Course Syllabus: Scientific Principles of Medicine I (PSPM 5001) & II (PSPM 5002) August 2, 2010 through May 17, 2011

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Table of Contents

Course Description..............................................................................................................................................3
Course Goals..........................................................................................................................................................7
Educational Methods and Learning Experiences..............................................................................................8
Course Policies and Procedures..........................................................................................................................9
Assessment and Grading........................................................................................................................................10
Required Texts.....................................................................................................................................................13
Faculty Roster (Unit Directors)..................................................................................................................................15
Professionalism, Plagiarism and Copyright Policies............................................................................................16
Course Description

The Scientific Principles of Medicine (SPM) course is designed to foster the rapid acquisition, integration and application of scientific knowledge fundamental to the practice of medicine. By using diagnostic scheme algorithms as conceptual frameworks for both learning and application, the knowledge structure and diagnostic skills of an experienced clinician will be developed from the very outset of instruction. Students will explore human health and disease within individual organ-system based units that are each organized into a series of ‘clinical presentations’ (CPs) (e.g. sore throat, abdominal pain, wheezing) that reflect the major ways in which a person would present to a physician. By learning the basic and clinical sciences synchronously and within the context of CPs, a high level of integration and clinical relevance is achieved. The use of diagnostic scheme algorithms as conceptual frameworks for structuring and applying scientific knowledge is aimed at equipping students with the skills to make highly effective evidence-based diagnoses using scheme-inductive reasoning. This pedagogical approach, as implemented in SPM, has been shown to help mitigate the temporal loss of basic science knowledge, to help students think like experts when solving clinical problems, and to dramatically improve students’ diagnostic success rates.*

**SPM I (PSPM 5001):**
This first semester course of Year 1 consists of two integrated units: ‘Introduction to Health and Disease’ and ‘Musculoskeletal and Neurological Systems’.

**Unit 1: Introduction to Health and Disease**
This 5-week Unit is comprised of five CPs that introduce students to the basic foundations of health and disease:

1) Periodic Health Exam – Adult
2) Periodic Health Exam – Child
3) Sore Throat
4) Fever
5) Wound

The molecular and cellular mechanisms underlying homeostasis, cell growth and division, quiescence, senescence and apoptosis will be introduced to provide a foundation for understanding the processes of health and disease. Cell biology, immunology, microbiology and pathology are featured prominently in this Unit. Highlights of this Unit include the student’s first hands-on experiences in the anatomy, microscopy and microbiology laboratories.

**Unit 2: Musculoskeletal and Neurological Systems**
This 9-week Unit deals with the musculoskeletal system, the central nervous system and the peripheral nervous system. CPs include:

1) Bone Fractures and Dislocations
2) Joint Pain
3) Musculoskeletal Lumps and Masses
4) Limp and Deformity
5) Numbness and Pain
6) Weakness and Loss of Motion
7) Movement Disorders
8) Gait Disturbances
9) Headache
10) Seizures and Epilepsy
11) Stroke and Aphasia
12) Altered Mental Status (Delirium, Stupor and Coma)
Visual anatomy is featured during this Unit by way of cadaver dissection, three-dimensional models, radiographs, computer assisted tomography, magnetic resonance imaging, angiograms, ultrasound images, and histological images. The neuroscience of pain, the molecular biology and pathology of cancer, and the scientific principles of neurodegenerative diseases are some of the themes explored in this Unit.

**SPM II (PSPM 5002):**
This second semester course of Year 1 consists of three integrated Units:
‘Gastrointestinal/Hematological’, ‘Cardiovascular/Pulmonary’ and ‘Integration of Systems I’.

**Unit 3: Gastrointestinal and Hematological Systems**
This 9-week Unit investigates the gastrointestinal and hematological systems within the context of the following CPs:

1) Dysphagia  
2) Nausea and Vomiting  
3) Diarrhea  
4) Constipation  
5) Abdominal Distension  
6) Abdominal Pain  
7) GI Bleeding  
8) Abnormal Liver Function Tests  
9) Jaundice  
10) Abnormal Hemoglobin  
11) Abnormal White-Blood Cells  
12) Lymphadenopathy  
13) Coagulation Abnormalities

Students will be introduced to the processes of motility, secretion, digestion and absorption, which form the basis of function in the gastrointestinal system. In addition, they will study the structure and function of each formed element in the blood as well as the components contained in blood plasma. Mastery of the concepts in this Unit will lay a foundation for understanding concepts related to human nutrition, pathology and pharmacology.
**Unit 4: Cardiovascular and Pulmonary Systems**
This 8-week Unit explores the normal parameters of the cardiovascular and respiratory systems and investigates their dysfunction in the following CPs:

