



## **FAU COLLEGE OF MEDICINE**

Syllabus

Fundamentals of Biomedical Science 3

**BMS 6009**

**Number of credit hours: 6**

### **2. Course prerequisites:**

Accepted for matriculation in the FAU College of Medicine.

### **3. Course logistics:**

a. term: Fall 2011

b. not an online course

c. Biomedical Science Building room BC-126, anatomy lab, small group PBL rooms.

### **4. Instructor information:**

Course Director: Gary Rose, M.D.  
Clinical Professor  
Biomedical Science Room 119  
561-297-00675  
grose@fau.edu

Course support: Ms Mavis Brown  
Curriculum Coordinator  
BC-138  
561-297-0899  
mwbrown@fau.edu

*Please note:* Any official student communication from the director or curriculum coordinator will be sent via e-mail to students at their FAU e-mail addresses. *If students would like to meet with the course director, they must call or e-mail the course director to schedule an appointment.*

### **5. TA contact information:**

N/A

### **6. Course description:**

The FBS Course series (FBS 1, FBS 2, FBS 3) is designed to provide students with a broad foundation in critical biomedical science subject areas, including biochemistry, molecular biology, cell biology, genetics, microbiology, immunology, pharmacology, pathology, histology, physiology, anatomy, and embryology. FBS 3 continues the themes introduced and developed in FBS 1 and FBS 2. FBS 3 focuses on viral microbiology, immunology, inflammation, neoplasia, tissue repair, as well as, histology, embryology, and anatomy.

### **7. Course objectives/student learning outcomes:**

After completing this course the student will:

- Describe the physical and chemical properties of viruses
- Understand common unique characteristics of viruses as compared to other microorganisms
- Understand the basis for the modern classification of viruses
- Understand the steps of the reproductive cycle of RNA and DNA viruses
- Review the principles of cultivation, assay and laboratory diagnosis of viruses
- Be familiar with the molecular basis of viral pathogenesis
- Describe latent and persistent viral infections
- Identify viruses that are capable of stimulating cell growth and induce oncogenic transformation
- Explain T cell activation and cell-mediated immune response
- Explain role of natural killer cells in immune response and how they carry out their functions
- Understand the roles of essential immunological factors causing and regulating type I – IV hypersensitivity reactions
- Describe common sources of allergens, types of allergens, and properties of allergens.
- Discuss local and systemic allergic reactions.
- Describe mechanisms of drug-induced allergies
- Discuss therapies for allergies and their relevance to key steps in the allergic immune response
- Define tests for allergies (skin tests; RAST test).
- Describe major and minor histocompatibility processes
- Understand the molecular basis of direct and indirect allograft recognitions, as well as the limitations associated with xenotransplantation
- Describe the types and mechanisms of clinical rejection (hyperacute, acute, chronic and graft-versus-host reaction)
- Describe the mechanisms of self-tolerance
- Describe the tissue-typing techniques (serological, cellular and molecular)
- Understand the mechanisms of action of immunosuppressive drugs
- Describe the developmental, microscopic, and gross anatomy of the male reproductive system
- Describe the developmental, microscopic, and gross anatomy of the female reproductive system
- Describe the developmental, microscopic, and gross anatomy of the digestive system
- Describe the developmental, microscopic, and gross anatomy of the urinary system
- Describe the important types of macronutrients.
- Explain the processes involved in the digestion of carbohydrates, proteins, lipids, and nucleic acids
- Explain the role of digestive enzymes in the breakdown of biomolecules.
- Describe the important types of micronutrients.
- Describe the structures and functions of vitamins and explain the distinctions between water-soluble vitamins and fat-soluble vitamins

