**Calendar and thematic plan**

*of out-classes works of* “**Pharmaceutical chemistry”**

*for the 4-th Year* *students of the Faculty of Pharmacy*

(autumn (VII) semester of 2012/2013 year)

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| --- | --- | --- |
| **№ п/п** | **Topics** | **Hours** |
| **1** | Synthesis of drugs and analysis of quality. Synthesis of salicylamide, phtivazide, nifedipine | **2** |
| **2** | Synthesis of drugs and analysis of quality. Synthesis of acetyl salicylic acid, dibazole, nitrofural | **2** |
| **3** | Sugars as a drug (glucose anhydrous, lactose monohydrate). Synthesis, quality ananalysis, assay, storage, usage. | **3** |
| **4** | Cardiac glycosides as drugs (digoxin, dyhitokxin, strophanthin K). Synthesis, quality ananalysis, assay, storage, usage. | **3** |
| **5** | Antibiotics-glycosides as drugs (streptomycin, kanamycin monosulfat, gentamicin sulfate). Synthesis/purification , properties, identification, assay, application. | **2** |
| **6** | Androgens, antiandrogens, anticancer agent, anabolic steroids (testosterone propionate, testenate methyltestosterone, medrotestrone propionate, cyproterone acetate, flutamid, phenobolin, retabolil, sylabolin) Synthesis, quality ananalysis, assay, storage, usage. Structure-activity relationship | **3** |
| **7** | Female sex hormones and contraceptives of steroid structure (estrone, ethinyl estradiol, estratsyt, sinestrol, dietylstylbestrol, hlortrianizen, fosfestrol) Synthesis, quality ananalysis, assay, storage, usage. Structure-activity relationship | **3** |
| **8** | Corticosteroids as drugs. Structure-activity relationship Synthesis, quality ananalysis, assay, storage, usage. Corticosteroids with Fluor in molecules | **3** |
| **9** | Derivatives of thiofen and furan as drugs – chemical characteristics, analysis and usage. Structure-activity relationship | **3** |
| **10** | Derivatives of furan, benzofuran, pyrane as drugs – chemical characteristics, analysis and use. Structure-activity relationship | **2** |
| **11** | Derivatives of benzopyrane as drugs – chemical characteristics, analysis and usafe. Structure-activity relationship | **2** |
| **12** | Chemistry of antibiotics: β-lactamides (penicillin’s, 1-4 generations, mono-lactames) | **3** |
| **13** | Chemistry of antibiotics: β-lactamides cephalosporin’s, mono-lactames) | **3** |
| **14** | Derivatives of phenothiazine as drugs – chemical characteristics, analysis and use | **3** |
| **15** | Drugs which belong to the phenothiazine derivatives with Fluor in the molecules.  1,2-benzothiazine and 1,2,4-benzothiadiazine derivatives (trifluoperazine hydrochloride fluphenazine hydrochloride and decanoate, Fluacizine) | **3** |
| **16** | Pyrrolidine derivatives as nootropic (piracetam), detoxification (piracetam, Povidone, povidone-iodine, gemodez, Neogemodez, enterodez) and antihistamines (Clemastine) agents | **3** |
| **17** | Drugs belong to vitamin B12 group (cyanocobalamin, oksycobalamin, cobamid) | **3** |
| **18** | Pyrrolidine derivatives as cardiovascular drugs (captopril, enalapril, prestarium, lisinopril) | **6** |
| total | | **52** |

**Calendar and thematic plan**

*of laboratory works of* “**Pharmaceutical chemistry ”**

*for the 4-th Year* *students of the Faculty of Pharmacy*

(autumn semester of 2012/2013 educational year)

