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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 III (PSPM 6001):**
This first semester course of Year 2 consists of two integrated units: ‘Renal / Endocrine’ and ‘Reproduction’.

**Unit 6: Renal/ Endocrine**
This Unit focuses on fluids, electrolytes, homeostatic mechanisms, and the role of the kidney in the process of regulation. The course also deals with glucose, lipids, intermediary metabolism of these entities, and the disease processes associated with their abnormalities. Other endocrine disorders and their anatomic and pathophysiological basis will also be considered. The following are the Clinical Presentations to be covered:

1) Abnormalities of Renal Function
2) Disorders of Serum Sodium
3) Intrinsic Renal Disease
4) Abnormalities of Hydrogen Ion Concentration
5) Renal Failure: Acute Kidney Injury
6) Renal Failure: Chronic Renal Disease
7) Hypertension
8) Hypothalamus/Pituitary/Adrenal Axis
9) Disorders of Thyroid Function
10) Weight Gain/Obesity
11) Diabetes/Hyperlipedemia
12) Male Genitourinary Disorders

**Unit 7: Reproduction**
This Unit focuses on human reproduction, pregnancy, and illnesses associated with the female genital tract and the breast. The sequence of these Clinical Presentations has been structured so that the concepts developed during the study of one topic lays down a foundation for subsequent topics. Students are provided with a brief definition and a statement of clinical significance for each Clinical Presentation. This serves as the foundation for presentations of both clinical and basic science information. Gross, microscopic, and radiographic normal and abnormal anatomy are presented in laboratory and small group discussions. The 13 Clinical Presentation modules include the following:

1) Abnormal Menstrual Cycle
2) Infertility
3) Contraception
4) Menopause
5) Prolapse/Pelvic Floor Relaxation
6) Screening and Prevention
7) Vaginal Discharge, Cervicitis and Sexually Transmitted Disease
8) Abnormal Genital Tract Bleeding
9) Pelvic Mass
10) Pelvic Pain
11) Normal Pregnancy
12) Pregnancy Complications
13) Pregnancy Loss

SPM IV (PSPM 6002):
This second semester course of Year 2 consists of two integrated Units: ‘Mind and Human Development’ and ‘Special Senses’.

Unit 8: Mind and Human Development
This is a complex Unit that will include a wide range of topics. The Unit transitions logically from the preceding course on reproduction, and spans the life cycle beginning with birth and infancy and concluding with Clinical Presentations that pertain primarily to elderly patients. Across the lifespan, the course deals with the individual and family, social issues impacting health, and behavioral and thought disorders. The topics are developed as two overlapping developmental and life cycle components: one predominantly pediatric and the other predominantly adult. This Unit includes the following Clinical Presentations:

1) Prematurity
2) Newborn Depressed
3) Crying-Fussing Infant
4) Acutely Ill Child
5) Failure to thrive
6) Abnormal Stature
7) Sexual Maturation/Ambiguous Genitalia
8) Developmental Disorders/Delay
9) Attention Deficit/Hyperactivity in Children
10) Mood Disorders
11) Panic and Anxiety
12) Psychotic Patient/Disordered Thought
13) Substance Abuse/Drug Addiction/Withdrawal
14) Dementia
15) Sleep/Circadian Rhythm Disorders/Sleep Apnea/Insomnia
Unit 9: Special Senses

Content of this Unit is concentrated in the areas of disorders and abnormalities of the skin and special senses. Each Clinical Presentation will include a brief definition, a statement of clinical significance and a schematic representation of potential causes (along with “process worksheets” and “worked examples” for small groups). There will also be basic science learning objectives related to the appropriate scientific concepts of anatomy (including gross and microscopic anatomy, embryology, neuroanatomy and radiographic anatomy), biochemistry, physiology, genetics, immunology, microbiology, pharmacology, and pathology.

Content areas to be covered include:

1. Visual disturbance and loss, pupillary abnormalities
2. Diplopia and strabismus
3. Eye redness
4. Eye socket abnormalities
5. Hearing loss, tinnitus, dizziness-vertigo, ear pain
6. Smell and taste dysfunctions
7. Hoarseness, speech abnormalities
8. Skin infections (rashes, papules, blisters, boils, macules, dermatitis)
9. Skin ulcers, pigmented lesions, benign and malignant tumors
10. Hair and nail disorders (alopecia)
11. Pruritus
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

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 will be 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; and 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 6-9. In addition to the summative end-of-Unit exam, the USMLE Comprehensive Basic Science Exam (CBSE) will be given at the end of each of the four Units comprising SPM III and SPM IV. The performance on these CBSEs is for practice and diagnostic purposes only, in preparation for the STEP 1 exam, and will not be factored into the SPM Unit grades. The semester courses SPM III and IV (PSPM 6001 and PSPM 6002) must be passed or remediated in order to progress to the third 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.
   b. 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).
   c. 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 9.

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.

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><strong>Anatomy and Embryology</strong></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>
</tr>
<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>
</tr>
<tr>
<td><strong>Behavior</strong></td>
<td>Required</td>
<td>Behavioral Science in Medicine</td>
<td>Fadem, Barbara</td>
<td></td>
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<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><strong>Biochemistry</strong></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>
</tr>
<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><strong>Microbiology</strong></td>
<td>Required</td>
<td>Lippincott's Illustrated Reviews: Microbiology</td>
<td>Harvey, Champe, and Fisher</td>
<td>2nd</td>
</tr>
<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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<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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<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>Requirement</td>
<td>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</td>
<td>Required</td>
<td>Wheaton's Functional Histology</td>
<td>Young, Barbara and James Lowe</td>
<td>5th</td>
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<tr>
<td>Molecular</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>
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<tr>
<td></td>
<td>Required</td>
<td>Clinical Neuroanatomy and Neuroscience</td>
<td>Fitzgerald, Gruener, and Mtui</td>
<td>5th</td>
</tr>
<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>Silbernaglm and Despopoulos</td>
<td>5th</td>
</tr>
<tr>
<td></td>
<td>Optional</td>
<td>Color Atlas of Pathophysiology</td>
<td>Silbernaglm and Lang</td>
<td></td>
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</tbody>
</table>
Faculty Roster: SPM Year 2 Unit Directors and Contact Details

Unit 6 – Renal / Endocrine:
Dr. Steven Sandroni
Dr. Amy Trott

Unit 7 – Reproduction:
Dr. Sanja Kupesic
Dr. Barghavi Patham
Dr. Martine Coue
Dr. Elmus Beale

Unit 8 – Mind and Human Development:
Dr. Tania Arana
Dr. Richard Brower
Dr. Robert Suskind

Unit 9 – Special Senses:
Dr. Dale Quest
Dr. Debra Bramblett
Dr. Asa Black
Dr. Benjamin Burt

Contact: Michele Verduzco (michelle.verduzco@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.