- Understand the general principles of inflammation, including neurogenic, vascular, cellular and chemical events
- Be able to compare and contrast vascular, cellular, and stromal characteristics of acute and chronic inflammation
- Explain the basic forms of tissue repair
- Describe the cause and appearances of tissue edema, congestion and hemorrhage
- Describe the sequence of events leading to thrombosis
- Describe the gross and microscopic appearances of thrombi
- Outline the sequence of events in coagulation and indicate what laboratory tests can be used to determine abnormalities of coagulation
- Describe etiologies, appearances, and consequences of infarction
- Describe the process of embolization and when it occurs
- Understand the over-arching fundamental characteristics of carcinogenesis
- Review the biologic and molecular characteristics of the cell cycle, including cell cycle regulators, phases, and checkpoints
- Be familiar with the most common physiologic alterations found in malignant transformation, including self-sufficiency in growth signaling, the role of tumor suppressor genes, evasion of apoptosis, defects in DNA repair, telomerase, sustained angiogenesis, the ability to invade and metastasize, escape from immunity
- Define what an oncogene is and how oncogenes function in neoplasia
- Know common proto-oncogenes and oncogenes and their roles in neoplasia.
- Understand the mechanisms of carcinogenic genetic alterations, structural and functional, including point mutations and deletions, chromosomal rearrangements, and gene amplification
- Understand the current multi-step molecular model of carcinogenesis, including the roles of “gatekeeper” and “caretaker” genes, and tumor progression
- Know several specific examples of different types of carcinogenesis, including chemicals, radiation, and viruses
- Understand the classification, histologic diagnosis, grading and staging of neoplasms
- Be familiar with hereditary neoplastic disorders
- Explain invasion and metastasis
- Review tumor immunology
- Define the paraneoplastic manifestations of cancer
- Review cancer epidemiology and prevention
- Describe the anatomy of the thigh and leg
- Describe the anatomy of the foot and joints of the lower limbs

## **8. Course evaluation method:**

Examination Policy:

Exam Composition: All examination questions will be multiple-choice. Clinical vignettes will be used for many questions, and images will be incorporated as appropriate. Approximately 1-2 questions per lecture hour, 1-2 questions per PBL case hour and 1-2 questions per laboratory hour will be used.

Exams will be delivered electronically via student laptops. Laboratory Practical Exams will be pen and paper exams.

During the exams, students are required to follow the examination protocol presented by the proctors. No specific questions regarding an exam item will be answered during any exam.

Examination Scoring: Scoring will be based solely on the answers recorded by the student on their laptop computer. Miskeying of answers will not be considered in grading a student's examination. Accuracy is the sole responsibility of the student.

Grades will be available via Blackboard in a timely fashion.

Viewing the Examination: All exams will be secure. Students can access a copy of the exam for review in the Office of Medical Education, Room BC-136

### Grading Policy:

The course grade is made up of three components (exams, Anatomy exams & quizzes, and PBL). An unsatisfactory grade for any of the three components will result in an unsatisfactory grade for the course

#### *Component 1*

Exam 1	40 points
Exam 2	40 points

#### *Component 2*

Anatomy Exams & Quizzes 20 points

#### *Component 3*

PBL facilitators will provide narrative evaluation which will contain notations as to whether the student's academic and professional performance is on the level of "honors" (H), "high satisfactory" (HS), "satisfactory" (S), "marginally satisfactory" (MS), and "unsatisfactory" U. This will be based on the student's performance the following areas:

- Use of student's own knowledge base
- Knowledge acquisition/active learning
- Critical thinking/reasoning/problem-solving
- Teamwork/group communication and assessment

When a student obtains a "MS" or "U" on any examination, a letter is sent to the student asking them to contact the course director for assistance. The letter is copied to the student's file.

### **9. Course grading scale:**

The grading scale for the course is as follows:

(H) Honors = or >93% and (H) in PBL

(HS) High Satisfactory	85% - 92.99% (H) or (S) in PBL
(S) Satisfactory	=or>75% and (S) or (H) in PBL
(MS) Marginal Satisfactory	=or>75% and (MS) in PBL
	70%-74.99% and (H), (S) or (MS) in PBL
(U) Unsatisfactory	=or>70% and (U) in PBL
	<70% and (H), (S), (MS), or (U) in PBL

## 10. Policy on makeup tests, etc.

Exam Administration: All examinations will be administered in the Biomedical Sciences building on the dates and times documented in the examination schedule. A student must sit for all examinations as scheduled. A student must obtain permission for an excused absence from the course director and notify the Senior Associate Dean for Student Affairs prior to the time for sitting for a scheduled examination. In the event of a personal emergency, the course director and the Senior Associate Dean for Student Affairs must be notified of the absence as soon as possible. Missed examinations will be rescheduled at the discretion of the course director, at a time that does not interfere with other course work. Unexcused absences will result in a grade of zero (0) for the missed examination.

