**COURSE SPECIFICATIONS**

**(CS)**

**Basics of Natural Products**

**(PHG 220)**

**Course Specifications**

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| Institution: **King Saud University** | Date: **26/2/2019 (21/6/1440)** |
| College/Department : **College of Pharmacy/ Pharmacognosy Department** | |

**A. Course Identification and General Information**

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| 1. Course title and code: **Basics of Natural Products (PHG 220)** |
| 2. Credit hours: **3+ 0** |
| 3. Program(s) in which the course is offered.  (If general elective available in many programs indicate this rather than list programs)  **Doctor of Pharmacy (Pharm D)** |
| 4. Name of faculty member responsible for the course  **Ramzi A. Mothana (Co-Ordinator and instructor), Ali El-Gamal (Instructor)**  **Taghreed Ibrahim (Instructor), Ibtesam Al-Sheddi (Instructor), Hanan Alyousef (Instructor), Hanan Alaati (Instructor).** |
| 5. Level/year at which this course is offered: **4th level** |
| 6. Pre-requisites for this course (if any): **PHC 211** |
| 7. Co-requisites for this course (if any): **None** |
| 8. Location if not on main campus: |
| 9. Mode of Instruction (mark all that apply):  **100%**  a. traditional classroom What percentage?  b. blended (traditional and online) What percentage?  c. e-learning What percentage?  d. correspondence What percentage?  f. other What percentage?  Comments: |

**B Objectives**

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| 1. What is the main purpose for this course?  “Basics of Natural Products” course is designed to provide Pharm D students with the required knowledge about drugs derived from natural sources including plants, animals and marine sources. Discuss information regarding macroscopical and microscopical identification of drugs, and handling of crude drugs from farm to industrialization. Moreover, a comprehensive learning of biological, physical, chemical and pharmacological characters of several classes of natural products including carbohydrates, polyphenolics, lipids, alkaloids, glycosides and volatile oils. In addition to assisting students to be capable of identification, comprehension, detection, comparison and prediction of different classes of natural products. |

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| 2. Briefly describe any plans for developing and improving the course that are being implemented. (e.g. increased use of IT or web based reference material, changes in content as a result of new research in the field)  Using blackboard for improving course delivery  Continuous updating of course content revealing to electronic data bases, recent trends in natural products, drug discovery and pharmaceutical products newly introduced to drug market. |

**C. Course Description** (Note: General description in the form used in Bulletin or handbook)

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| Course Description:  The course is designed to provide the pharmacy student the basic knowledge needed to learn about clinically used drugs that are derived from natural sources. In this course, the student will study: importance of natural products, pharmacognostical characters of medicinal plants. Production of natural products-derived drugs including collection, preparation, storage, uses either in crude form or extracts and their identification will be also discussed. The course will introduce the students to the different biogenetic pathways of secondary metabolites formation and their classification. The course will give an idea to the students regarding the biological sources, chemical constituents of medicinal plants as well as from other natural sources such as marine organisms. In addition, the course will discuss and address the variability in occurrence of pharmacologically active substances in plants and their impact on efficacy and toxicity. |

