, Trigonellae foenugraeci semen, Psyllii

semen, Plantaginis ovatae semen, Salviae hispanicae semen, Cyamopsidis seminis pulvis

Mushroom polysaccharides. Algae polysaccharides: alginates, agar, fucoidan, carrageenan

Week 4: Vegetable acids. Polyketides. Acid metabolism, acid drugs

Organic acids: Pulpa tamarindorum, Rosae pseudo-fructus, Hippophaeae fructus,

Malpighiae fructus, Hibisci sabdariffae flos

Inorganic acids: Urticae folium, Equiseti herba

Fatty oils: Biosynthesis, production, analysis, effects of fatty acids, triglycerides, waxes

Oils rich in saturated fatty acids: Theobromatis oleum, Gossypii oleum

Oleic acid-rich oils: Olivae oleum, Amygdalae oleum, Rapae oleum, Sesami oleum

Linoleic acid-rich oils: Helianthi annui oleum, Carthami oleum, Soiae oleum, Cucurbitae oleum

α -Linolenic acid-rich oils: Lini oleum

γ -Oils rich in linolenic acid: Boraginis oleum, Oenotherae oleum

Oils containing special fatty acids: Ricini oleum

Week 4: Classification of phenolics. Cinnamic acid derivatives.

Biosynthesis and grouping of phenolics.

Degraded cinnamic acid derivatives and their drugs

Phenolic glycosides: Uvae ursi folium

Salicylic glycosides: Salicis cortex, Filipendulae ulmariae herba

Benzoic and cinnamic acid esters: Benzoic drugs, Balsamum peruvianum

Caffeic acid derivatives and their drugs: Cynarae folium, Taraxaci officinalis herba cum

radice, Melissa folium, Rosmarini folium, Rhodiolae roseae rhizoma et radix, Echinacea drugs

Week 5: Coumarins

Formation, chemical structure and grouping of coumarins. Medicinal significance of coumarins, phototoxicity and other toxicity issues, aflatoxins.

Coumarins: Meliloti herba, Hippocastani cortex, Herniariae herba, Pelargonii radix, Fraxini folium

Furanocoumarins: Heracleum-species, Rutae herba, Aurantii amari epicarpium et mesocarpium, Angelicae radix, Ammi fructus,

Pyranocoumarins: Ammi visnagae fructus

Week 6: Lignans, sterylpyrions, diarylheptanoids, arylalcanones, stilbenoids

Lignans: Eleutherococci radix, Podophylli peltati rhizoma, Schisandrae chinensis fructus, Lini semen

Sterylpyrions: Piperis methystici rhizoma

Diarylheptanoids: Curcumae longae rhizoma, Curcumae xanthorrhizae rhizoma

Arylalkanones: Zingiberis rhizoma

Stilbenoidok: Vitis viniferae fructus, Vitis viniferae folium

Week 7: Flavonoids I

The formation, chemical structure and biological properties of flavonoids.

Flavanones: Aurantii amari epicarpium et mesocarpium, Lupuli flos

Flavone-C-glycosides: Crataegi folium flore, Passiflorae herba, Viola herba flore
Flavone and flavonol O-glycosides: Fagopyri herba, Sophorae japonicae flos, Ginkgonis folium, Betulae folium, Solidaginis herba, Tiliae flos, Sambuci flos

Week 8: Flavonoids II: additional structures

Chalcones: Carthami flos, Lupuli flos, Aspalathi linearis herba

Isoflavonoids: Ononidis radix, Liquiritiae radix, Glycini semen

Anthocyanins: Myrtilli fructus recens, Vitis viniferae fructus, Hibisci sabdariffae flos

Flavonolignans: Silybi mariani fructus

Week 9: Tannins

Biosynthesis, grouping, chemical structure, biological effect of tanning agents.

Hydrolysable tannins: Quercus cortex, Cotini folium, Alchemillae herba, Epilobii herba, Hamamelidis cortex, Rubi idaei folium

Proanthocyanidins: Agrimoniae herba, Tormentillae rhizoma, Ratanhiae radix,

Hamamelidis folium, Myrtilli fructus siccus, Camelliae sinensis non fermentata folia

Special proanthocyanidins: Crataegi folium flore, Crataegi fructus, Vaccinii macrocarpi fructus

Week 10: Naphthoquinones, anthraglycosides. Naphthodiantrons, terpenophenolics.