All absences from examinations should be documented by a PIR from the course director and will be communicated to the Office of Student Affairs. A record of excused and unexcused absences from examinations will be maintained by the Office of Student Affairs. A pattern of recurrent absences from examinations, whether excused or unexcused, will be reviewed by the MSPPSC and may result in a recommendation up to and including dismissal from the FAU medical Education Program. (See Student Rights and Responsibilities Handbook)

## 11. Special course requirements:

Attendance Policy:

The FAU faculty and administration agree that student attendance and participation in all scheduled learning sessions are important to students' academic and professional progress and ultimate success as physicians.

Attendance at the Monday/Wednesday/Friday small-group sessions and wrap-up is **mandatory**.

***For an absence to be excused, a request must be made to the Course Director. Only a Course Director can excuse an absence. No missed work associated with a specific session can be made up without loss of credit for satisfactory completion unless an excused absence has been granted.***

***An excused absence from a small-group PBL session will be made up by the assignment of an additional learning issue to the student. An unexcused absence will result in the assignment of an additional learning objective for each absence, and a two point deduction from the PBL small group performance component of the final grade.***

Attendance at the Tuesday morning anatomy sessions is expected for all scheduled activities. Students are expected to be on time: in that each session will start with a short written quiz, being on time is defined as being ready to start at the assigned time so as to not be pressured to finish the web-based quiz within its assigned time.

Repeated unexcused absences from required curricular activities may result in disciplinary action, up to and including dismissal from the FAU Medical Education Program.

## **12. Classroom etiquette policy:**

Students should be considerate of each other by switching his/her cell phone to vibrate during all teaching activities.

If a telephone call is of an emergency nature and must be answered during class, the student should excuse him/herself from the lecture hall before conversing.

Laptop computer use should be limited to viewing and recording lecture notes rather than checking e-mail, playing or viewing other distracting websites. Students may be asked by faculty to turn off laptops during any session where group participation is required (such as PBL and wrap-up sessions).

## **13. Disability policy statement:**

In compliance with the Americans with Disabilities Act (ADA), students who require special accommodation due to a disability to properly execute coursework must register with the Office for Students with Disabilities (OSD) –in Boca Raton, SU 133 (561-297-3880)—and follow all OSD procedures.

## **14. Honor code policy:**

Students at Florida Atlantic University are expected to maintain the highest ethical standards. Academic dishonesty is considered a serious breach of these ethical standards because it interferes with the University mission to provide a high quality education in which no student enjoys an unfair advantage over any other. Academic dishonesty is also destructive of the University community, which is grounded in a system of mutual trust and places high value on personal integrity and individual responsibility.

The FAU Honor Code requires a faculty member, student, or staff member to notify an instructor when there is reason to believe an academic irregularity is occurring in a course. The instructor must pursue any reasonable allegation, taking action where appropriate. The following constitute academic irregularities:

1. The use of notes, books or assistance from or to other students while taking an examination or working on other assignments, unless specifically authorized by the instructor, are defined as acts of cheating.
2. The presentation of words or ideas from any other source as one's own is an act defined as plagiarism.
3. Other activities that interfere with the educational mission of the University.

For full details of the FAU Honor Code, see University Regulation 4.001 at [www.fau.edu/regulations/chapter4/4.001\\_Honor\\_Code.pdf](http://www.fau.edu/regulations/chapter4/4.001_Honor_Code.pdf).

In addition to the FAU Honor Code, the FAU College of Medicine has adopted specific academic, professional and behavioral standards governing medical student conduct which the FAU COM faculty and administration believe are essential components of medical education and the development of medical students. The FAU COM academic, professional and behavioral standards are included in the COM Student Handbook.

**15. Required texts/readings:**

The following are textbooks that students are expected to purchase for use in the course . All the textbooks listed below will be available at the FAU Bookstore at the beginning of the academic year.

The following are textbooks that students are expected to purchase for use in the Fundamentals of Biomedical Science sequence. All the textbooks listed below have been available at the FAU Bookstore since the beginning of the academic year.