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| 1. Topics to be Covered | | | | | | | | | |
| List of Topics | | | | | | No. of  Weeks | | Contact hours | |
| **Introduction to pharmacognosy:**  Definitions to drugs, origins, pharmacopoeia, importance of natural products | | | | | | **1/3** | | **1** | |
| **Botanical identification:**  Morphology of different plant organs, Histology of plant tissues | | | | | | **2** | | **6** | |
| **Preparation of Medicinal Plants:**  Factors affecting collection of medicinal plants, drying, grinding, Preservation of medicinal plants; stabilization, fermentation, Extraction of active constituents | | | | | | **2** | | **6** | |
| **Plant Metabolites:**  Classification of plant metabolites and their biogenetic pathways | | | | | | **1** | | **3** | |
| **Tannins:**  Definition, classification, different types, chemistry, qualitative and quantitative determination, Tannins-containing medicinal drugs e.g. Galls, Pomegranate and Hammalis. | | | | | | **1/3** | | **1** | |
| **Lipids:**  **chemistry of oils, fats and waxes** | | | | | | **1/3** | | **1** | |
| **Essential oil:**  Chemistry, Classification, preparation, Drugs containing essential oils: clove, chamomile, cinnamon, cassia, cardamom, ginger, anise, mentha. | | | | | | **1** | | **3** | |
| **Carbohydrates:**  Chemical characters of different classes of carbohydrate-containing plants and their biological significance. | | | | | | **1** | | **3** | |
| **Plants containing Alkaloids (botanical and chemical characters):**  Introduction, Classification, Examples of medicinally important Alkaloids and their importance as a “Lead Compounds” from the following groups:  Phenylalkylamine, Tropolone and Imidazole alkaloids, Pyridine and piperidine, Tropane Alkaloids, Quinoline and isoquinoline Alkaloids, Opium Alkaloids, Indole Alkaloids, Carboline & Purine. | | | | | | **2** | | **6** | |
| **Plants containing Glycosides:**  Introduction, Classification, Examples of medicinally important Glycosides and their importance as a “Lead Compounds” from the following groups:  Phenolic, Cyanogenic and thioglycosides, Coumarin, Flavonoidal glycosides and related compounds, Anthracene derivatives, Cardiac glycosides, Saponins glycosides | | | | | | **1 2/3** | | **5** | |
| **Marine and Animal Drugs**  Introduction, Biologically active substances from marine sources | | | | | | **1/3** | | **1** | |
| **Animal drugs:**  cantharides, cochineal, ambergris, musk, bees wax, gelatin, royal jelly, surgical sutures. | | | | | | **1/3** | | **1** | |
| **Unorganized drugs:**  Examples on each of the different classes of unorganized drugs;  Resins and resin combinations, Gums, Dried lattices, Dried juices, Dried extracts. | | | | | | **2/3** | | **2** | |
| **Toxicological Pharmacognosy:**  Introduction, Poisonous plants | | | | | | **1** | | **3** | |
| 2. Course components (total contact hours and credits per semester): | | | | | | | | | |
|  | | Lecture | Tutorial | Laboratory/  Studio | Practical | | Other | | Total |
| Contact  Hours | Planed | 42 (3x 14 weeks) | 0 | 0 | 0 | | 0 | | 42 |
| Actual | 42 (3x 14 weeks) | 0 | 0 | 0 | | 0 | | 42 |
| Credit | Planed | 3+ 0 | 0 | 0 | 0 | | 0 | | 3 |
| Actual | 3+ 0 | 0 | 0 | 0 | | 0 | | 3 |

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| 3. Additional private study/learning hours expected for students per week.  **3 hr**  **3 hours per week (homework, quizzes and other assignments)** |

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| 4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategy | | | |
| **On the table below are the five NQF Learning Domains, numbered in the left column.**  **First**, insert the suitable and measurable course learning outcomes required in the appropriate learning domains (see suggestions below the table). **Second**, insert supporting teaching strategies that fit and align with the assessment methods and intended learning outcomes. **Third**, insert appropriate assessment methods that accurately measure and evaluate the learning outcome. Each course learning outcomes, assessment method, and teaching strategy ought to reasonably fit and flow together as an integrated learning and teaching process. (Courses are not required to include learning outcomes from each domain.) | | | |
| **Code**  **#** | **NQF Learning Domains**  **And Course Learning Outcomes** | **Course Teaching**  **Strategies** | **Course Assessment**  **Methods** |
| **1.0** | **Knowledge**  **By the end of the course, the student should be able to:** | | |
| 1.1 | Demonstrate knowledge about screening of natural products, biological, chemical and pharmacological characters of secondary plant metabolites, structure activity relationship and handling of crude drugs | Interactive lecture (multimedia enriched slides)  Group discussion | Quiz  Midterm and final exam (complete, MCQ, matching, definitions)  Homework (HW) assignment |
| 1.2 | Describe different classes of medicinal natural products to assure the quality of natural pharmaceutical products. | Interactive lecture (multimedia enriched slides)  Group discussion | Quiz  Midterm and final exam (complete, MCQ, matching, definitions)  HW assignment |
| 1.3 | Indicate the basic principles of toxic effect of poisonous plants and their antidotes | Interactive lecture (multimedia enriched slides)  Group discussion | Quiz  Midterm and final exam (complete, MCQ, matching, definitions)  HW assignment |
| **2.0** | **Cognitive Skills**  **By the end of the course, the student should be able to:** | | |
| 2.1 | Evaluate, microscopically and chemically the medicinal plants especially those growing in the Kingdome of Saudi Arabia. | * Lectures. * Self-directed learning * Field visits | * Quiz, * HW assignment (Problem solving and case study)   Midterm and final exam (complete, MCQ, matching, definitions) |
| 2.2 | Estimate the suitable medicinal uses of particular drugs. | Lecture  Group discussion | - Written exams (Mid and final exams.)  -HW (Problem solving and case study) assignments |
| 2.3 | Design a scheme for identification and isolation of natural products from their natural sources | Lecture  Group discussion | Written exams (Mid and final exams.)  HW (Problem solving and case study) assignments |
| **3.0** | **Interpersonal Skills & Responsibility**  **By the end of the course, the student should be able to:** | | |
| 3.1 | Work effectively both individually and in teams in classroom. | * Problem solving * Case study. * Group discussion. * Team project | * Individual performance within a group. * Performance evaluation in the problem-solving assignments |
| **4.0** | **Communication, Information Technology, Numerical**  **By the end of the course, the student should be able to:** | | |
| 4.1 | Communicate effectively either verbal or written. | * Team project * Group Discussion | * Written reports * Oral presentations. |
| 4.2 | Use information technology and different scientific sites and periodicals | Computer-based project | Data analysis evaluation |
| **5.0** | **Psychomotor** | | |
|  | Not applicable |  |  |