Biosynthesis, biological properties of plant quinones.

Pharmacological action of anthraglycosides and issues of their medicinal use.

Drugs containing naphthoquinones: Juglandis folium, Lawsoniae herba

Drugs containing anthraglycosides: Sennae foliolum, Sennae fructus, Frangulae cortex,

Rhei radix, Aloe drugs, Rhamni purshianae cortex

Naphthodiantrons: Hyperici herba

Phloroglucin derivatives: Lupuli flos

Cannabinoids: Cannabis herba

Week 11: Summary: preparation for the obligatory midterm

Week 12: Medicinal potential and toxicological significance of fungi.

Molds: aflatoxins, fusarium toxins. Mushrooms: killer agaric, panther agaric, wrinkled ink mushroom, psilocybin. Mushrooms as sources of medicinal ingredients, edible mushrooms.

Week 13: Midterm

Topics of practical classes (pro week):

1. week: Introduction, safety rules. Macroscopic and microscopic knowledge. European Pharmacopoeia.
2. week: General methods in Pharmacognosy
3. week: Instrumental phytoanalytics
4. week: Vegetable drugs containing carbohydrates (starches, mucilages, etc.).
5. week: Plant lipids and their drugs.
6. week: Plant acids and their drugs.
7. week: Phenolic glycosides, lignans, coumarins and diarylheptanoids.
8. week: Flavonoids and chief drugs I.
9. week: Flavonoids and chief drugs II.
10. week: Tannins and chief tannin drugs.
11. week: Anthraglycoside containing crude drugs I. Chemical tests, quantitative determinations.
12. week: Anthraglycoside containing crude drugs II. Quantitative determination of sennosides.
13. week: Terpenophenolics and phloroglucine derivatives.
14. week: Individual task I.: Natural product development. Natural product development.

Schedule of consultations: on demand
Course requirements
Prerequisites: Pharmaceutical botany
Conditions of attending the classes, amount of acceptable absents, way of presentation of leave, opportunity for makeup: Based on the current Study and Exam Regulation
The grading method; the conditions for getting the signature; the number, topic(s) and date(s) of the mid-term assessments, (reports, term tests), and the process in which they contribute to the final grade; and the possibility of their retake or their upgrading retake (as provided in §§ 25-28 of the STUDY AND EXAMINATION REGULATIONS):
<p>Number, topics and dates of tests during the semester, opportunities of makeup and improvement of results***:</p> <p>During the term: three written or oral midterms based on the material of the practices and the lectures. Test of the knowledge of herbal drugs: examination of unknown drug mixtures, identification of unknown drug powders, recognition of microscopic preparations.</p> <p>The first test takes place during the 7-8th week practice. The midterm consists of a theoretical and macromorphological examination part, including the studies carried out and described during the exercises in weeks 1-7, as well as the material of seminars. The grade obtained in this process will be counted with a single weight when determining the practical grade.</p> <p>The second midterm takes place during the 12-13th week practice, which consists of theoretical and macromorphological examinations. The report covers the theoretical and practical material of weeks 7-12. The grade obtained in this process will be counted with a single weight when determining the practical grade.</p> <p>At the 13-14th week lecture, an obligatory midterm will take place, the material of which covers the theoretical material of the semester. At least a sufficient (2) grade must be achieved on the test. The grade is counted with double weight when determining the practical grade.</p> <p>Midterm examinations may be replaced and corrected two times each. The results of the first test can be corrected during the two practices following the announcement of grades. We provide an opportunity to retake the obligatory midterm in an out-of-class time in week 14. No retake can be done after the first week of the examination period.</p> <p>Short quizzes can be completed from the material submitted at the lectures on the given day. For students who score at least 80% of the total points, the score of their obligatory midterm will be increased by 5% of the midterm points.</p>
<p>Requirements of signature (as provided for in STUDY AND EXAMINATION REGULATIONS § 29):</p> <p>Participation at the practices based on the current study and examination regulation. Submission and acceptance of reports. Attendance on every midterms during the semester. The average of midterm test at least 2.0. Passing the obligatory midterm.</p>
<p>Number and type of projects students have to perform independently during the semester and their deadlines: Preparation of a presentation in a chosen topic, performed at weeks 8-14.</p>
<p>Type of the semester-end examination: signature*/<u>practical grade</u>*/semi-final*/final* (<i>Please underline</i>)</p> <p>Examination requirements: -</p>
<p>Form of the semester-end examination: written*/oral*/combined examination/<u>practical examination/the assessment of completing project work (according to STUDY AND EXAMINATION REGULATIONS 30.§)</u>* (<i>Please underline</i>)</p>
<p>The possibility and conditions for offering grades: -</p>