In FBS 2 and FBS 3, the additional texts emphasized are:

Title	Author(s)	Publisher
Medical Physiology 1 <sup>st</sup> Edition	Boron and Boulpaep	Elsevier
The Immune System 3 <sup>rd</sup> Edition	Parham	Garland Science
Medical Microbiology 5 <sup>th</sup> Edition	Murray, Rosenthal, Kobayashi & Pfaller	Elsevier
Robbins and Cotran's Pathologic Basis of Disease 8 <sup>th</sup> Edition	Kumar, Cotran, Robbins	Saunders
Basic and Clinical Pharmacology 10 <sup>th</sup> Edition	Katzung	McGraw-Hill

The texts emphasized In FBS 1 remain part of the student resources:

Title	Author(s)	Publisher
Genetics in Medicine 7 <sup>th</sup> Edition	Thompson and Thompson	Saunders
Biochemistry: Lippincott's Illustrated Reviews 4 <sup>th</sup> Edition	Champe, Harvey and Ferrier	Lippincott, Williams and Wilkins
Langman's Medical Embryology 11 <sup>th</sup> Edition	Sadler	Lippincott, Williams and Wilkins
Histology: a Text and Atlas 6 <sup>th</sup> Edition	Ross and Pawlina	Lippincott, Williams and Wilkins
Essential Clinical Anatomy 3 <sup>rd</sup> Edition	Moore and Agur	Lippincott, Williams and Wilkins
Frank Netter Anatomy Atlas 4 <sup>th</sup> Edition	Netter	Elsevier



Suggested Textbook:

Title	Author(s)	Publisher
Anatomy in Diagnostic Imaging	Fleckenstein and Tranum-Jensen	Blackwell

**16. Supplementary resources:**

Web Resources:

(These resources and others may be accessed via the “*Handouts and links*” of the student e-Dossier on Blackboard)

Integrated Medical Curriculum <http://imc.meded.com/>

The site provides materials related to the gross anatomy component of the FBS sequence. The username and password given to each student at the beginning of the FBS1 course will continue to be valid.

Medline Dictionary <http://www.nlm.nih.gov/medlineplus/mplusdictionary.html>

An online dictionary provided by the US National Library of Medicine and the National Institutes of Health. A potentially useful resource during the PBL small group sessions.

The Visible Embryo <http://www.visembryo.com>

This highly recommended site presents a series of 3D images of the developing embryo and fetus with text commenting on specific developmental events that are occurring at each stage. The website contains images from the collection of 10,000 embryos at the National Institute of Child Health and Human Development, an institute of NIH.

Aperio Microscope Images: These virtual microscope images, which can be accessed through the One45 site, via the “Handouts and Links” tab, can be found at: <http://med.fau.edu/aperio>. These images will be used for in-class didactic as well as PBL-based exercises.

Internet Pathology Laboratory for Medical Education [“Webpath”]: <http://med.fau.edu/webpath>

A comprehensive learning tool, it encompasses the latest edition of the world-famous WebPath© software. Individual PBL-based exercises will utilize this resource. In addition, the application contains useful anatomy, radiology, histology, and microbiology images and tutorials, in addition to thousands of general and systemic pathology images. Students and faculty alike may wish to utilize this resource for learning and teaching purposes. In addition, WebPath contains a section of case-based laboratory exercises and examination questions (with fully-explained answers) that are very helpful resources for learning and review. The username and password given to each student at the beginning of the FBS1 course will continue to be valid.

**17. Web-based postings:**

Students are encouraged to carry their laptop with them as much as possible in order to access resources, patient log and other resources.

Please refrain from checking personal e-mails during teaching periods. Please put your cell phone or pager on “vibrate” to minimize disruption.

Please be punctual as a courtesy to your colleagues and faculty.

Session handouts	Yes	Session Objectives	Yes	Quizzes	Delivered via laptop
Required Activities	Yes	Grades	Yes	Exams	Delivered via laptop (except practicals)

## 18. Course topical outline:

### Content outline:

*Please refer to Blackboard for up-to-date information and session-related objectives and handouts.*

Session Topic
T cell overview
NK Cell and Innate Immunity
Viral Replication
Respiratory Viruses
Large DNA Viruses
Small DNA Viruses
Pelvic Viscera
Anatomy Case Correlations
Gross Anatomy Laboratory
Hepatitis
Antigen Processing and Presentation
Neurologic and Gastroenteric and Hemorrhagic Fever
Allergy and Asthma
Tolerance and Immunity
Histology of Male Reproductive System
Histology of Female Reproductive System
Digestive System
Lower Limb, Gluteal Region
Anatomy Case Correlations
Gross Anatomy Laboratory
Chronic Inflammation and Repair
Histology of Urinary System
Anatomy Case Correlations
Gross Anatomy Laboratory
Congestion and Edema
Thrombosis, Embolism and Infarction
Neoplasia Overview

Anatomy Quiz ,Foot and Joints of the Lower Extremity
Anatomy Case Correlations
Neoplasia Basic Characteristics of Cancer
Molecular Basis of Cancer

### **19. Study habits:**

A major contribution to your learning is active engagement, which includes participation in the learning of other students and interaction with the instructors. Students are expected to be proactive and to access the Blackboard system to review items associated to individual sessions.