1) Chest Discomfort
2) Mediastinal Mass
3) Abnormal Heart Sounds
4) Cardiac Murmurs
5) Syncope
6) Palpitations
7) Pulse Abnormalities
8) Abnormal Blood Pressure: Hypertension & Shock
9) Dyspnea
10) Cough
11) Wheezing
12) Cyanosis
13) Hemoptysis

The faculty of the Department of Medical Education will work together with cardiologists, pulmonologists, acute care physicians and other practicing specialists to present the topics using a variety of educational approaches. Several laboratory experiences are included to emphasize critical physiological concepts underlying the function of the cardiovascular and respiratory systems.

**Unit 5: Integration of Systems**
This 2-week Unit is designed to provide students with an opportunity to review and further integrate and apply scientific concepts introduced in Units 1 through 4. The main components of this Unit include: (1) Basic science in Emergency Medicine (EM) by EM faculty through presentations and simulation workshops; (2) SPM review sessions where key concepts in Units 1-4 are reviewed in the context of relevant clinical problems; (3) Tankside Grand Rounds consisting of student team presentations; and (4) Self-study time to prepare for the Comprehensive End-of-Year Exam (CEYE).
Course Goals

Specific learning objectives and assigned learning materials will be provided prior to the individual learning activities. SPM is designed to meet the following “Institutional Learning Goals” of the Paul L. Foster School of Medicine (a complete list of the Institutional Learning Goals can be found in the Student Handbook; numbering refers to this original document):

**MEDICAL KNOWLEDGE**

- Describe the normal structure and function of the human body (MK-1)
- Compare and contrast normal variation and pathological states in the structure and function of the human body (MK-2)
- Describe analytic methods (laboratory, quantitative methods, Evidence-Based medicine principles) and apply them in patient care (MK-3)

**PATIENT CARE**

- Categorize, describe, and use various therapeutic methods in the treatment of illness and disease (PC-1)
- Identify life-threatening conditions that require immediate and specific interventions (PC-2)
- Choose appropriate laboratory tests and/or diagnostic procedures and accurately interpret results (PC-5)
- Generate a comprehensive list of diagnostic considerations based on the integration of historical, physical and laboratory findings (PC-6)

**INTERPERSONAL COMMUNICATION SKILLS**

- Communicate clearly, respectfully and compassionately with patients, families, colleagues, and members of the health care team (ICS-1)
- Communicate knowledge, interpretation and recommendations orally and/or in writing to a wide range of professional or lay audience in culturally appropriate ways (ICS-3)

**PROFESSIONALISM**

- Apply the highest ethical standards in a professional activities (Prof-4)
- Demonstrate respect for the beliefs, opinions and privacy of patients, families, and members of the health care team (Prof-5)
- Demonstrate scrupulous honesty in all professional matters (Prof-6)
- Preserve patient’s dignity in all interactions (Prof-8)
PRACTICE-BASED LEARNING

• Use inductive and deductive reasoning as appropriate in the diagnosis and management of disease (PBL-1)
• Identify the need to employ self-initiated learning strategies (problem definition, resource identification, critical appraisal) when approaching new challenges, problems, or unfamiliar situations (PBL-3)
• Demonstrate sophistication in the use of digital resources for patient care, self-education, and the education of patients and their families (PBL-5)
• Demonstrate the application of a scheme inductive approach to arrive at a focused differential diagnosis (PBL-6)
• Demonstrate self-awareness and the skills necessary for life-long learning (PBL-7)

Educational Methods and Learning Experiences

SPM offers a robust learning experience by employing a variety of educational methods including:

• Lectures (e.g. Clinical scheme presentations)
• Large Group Interactive Discussions (e.g. Basic science ‘clicker’ presentations)
• Small Group Interactive Discussions (e.g. Worked case example sessions)
• Integrative Team-based Learning Experiences (e.g. “Mechanisms of Anemia”)
• Laboratory exercises (e.g. Anatomy, Physiology, Microbiology, Immunology)
• Web-based instruction and feedback (e.g. ‘Nutrition in Medicine’ program)
• Clinical Site Visits (e.g. Clinical Microbiology labs)
• Patient Visits and Chart Reviews (Pharmacology)
• Virtual simulations with hands-on participation (e.g. Emergency Medicine workshops)