A list of the basic notes, textbooks, resources and literature that can be used to acquire the knowledge necessary to master the curriculum and to complete the assessments, with exact description about which of them is required to acquire which part of the syllabus (e.g. description based on topics)), as well as the main technical and other aids and study aids that can be used:

Materials of the lectures: uploaded continuously to the Moodle system

Drugs to recognize:

- Carbohydrates: Acaciae gummi, Althaeae folium, Althaeae radix, Graminis rhizoma, Lini semen, Malvae folium, Malvae sylvestris flos, Psyllii semen, Salviae hispanicae semen, Taraxaci radix, Tiliae flos, Tragacantha, Verbasci flos
- Plant lipids: Cucurbitae semen, Lini semen, Ricini semen, Sesami semen, Helianthi annui semen
- Plant acids: Rosmarini folium, Rosae pseudo-fructus, Hippophae fructus, Hibisci sabdariffae flos, Equiseti herba, Pulmonariae folium, Echinaceae purpureae herba
- Phenolglycosides, coumarins, lignans, diarylheptanoids: Curcumae longae rhizoma, Meliloti herba, Schisandrae chinensis fructus, Uvae ursi folium
- Flavonoids: Betulae folium, Crataegi folium cum flore, Ginkgonis folium, Hyperici herba, Sambuci flos, Silybi mariani fructus, Ononidis radix, Tiliae flos, Aurantii amari epicarpium et mesocarpium, Solidaginis herba
- Tannins: Cotini folium, Quercus cortex, Vaccinii macrocarpi fructus, Galla, Alchemillae herba, Agrimoniae herba, Ratanhiae radix
- Anthraglycosids: Frangulae cortex, Rhamni purshianae cortex, Rhei radix, Sennae foliolum, Sennae fructus, Aloe capensis

List of structures:

- Carbohydrates: D-glucose, D-fructose, D-arabinose, sucrose, D-xylitol (xylitol)
- Lipids: palmitic acid, stearic acid, oleic acid, linoleic acid, ricinoleic acid, α -linolenic acid, γ -linolenic acid, β -sitosterol
- Vegetable acids: citric acid, malic acid, oxalic acid, tartaric acid, ascorbic acid
- Caffeic acid derivatives: rosmarinic acid, chlorogenic acid, cynarine, echinacoside
- Lignans: schizandrin A, arctiin, pinoresinol, sesamin
- coumarins: umbelliferon, bergaptene, xanthotoxin
- Diarylheptanoids: curkumin
- Phenolic glycosides: arbutin
- Flavonoids: apigenin, quercetin, hesperidin, bilobetin, rutin, hyperoside, vitexin
- Flavonoids with a special structure: xanthohumol, genistein, cyanidine, silybin
- Tannins: gallic acid, ellagic acid, catechin, dimer procyanidin (type B1), 1,2,3,4,6-penta-O-galloylglucose
- Anthraglycosides, naphthodianthrone: aloe-emodin, frangula-emodin, rhein, sennoside A and B, frangulin A and B, hypericin
- Terpenophenolics: Δ^9 -tetrahydrocannabinol (Δ^9 -THC), cannabidiol (CBD), humulone, lupulone

In the case of a subject lasting more than one semester, the position of the teaching/research department on the possibility of parallel enrolment and the conditions for admission**:**

yes*/no*/on and individual assessment basis* (*Please underline*)

The course description was prepared by: Dr. Nóra Gampe

**** A tantárgy tematikáját oly módon kell meghatározni, hogy az lehetővé tegye más intézményben a kreditismerési döntéshozatalt, tartalmazza a megszerzendő ismeretek, elsajátítandó alkalmazási (rész)kézszségek, (rész)kompetenciák és attitűdök leírását, reflektálva a szak képzési és kimeneti követelményeire.**