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| 5. Schedule of Assessment Tasks for Students During the Semester | | | |
|  | Assessment task (i.e., essay, test, quizzes, group project, examination, speech, oral presentation, etc.) | Week Due | Proportion of Total Assessment |
| 1 | Midterm Exam I | Week 7 | 20% |
| 2 | Midterm Exam II | Week 14 | 20% |
| 3 | Final Exam | Week 16 | 40% |
| 4 | Activities including Quizzes, presentation, group discussion, home work | Biweekly | 20% |

**D. Student Academic Counseling and Support**

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| 1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice. (include amount of time teaching staff are expected to be available each week)  Office hours = 6 hours / week, for each course instructor  Contact through e-mails, LMS and WhatsApp |

**E Learning Resources**

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| 1. List Required Textbooks  1- Varro Tyler, Lynn Braddy and James Robbers: Pharmacognosy., Lea & Febiger (2011).  2- علم العقاقير: ترجمة منصور السعيد وزملائه-2003-المركز العربي للتعريب والترجمة و النشر-دمشق  3- النباتات السامة في السعودية: د.جابر القحطاني و زملائه-2005-مجموعة هاي لوك الاعلامية |
| 2. List Essential References Materials (Journals, Reports, etc.)  1- Nobuhiro Fusetani: Drugs from the sea. September 2011 S Karger Pub.  2- Varro Tyler, Lynn Braddy and James Robbers: Pharmacognosy., Lea & Febiger (2011) |
| 3. List Electronic Materials, Web Sites, Facebook, Twitter, etc. 1- Journal of Ethnopharmacology2- Phytotherapy Research 3- Phytochemistry |
| 4. Other learning material such as computer-based programs/CD, professional standards or regulations and software.  <https://www.ncbi.nlm.nih.gov/pubmed/>  <http://scholar.google.com/>  <http://www.worldcat.org/>   * Power point presentations and other handouts posted on the WebCT for the students enrolled in the course. |

**F. Facilities Required**

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| Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access, etc.) |
| 1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)  A classroom |
| 2. Technology resources (AV, data show, Smart Board, software, etc.)  Podium, data show, Smart Board, Smart Class. |
| 3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list)  - |

**G Course Evaluation and Improvement Processes**

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| 1. Strategies for Obtaining Student Feedback on Effectiveness of Teaching   * Course evaluation survey by students. |
| 2. Other Strategies for Evaluation of Teaching by the Instructor or by the Department   * Course report by instructors * Departmental council discussions. * Discussions with the group of faculty teaching the course. |
| 3. Processes for Improvement of Teaching   * Conducting workshops presented by experts on the teaching methodologies. * Periodical departmental revisions on the methods of teaching. * Peer reviewing |
| 4. Processes for Verifying Standards of Student Achievement (e.g. check marking by an independent member teaching staff of a sample of student work, periodic exchange and remarking of tests or a sample of assignments with staff at another institution)   * Assigning group of faculty members teaching the same course to grade same questions for various students. * Faculty from other institutions are invited to review the accuracy of the grading policy. * Conducting standard exams such as the American Society of Pharmacognosy exams or others. * Revising direct and indirect results of assessment by assessment committee. |
| 5. Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement.   * The course material and learning outcome are periodically reviewed and the changes to be taken by the departmental council. * The chairman of the department and faculty members take the responsibility. * Revision of the course by the curriculum committee |

Name of Course Instructor: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Signature: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date Specification Completed: \_\_\_\_\_\_\_\_\_\_\_\_

Program Coordinator: Dr. Mansour Almetwazi

Signature:  Date Received: March 15, 2019