Learning experiences are framed around each CP and consist of three main components: (1) Introduction & Diagnostic Scheme Overview, (2) Basic Science, (3) Synthesis, Integration and Application of Concepts. The Introduction session is a clinician-guided overview of the clinical presentation and the underlying conceptual framework (diagnostic scheme) of scientific concepts utilized by expert clinicians to make effective diagnoses. The Basic Science sessions are designed to help students build an integrated foundation of clinically relevant scientific knowledge within the context of CPs and their respective diagnostic schemes. The Application of Concepts segment emphasizes the deliberate practice of making evidence-based clinical
diagnoses using basic science knowledge and scheme-inductive diagnostic reasoning; here, a high level of student engagement is promoted in a clinician-tutored small group setting.

**Course Policies and Procedures**

Students are expected to be present, to be prepared, and to be on time. Unless otherwise specified, lectures, labs and small group activities begin on the hour. The Paul L. Foster School of Medicine curriculum is modeled on the concept of ‘learning communities’ where each individual offers knowledge, skills and experiences that are unique and beneficial to the community. A number of SPM learning activities will rely on active student participation and teamwork, and therefore a student’s absence can be detrimental to the educational experience of his or her peers. As the effective practice of medicine requires physicians to demonstrate punctuality, teamwork, trustworthiness and beneficence, similar behaviors and attitudes will be expected of our students. Therefore, attendance and punctuality will be monitored for a number of required SPM activities including the following:

- Worked-case example sessions
- Specified lab-based learning sessions
- Small-group interactive or team-based learning sessions
- Tankside rounds

A list of sessions with required attendance will be provided at the beginning of each SPM Unit. Students will sign in at the beginning of these sessions.
Assessment and Grading

SPM is a pass/fail course. Successful passage requires that the student has not only achieved a level of competency as measured by performance on summative assessments, but has also demonstrated a commitment to professional responsibility by being an active participant in the educational experience that is defined by the curriculum. Each SPM Unit grade will be determined by: (i) demonstrable mastery of content on the end-of-Unit summative assessment (95% weighting); and (ii) demonstrable reliability and commitment as measured by punctuality and attendance at required SPM sessions (5% weighting).

\[
\text{SPM Unit Grade} = 95\% (\text{End-of-Unit Exam Grade}) + 5\% (\text{Attendance})
\]

‘Attendance’ is defined as the fraction of required SPM sessions punctually attended by the student. The passing SPM Unit Grade is 75% or greater.

Punctuality and Attendance

Non-compliance with the SPM punctuality and attendance policy will have consequences that are reflected in a student’s academic record. These consequences may include: a failing grade on the basis of attendance or punctuality; required remediation or repeating of the course; documentation in the student’s academic record and e-Portfolio; and reporting to the Associate Dean of Student Affairs, the Senior Associate Dean of Medical Education, and the PLFSOM Grading and Promotion Committee.

Each unexcused absence or late arrival for a required SPM session will be recorded in the student’s e-Portfolio for inclusion in their academic record. In addition, each such occurrence within a Unit will impact the attendance component of the SPM Unit Grade.

Excused absences include the following: documented illness; approved personal or family emergency; approved religious observance; approved professional commitment (see ‘Classroom Policies’ in the PLFSOM Student Handbook). Excused absences will be granted through the Office of Student Affairs.

Formative and Summative Assessments

Regular formative student assessment and feedback are an important part of the educational experience. USMLE-style formative assessments will be given on a weekly basis to allow students to monitor progress and to identify potential deficiencies that warrant early
remediation through self-study. Grades on formative assessments are for diagnostic purposes only and will not count towards the student’s final grade. USMLE-style end-of-Unit summative (formal) exams will be given at the end of SPM Units 1-5. A comprehensive end-of-year exam (CEYE) will be administered at the end of Unit 5. The semester courses SPM I and II (PSPM 5001 and PSPM 5002), in addition to the CEYE, must be passed or remediated in order to progress to the second year. The SPM grading and promotion policy is designed to provide students with ample opportunity to demonstrate satisfactory knowledge and skills. SPM assessment and grading guidelines are summarized as follows:

1. SPM end-of-Unit exam (within a semester course) – Unit and Course Directors are responsible for determining a student’s progress.
   a. Passing = 75% (cut point) or above
   b. **Rule 1**: If all student grades are greater than or equal to 75%, all students pass. If any student grades are less than 75% then rule 2 will be applied.
   c. **Rule 2**: Grades will be curved such that the Curved = Raw grade + CPΔ, where:
      • Cut point differential (CPΔ) = 75 – Difficulty
      • Difficulty = Mean – (1.5 standard deviations of the mean)
   d. **Rule 3**: No student’s grade will be lowered by Rule 2, i.e., if a few students’ raw grades are very low relative to the majority thereby forcing CPΔ to be negative (“drag down” the average), Rule 2 will not be applied.

