Integrated Organ-System Course 2: Hematology and Oncology (HONC)

Course Content:
The Hematology and Oncology course will provide an integrated approach to hematology and neoplasia. Students will acquire a broad understanding of the normal structure and function of blood and the lymphoreticular system. A comprehensive overview of pathophysiology, epidemiology, biostatistics, diagnostic tests, and therapeutic principles related to disorders of the hematologic system will be covered. Students will also have exposure to foundational concepts of cancer biology, epidemiology, and anti-neoplastic therapies.

Content Distribution:
Week 1: Erythrocytes
Week 2: Transfusion and hemostasis
Week 3: Neoplasia
Week 4: Malignant hematology

Course Objectives:

- Describe the essential features of the hematologic system, its normal structure and function, and the epidemiology, clinical features, pathogenesis, pathophysiology, and laboratory findings associated with benign and malignant hematologic diseases.
- Describe the essential features of cancer, including its molecular basis, classification, staging, and the basic types of anti-neoplastic therapies.
- Identify appropriate therapeutic options for selected hematologic diseases.
- Describe how epidemiologic, socioeconomic, behavioral, sociocultural, and community factors may impact the care of patients with hematologic diseases.
- Describe how wellness, nutrition, hospitality principles, pain management, and integrative medicine may contribute to the care of patients with hematologic diseases.
- Recognize bioethical issues germane to the medical care of patients with hematologic diseases.
- Recognize end-of-life issues germane to patients with cancer and non-malignant hematologic diseases.
- Construct a differential diagnosis based on the clinical presentation of a patient with a hematologic disease and apply diagnostic reasoning to narrow the differential.
- Develop pertinent clinical questions related to the diagnosis and/or treatment of hematologic diseases, and utilize appropriate resources to answer those questions in a self-directed fashion.

PBL Objectives:

- Demonstrate self-directed learning through the assessment of personal educational needs, the appropriate selection and use of learning resources, the acquisition, integration, and application of knowledge, and the assessment of educational progress.
- Demonstrate the interaction skills and discussion skills used in learning, educating, research, patient care, and advocacy.
- Demonstrate clinical reasoning to develop and refine differential diagnoses.
- Identify and use data and resources to formulate diagnostic assessments and treatment plans.

- Identify and use data and resources to formulate an integrated medical knowledge base.
- Demonstrate the integration of individual and social health processes that contribute to the complete picture of wellness and illness in patients.
- Analyze, interpret, and apply new data and knowledge relevant to clinical problems.

Weekly Objectives:

Week 1 – Erythrocytes

- Describe the normal anatomy and embryology of the hematopoietic and lymphoid tissues.
- Recognize the salient histologic features of blood and describe its cellular and acellular components.
- Illustrate the key features of normal hematopoiesis, including essential regulatory mechanisms.
- Describe the major structural and biochemical features of red cells.
- Illustrate the formation of normal hemoglobin at varying points in the life cycle, including iron metabolism and heme synthesis.
- Describe the role of hemoglobin in transporting oxygen and carbon dioxide, including factors that modify this transport.
- Describe the clinical features, pathogenesis, and diagnostic findings associated with selected types of congenital anemia, including sickle cell disease, thalassemia, and hereditary spherocytosis.
- Describe the clinical presentation, pathogenesis, and laboratory findings associated with selected types of acquired anemia, including immune-mediated hemolysis and anemia of chronic disease.
- Describe the epidemiology of selected red cell disorders.
- Recognize the major therapeutic modalities for treating disorders of the red cell, including the uses, contraindications, side effects, and major drug-drug interactions associated with various pharmacologic interventions.

Week 2 – Transfusion and hemostasis

- Recognize the major blood group antigens and describe their significance in assessing compatibility for blood transfusion.
- Recognize the major indications and significant potential complications associated with blood transfusion.
- Illustrate the normal steps in thrombopoiesis and describe its regulation.
- Describe the major features of the coagulation system, including the synthesis, localization, and actions of each component.
- Describe the process of clot formation and dissolution, including the roles of clotting factors, platelets, and the fibrinolytic proteins.
- Describe clinical features, pathogenesis, and diagnostic findings associated with selected bleeding disorders, including coagulopathies, von Willebrand disease (vWD), thrombotic thrombocytopenic purpura (TTP), and immune thrombocytopenic purpura (ITP).
- Describe the epidemiology of selected disorders of hemostasis.
- Recognize the major therapeutic modalities for treating disorders of hemostasis, including the uses, contraindications, side effects, and major drug-drug interactions associated with various pharmacologic interventions.

Week 3 – Neoplasia

- Describe the basic classification of, and terminology associated with, benign and malignant neoplasms.
- Recognize the salient histologic features that characterize benign and malignant neoplasms.
- Define and contrast grade and stage.
- Define oncogene, tumor suppressor, and describe the basic molecular mechanisms that culminate in neoplastic transformation.
- Recognize the basic mechanisms by which increased susceptibility to certain cancers may be inherited.
- Recognize the salient molecular and pathologic features of tumor invasion and metastasis.
- Recognize significant paraneoplastic manifestations of cancer.
- Describe the major features of selected antineoplastic agents, organized by their respective mechanisms of action.
- Describe the epidemiology of cancer globally and in the United States.
- Recognize the major therapeutic modalities for treating cancer, including the uses, contraindications, side effects, and major drug-drug interactions associated with various pharmacologic interventions.