|  |  |  |  |
| --- | --- | --- | --- |
| № | Theme | Hours. | Date |
| 1,2 | Synthesis of drugs:  а) synthesis and analysis of acetylsalicylic acid;  b) synthesis and analysis of phtivazide;  c) synthesis and analysis of nifedipine;  d) synthesis and analysis of salicylamide | 3  3 | 06.09  13.09 |
| 3 | Sugars as a drugs (glucose anhydrous, lactose monohydrate). | 3 | 20.09 |
| 4 | Cardiac glycosides as drugs (digoxin, dyhitokxin, strophanthin K). | 3 | 27.09 |
| 5 | Antibiotics-glycosides as a drugs (streptomycin, kanamycin monosulfat, gentamicin sulfate) | 3 | 04.10 |
| 6 | Androgens, antiandrogens, anticancer agent, anabolic steroids (testosterone propionate, testenate methyltestosterone, medrotestrone propionate, cyproterone acetate, flutamid, phenobolin, retabolil, sylabolin) | 3 | 11.10 |
| 7 | Female sex hormones and contraceptives of steroid structure (estrone, ethinyl estradiol, estratsyt, sinestrol, dietylstylbestrol, hlortrianizen, fosfestrol) | 3 | 18.10 |
| 8 | Analysis of corticosteroids. Identification, assay of cortisone acetate, prednisone, Dexamethasone. | 3 | 25.10 |
| 9 | Analysis of heterocyclic compounds: Identification, determination of purity and assay of 5-nitrofurane derivatives as antimicrobials (furaciline (nitrofural), Furazolidone. Nitrofurazone etc) | 3 | 01.11 |
| 10 | Analysis of heterocyclic compounds:  Identification, determination of purity and assay of furane derivatives (furasemide, **Amiodarone, Benzobromarone etc)** | 3 | 08.11 |
| 11 | Benzopyrane derivatives as a drugs (rutin, quercetin, Troxevasin, tokoferylatsetat) | 3 | 15.11 |
| 12 | Analysis of natural and semisynthetic penicillines. Identification and quantitative analysis of benzylpenicilline or phenoxymethylpenicilline. | 3 | 22.11 |
| 13 | Analysis of cephalosporines. Identification and quantitative analysis of (Cefalexin, Cefaloridinum, Cefazolin) | 3 | 29.11 |
| 14 | Identification and quantitative analysis of phenotiazines (chlorpromazine hydrochloride). | 3 | 06.12 |
| 15 | Phenothiazine derivatives with Fluor in molecules; 1,2-benzothiazine and 1,2,4-benzothiadiazine derivatives (trifluoperazine hydrochloride fluphenazine hydrochloride and decanoate, Fluacizine) | 3 | 13.12 |
| 16 | Pyrrolidine derivatives as nootropic (piracetam), detoxification (piracetam, Povidone, povidone-iodine, gemodez, Neogemodez, enterodez) and antihistamines (Clemastine) agents | 3 | 20.12 |
| 17 | Drugs belong to vitamin B12 group (cyanocobalamin, oksycobalamin, cobamid) | 3 | 27.12 |
| 18 | Pyrrolidine derivatives as cardiovascular drugs (captopril, enalapril, prestarium, lisinopril) | 3 | 10.01 |
| 19 | Experimental work. Practical skills | 3 | 17.01 |
| 20 | Final control of Module 4 | 3 | 24.01 |
| Total | | 60 | 52 |

**Calendar and thematic plan**

*of lectures of* “**Pharmaceutical chemistry ”** *for the 4-th Year* *students*

*of the Faculty of Pharmacy*

(autumn semester of 2012/2013 educational year)

|  |  |  |  |
| --- | --- | --- | --- |
| № | Theme | Hours | Date |
| 1 | Synthesis and analysis of drugs. Sugars as a drugs (glucose, lactose monohydrate). Methods of synthesis, properties, analysis, usage. Drugs which belong to glycosides. Features of the chemical structure. Cardiac glycosides as cardiotonic drugs (digoxin, dyhitoksyn, strophanthin K). (properties, analysis, usage). Antibiotics-glycosides (streptomycin sulfate) and aminoglycosides antibiotics, (kanamycin monosulfate, gentamicin sulfate). – properties, quality requirements, usage. | 2 | 10.09 |
| 2 | The classification of steroid hormones, action and role. Sex hormones. Androgens and their semisynthetic derivatives with prolonged action. Anabolic steroids. Anticancer drugs. Antiandrogens. Structure activity relationship. | 2 | 24.09 |
| 3 | Estrogens and their semisynthetic derivatives. Anticancer drugs. Derivatives of phenol as nonsteroidal estrogens. Antiestrogens. Structure activity relationship. Gestagens and their synthetic derivatives. Oral contraceptives. Anticancer agents. Corticosteroids and methods of their synthesis. Mineralocortecosteroids. Glucocorticosteroids, which contain fluorine atom in molecules. Glucocorticosteroids with fluorine and chlorine atoms in molecules | 2 | 08.10 |
| 4 | Heterocyclic compounds as a drugs; chemical classification. Heterocyclic compounds with oxygen in molecules. Derivatives of furan as antimicrobial agents. Derivatives of pyran, coumarin, furocoumarin, vitamins E and P. Thiazolydine derivatives. | 2 | 22.10 |
| 5 | Penicillines. General characteristics, history. Chemical structure, stability of β-lactame cycle. General scheme of inactivation of penicilines. Natural penicillines and their salts Semisynthetic penicillines. Derivatives of 1,3-thiazine. Cephalosporines. Natural cephalosporines. Synthesis of 7-ACA, 7-ADCA and semisynthetic cephalosporines. | 2 | 05.11 |
| 6 | Derivatives of phenothiazine without fluorine atoms in molecules.  Cardiovascular agents. Neuroleptic activity of phenthiazines with fluorine atoms in molecules. Derivatives of 1,2-benzothiazine | 2 | 19.11 |
| 7 | Pyrrole. derivatives - Nootropic (nootropil), detoxification (Povidone, povidone-iodine, gemodez, Neogemodez, enterodez) agents.  Cyanocobalamin and its analogues – oksycobalamin cobamamide - vitamins and metabolites. Cardiovascular (captopril, enalapril, prestarium, lisinopril) and antihistamines (tavegil) agents | 2 | 03.12 |