2. Semester Course – Progress within course will be determined by the Course Directors based on the student’s performance in the Units of the course.
   a. Grading:
      1) Pass (P) – All Units must be passed.
      2) Incomplete (I) – If one or two Units are failed, the semester course grade(s) initially will be recorded as an Incomplete (I) pending outcome of remediation at the end of the academic year.
      3) Failure (F) – If three Units are failed in one academic year, the course grade will be recorded as a fail (F) for the semester with two or more failures. A recommendation will be made to the Grading and Promotions Committee (GPC) for repeat of the year. If a student repeats the year, the second semester will also be recorded as a fail (F). The student would not take the CEYE.
   b. Remediation - If an “I” is recorded (one or two Units are failed within a semester course), students will be required to demonstrate remediation at the end of the academic year. Unit remediation exams will be held at two week intervals following Unit 5.
1) If the remediation exam(s) for the failed Unit(s) are passed the semester course grade(s) will be converted from “I” to “P”.

2) If any remediation test is failed the corresponding semester course grade will be converted to “F”. A recommendation will be made to the Grading and Promotions Committee (GPC) for repeat of the year.

c. Remediation must occur before the CEYE is taken.

If a student wishes to challenge their Unit grade, they must do so by contacting the course director within seven calendar days of the date their grade was originally posted on e-Portfolio.
### Required Texts

Required texts are listed in the following tables. Individual session readings will be announced at least ten days in advance of the session.