Week 4 – Malignant hematology

- Describe the basic classification of hematologic neoplasms by cell of origin.
- Contrast acute versus chronic hematologic neoplasms.
- Describe the clinical features, pathogenesis, and diagnostic findings associated with selected neoplasms of lymphoid origin.
- Describe the clinical features, pathogenesis, and diagnostic findings associated with selected neoplasms and preneoplastic lesions of myeloid origin, including myeloid leukemia, myelodysplastic syndrome (MDS), and myeloproliferative neoplasms (MPNs).
- Describe the clinical features, pathogenesis, and diagnostic findings associated with plasma cell disorders, including myeloma, monoclonal gammopathy of undetermined significance (MGUS), and plasma cell-derived amyloidosis.
- Describe the epidemiology of selected hematologic malignancies.
- Recognize the major therapeutic modalities for treating cancer, including the uses, contraindications, side effects, and major drug-drug interactions associated with various pharmacologic interventions.

<u>Assessment & Grading:</u>

Students will take three summative National Board of Medical Examiners (NBME) exams that use USMLE-style questions. They will also receive formative and summative assessments for small group activities (e.g. PBL), and complete several quizzes and/or written assignments. Students will receive a pass grade based upon satisfactory participation in small group activities, the timely completion of written assignments and exercises, and successful passage on summative NBME exams.

<u>University Expectations:</u>

Academic Misconduct – Academic integrity is a legitimate concern for every member of the campus community; all share in upholding the fundamental values of honesty, trust,

respect, fairness, responsibility and professionalism. By choosing to join the UNLV community, students accept the expectations of the Academic Misconduct Policy and are encouraged when faced with choices to always take the ethical path. Students enrolling in UNLV assume the obligation to conduct themselves in a manner compatible with UNLV's function as an educational institution. An example of academic misconduct is plagiarism. Plagiarism is using the words or ideas of another, from the Internet or any source, without proper citation of the sources. See the Student Academic Misconduct Policy (approved December 9, 2005) located at: http://studentconduct.unlv.edu/ misconduct/policy.html.

Copyright – The University requires all members of the University Community to familiarize themselves and to follow copyright and fair use requirements. You are individually and solely responsible for violations of copyright and fair use laws. The university will neither protect nor defend you nor assume any responsibility for employee or student violations of fair use laws. Violations of copyright laws could subject you to federal and state civil penalties and criminal liability, as well as disciplinary action under University policies. Additional information can be found at: http://www.unlv.edu/provost /copyright.

Disability Resource Center (DRC) – The UNLV Disability Resource Center (SSC-A 143, http://drc.unlv.edu/, 702-895-0866) provides resources for students with disabilities. If you feel that you have a disability, please make an appointment with a Disabilities Specialist at the DRC to discuss what options may be available to you.

If you are registered with the UNLV Disability Resource Center, bring your Academic Accommodation Plan from the DRC to me during office hours so that we may work together to develop strategies for implementing the accommodations to meet both your needs and the requirements of the course. Any information you provide is private and will be treated as such. To maintain the confidentiality of your request, please do not approach me before or after class to discuss your accommodation needs.

Religious Holidays Policy – Any student missing class quizzes, examinations, or any other class or lab work because of observance of religious holidays shall be given an opportunity during that semester to make up missed work. The make-up will apply to the religious holiday absence only. It shall be the responsibility of the student to notify the instructor no later than the end of the first two weeks of classes, January 31, of his or her intention to participate in religious holidays which do not fall on state holidays or periods of class recess. This policy shall not apply in the event that administering the test or examination at an alternate time would impose an undue hardship on the instructor or the university that could not have reasonably been avoided. For additional information, please visit: http://catalog.unlv.edu/content.php?catoid=6&navoid=531.

Incomplete Grades - The grade of I – Incomplete – can be granted when a student has satisfactorily completed all course work up to the withdrawal date of that semester/session but for reason(s) beyond the student's control, and acceptable to the instructor, cannot complete the last part of the course, and the instructor believes that the student can finish the course without repeating it. A student who receives an I is responsible for making up whatever work was lacking at the end of the semester. If course requirements are not completed within the time indicated, a grade of F will be recorded and the GPA will be adjusted accordingly. Students who are fulfilling an Incomplete do not register for the course but make individual arrangements with the instructor who assigned the I grade.

Tutoring – The Academic Success Center (ASC) provides tutoring and academic assistance for all UNLV students taking UNLV courses. Students are encouraged to stop by the ASC to learn more about subjects offered, tutoring times and other academic resources. The ASC is located across from the Student Services Complex (SSC). Students may learn more about tutoring services by calling (702) 895-3177 or visiting the tutoring web site at: http://academicsuccess.unlv.edu/tutoring/.

UNLV Writing Center – One-on-one or small group assistance with writing is available free of charge to UNLV students at the Writing Center, located in CDC-3-301. Although walk-in consultations are sometimes available, students with appointments will receive priority assistance. Appointments may be made in person or by calling 895-3908. The student's Rebel ID Card, a copy of the assignment (if possible), and two copies of any writing to be reviewed are requested for the consultation. More information can be found at: http://writingcenter.unlv.edu/

Rebelmail – By policy, faculty and staff should e-mail students' Rebelmail accounts only. Rebelmail is UNLV's official e-mail system for students. It is one of the primary ways students receive official university communication such as information about deadlines, major campus events, and announcements. All UNLV students receive a Rebelmail account after they have been admitted to the university. Students' e-mail prefixes are listed on class rosters. The suffix is always @unlv.nevada.edu.