SCHEDULE OF lectures

**ON INDUSTRIAL TECHNOLOGY OF DRUGS**

*for the 4th year students of the Pharmaceutical Faculty*

*VII semester*

|  |  |  |
| --- | --- | --- |
| **№** | Topic | Duration |
|  | Common principles of pharmaceutical manufacturing. Normative and technical documentation. | 2 |
|  | Solid preparations. Powders. Species. Granules. Characteristics. Classification. Manufacturing process. Quality control | 2 |
|  | Tablets. Characteristics. Classification. Theoretical foundations of tableting. Manufacturing methods. Quality control | 2 |
|  | Manufacturing of coated tablets. Dragee. Microdragee | 2 |
|  | Capsules. Microcapsules. Characteristics. Classification. Manufacturing methods. Quality control. Solid therapeutic systems | 2 |
|  | Liquid preparations. Characteristics. Classification. Manufacturing methods of solutions. Quality control | 2 |
|  | Heterogeneous liquid preparations. Emulsions and suspensions. Characteristics. Classification. Manufacturing methods. Quality control | 2 |
|  | Semi-solid preparations for cutaneous application. Classification. Manufacturing process. Quality control | 2 |
|  | Preparations for rectal and vaginal application. Classification. Characteristics. Manufacturing process. Quality control | 2 |
|  | Plasters. Classification. Manufacturing process. Quality control | 2 |
| **Total** | | 20 |

SCHEDULE OF PRACTICAL CLASSES

**ON INDUSTRIAL TECHNOLOGY OF DRUGS**

*for the 4th year students of the Pharmaceutical Faculty*

*VII semester*

|  |  |  |
| --- | --- | --- |
| **№** | Topic | Duration |
|  | Grinding. Sifting. Material balance. Investigation of physicochemical and technological properties of powders and granules. Powder production. Quality control | 4 |
|  | Manufacturing of tablets by direct compression and by compression with previous granulation | 4 |
|  | Manufacturing of coated tablets and molded tablets. Quality control | 4 |
|  | Manufacturing of capsules and microcapsules. Quality control | 4 |
|  | Manufacturing of granules and dragee. Quality control | 4 |
|  | Manufacturing of aqueous solutions under industrial conditions | 4 |
|  | Manufacturing of syrups and aromatic waters. Quality control | 4 |
|  | Alcoholometry. Determination of ethanol concentration. Strengthening and dilution of alcohol aqueous solutions. Recovery and rectification of ethanol. Manufacturing of alcohol solutions. Quality control | 4 |
|  | Manufacturing of semi-solid preparations. Quality control | 4 |
|  | Final module control | 4 |
| **Total** | | **40** |

QUESTIONS FOR SELF-TRAINING

ON INDUSTRIAL TECHNOLOGY OF DRUGS

*for the 4th year students of the Pharmaceutical Faculty*

*VII semester*

|  |  |  |
| --- | --- | --- |
| **№** | **Topic** | **Duration** |
|  | Drug technology as an academic and scientific discipline.Historical aspects of its development | 2 |
|  | Active pharmaceutical ingredients and excipients used in drug technology | 5 |
|  | Characteristics of basic manufacturing processes, pharmaceutical equipment. Basic concepts of machines and apparatus, automatic lines | 5 |
|  | Containers and sealing material for solid preparations | 5 |
|  | Containers and sealing material for liquid preparations | 5 |
|  | Quality control of medicinal products. State regulation on quality assurance and certification of medicinal products | 5 |
|  | New trends in solid dosage forms production | 6 |
|  | Nasal preparations. Classification. Characteristics. European Pharmacopoeia requirements | 6 |
|  | Ear preparations. Classification. Characteristics. European Pharmacopoeia requirements | 6 |
| TOTAL | | **48** |

   