<table>
<thead>
<tr>
<th>Discipline Areas</th>
<th>Required/Optional</th>
<th>Book</th>
<th>Author(s)</th>
<th>Edition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anatomy and Embryology</td>
<td>Required</td>
<td>Clinically Oriented Anatomy</td>
<td>Moore, Dalley &amp; Agur</td>
<td>6th</td>
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<tr>
<td></td>
<td>Required</td>
<td>Gross Anatomy</td>
<td>Chung, K.W. and H.M. Chung</td>
<td>6th</td>
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<tr>
<td></td>
<td>Required</td>
<td>Larsen's Human Embryology</td>
<td>Shoenwolf, Bleyl, Brauer, et.al</td>
<td>4th</td>
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<tr>
<td></td>
<td>Required</td>
<td>Atlas of Human Anatomy</td>
<td>Frank Netter</td>
<td>4th</td>
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<tr>
<td>Behavior</td>
<td>Required</td>
<td>Behavioral Science in Medicine</td>
<td>Fadem, Barbara</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Required</td>
<td>DSM - IV - TR</td>
<td>American Psychiatric Association</td>
<td>4th</td>
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<tr>
<td></td>
<td>Optional</td>
<td>Psychiatry</td>
<td>Tomb, David A.</td>
<td>7th</td>
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<tr>
<td>Biochemistry</td>
<td>Required</td>
<td>Marks' Basic Medical Biochemistry A Clinical Approach</td>
<td>Lieberman and Marks</td>
<td>3rd</td>
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<tr>
<td></td>
<td>Optional</td>
<td>Lippincott's Illustrated Reviews: Biochemistry</td>
<td>Champe, Harvey, Ferrier</td>
<td>4th</td>
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<tr>
<td></td>
<td>Optional</td>
<td>Clinical Biochemistry: An Illustrated Colour Text</td>
<td>Gaw, Murphy, et.al</td>
<td>4th</td>
</tr>
<tr>
<td></td>
<td>Required</td>
<td>Lippincott's Illustrated Reviews: Microbiology</td>
<td>Harvey, Champe, and Fisher</td>
<td>2nd</td>
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<tr>
<td></td>
<td>Optional</td>
<td>Medical Microbiology</td>
<td>Murray, Rosenthal, Pfaller</td>
<td>6th</td>
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<tr>
<td></td>
<td>Optional</td>
<td>Review of Medical Microbiology and Immunology</td>
<td>Levinson</td>
<td>10th</td>
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<tr>
<td></td>
<td>Optional</td>
<td>Medical Microbiology (Jawetz, Melnick, &amp; Adelberg's Medical Microbiology)</td>
<td>Brooks, Carroll, Butel, and Morse</td>
<td>24th</td>
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<tr>
<td></td>
<td>Optional</td>
<td>Medical Microbiology: The Big Picture</td>
<td>Chamberlain</td>
<td>1st</td>
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<tr>
<td></td>
<td>Optional</td>
<td>Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases</td>
<td>Mandell</td>
<td>7th</td>
</tr>
<tr>
<td>Subject</td>
<td>Type</td>
<td>Course Title</td>
<td>Authors</td>
<td>Edition</td>
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<tr>
<td>Genetics</td>
<td>Required</td>
<td>Elsevier's Integrated Genetics</td>
<td>Adkinson, Linda R and Michael D. Brown</td>
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<tr>
<td>Histology, Cell and Molecular</td>
<td>Required</td>
<td>Wheatner's Functional Histology</td>
<td>Young, Barbara and James Lowe</td>
<td>5th</td>
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<td></td>
<td>Required</td>
<td>Essential Cell Biology</td>
<td>Alberts, Bray and Hopkin, Johnson</td>
<td>3rd</td>
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<tr>
<td>Immunology</td>
<td>Required</td>
<td>Basic Immunology: Functions and Disorders of the Immune System</td>
<td>Abbas, Abul K., Andrew H. Lichtman</td>
<td>3rd</td>
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<tr>
<td>Neuroanatomy</td>
<td>Required</td>
<td>Clinical Neuroanatomy made Ridiculously Simple</td>
<td>Goldberg</td>
<td>3rd</td>
</tr>
<tr>
<td></td>
<td>Required</td>
<td>Clinical Neuroanatomy and Neuroscience</td>
<td>Fitzgerald, Gruener, and Mtui</td>
<td>5th</td>
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<tr>
<td></td>
<td>Required</td>
<td>Neuroanatomy</td>
<td>Fix, James D.</td>
<td>4th</td>
</tr>
<tr>
<td>Pathology</td>
<td>Required</td>
<td>Robbins &amp; Cotran Pathologic Basis of Disease</td>
<td>Kumar, Vinay, Abul Abbas and Nelson Fausto</td>
<td>8th</td>
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<tr>
<td>Pharmacology</td>
<td>Optional</td>
<td>Basic and Clinical Pharmacology</td>
<td>Katzung, Masters, Trevor</td>
<td>11th</td>
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<tr>
<td>Physiology</td>
<td>Required</td>
<td>Bucket Diagrams</td>
<td>Janssen</td>
<td>1st</td>
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<tr>
<td></td>
<td>Required</td>
<td>Rapid Interpretation of EKG's: an interactive course</td>
<td>Dubin, Dale</td>
<td>6th</td>
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<tr>
<td></td>
<td>Required</td>
<td>Textbook of Medical Physiology</td>
<td>Guyton and Hall</td>
<td>11th</td>
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<tr>
<td></td>
<td>Optional</td>
<td>Color Atlas of Physiology</td>
<td>Silbernagl and Despopoulos</td>
<td>5th</td>
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<tr>
<td></td>
<td>Optional</td>
<td>Color Atlas of Pathophysiology</td>
<td>Silbernagl and Lang</td>
<td></td>
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</tbody>
</table>
Faculty Roster: SPM Year 1 Unit Directors and Contact Details

Unit 1 – Introduction to Health and Disease:
Dr. Kathryn McMahon
Dr. Janet Piskurich
Dr. Rhonda Fleming

Unit 2 – Musculoskeletal and Neurological Systems:
Dr. Asa Black
Dr. Richard Brower

Unit 3 – Gastrointestinal and Hematological Systems:
Dr. David Osborne
Dr. Robert K. Baston
Dr. Javier Corral
Dr. Marc Zuckerman

Unit 4 – Cardiovascular and Pulmonary Systems:
Dr. Herb Janssen
Dr. David Osborne
Dr. Nadah Zafar
Dr. Jorge Martinez-Lopez
Unit 5 – Integration of Systems:

Dr. Gary Simpson

Dr. Robert Stump

Contact: Frank Maldonado (frankj.maldonado@ttuhsc.edu)

Professionalism, Plagiarism and Copyright Policies

In SPM, as with all other courses in the Paul L. Foster School of Medicine we expect students to adhere to the Student Honor Code and to adhere to published policies related to plagiarism and copyright protection. These policies are described in detail in the TTUHSC PLFSOM Medical Student Handbook. Students who do not behave in professionally acceptable way and in accordance with these policies are subject to disciplinary action.