Learning in the field of medicine is a life-long endeavor that is not only necessary, but can and should be fun. One of the most important factors for learning is curiosity and sometimes, the best way to keep this curiosity stimulated is through our interaction with colleagues and peers. When learning in small groups, we have a chance to try to explain topics to each other, brainstorm solutions together, give each other constructive feedback, and support and validate each other. We encourage balancing studying alone with learning in small groups. It is important to develop a study routine to avoid “putting things off” and “cramming” and to minimize the stress we may add to our lives in that way.

### **20. Independent study time:**

Independent Study Time allocated within the day time schedule is provided for students, on average about 9 hours per week.

Students are expected to use this time to further their learning. The time should be used for independent study or with peers. It is an opportunity to seek out faculty to interact with them outside the formal teaching setting. Since the PBL small-group format requires that students research learning objectives, the time may be used to prepare for the subsequent sessions. Finally, the time may be used to work on assignments, problem-solving cases, off-campus visits or other tasks that are required by the courses.

Occasionally, some Independent Study Time sessions may be used for curriculum-related activities (e.g. standardized examinations): notice will be given as early as possible for these occasions.

### **21. Course and faculty evaluation:**

FAU highly values the process of formal program evaluation and feedback. FAU students are required to complete all course evaluations and program evaluation surveys which are the Students Perception of Teaching (SPOT).

Grades and transcripts may be held for failure to submit required surveys. Evaluations should be constructive, to help improve individual faculty’s teaching, and the content and format of the courses.

Moreover, the timely completion of evaluations at the level of undergraduate medical education assists students in developing the administrative and organizational skills required throughout their

academic and professional career. We appreciate your completing evaluations to help continue with improvement of the learning experiences and environment for all students.

## 22. Faculty (in alphabetical order):

### Lecturers:

Massimo Caputi, Ph.D.  
Associate Professor  
Biomedical Science Room 222  
561-297-0627  
mcaputi@fau.edu

Deborah Cunningham, Ph.D.  
Clinical Assistant Professor  
Biomedical Science Room 340  
561-297-2302  
dcunni11@fau.edu

Vijaya Iragavarapu, Ph.D.  
Assistant Professor  
Biomedical Science Room 309  
561-297-3304  
iragavar@fau.edu

Morton Levitt, M.D. , MHA  
Clinical Professor  
Biomedical Science Room 338  
561-297-0911  
Mlevitt3@fau.edu

Mahyar Nouri-Shirazi, Ph.D.  
Assistant Professor  
Biomedical Science Room 326  
561-297-0935  
mahyar.shirazi@fau.edu

Willis K. Paull, Ph.D.  
Professor  
Biomedical Science Room 339  
561-297-1024  
wpaull@fau.edu

Gary Rose, M.D.  
Associate Professor  
Biomedical Science Room 119  
561-297-0675  
grose@fau.edu

Rainald Schmidt-Kastner, M.D.  
Clinical Assistant Professor  
Biomedical Science Room 213  
561-297-1360  
schmidtk@fau.edu

Yoshimi Shibata, Ph.D.  
Associate Professor  
Biomedical Science Room 224  
561-297-0606  
Yshibata@fau.edu

### Core Facilitators

Massimo Caputi, Ph.D.  
Associate Professor  
Biomedical Science Room 222  
561-297-0627  
mcaputi@fau.edu

Xupe Huang, Ph.D.  
Associate Professor  
Biomedical Science Room 223  
561-297-2443  
xhuang@fau.edu

Wen Shen, Ph.D.  
Associate Professor  
Biomedical Science Room 229  
561-297-0628  
wshen@fau.edu

Yoshimi Shibata, Ph.D.  
Professor  
Biomedical Science Room 224  
561-297-0606  
yshibata@fau.edu

Rui Tao, Ph.D.  
Associate Professor  
Biomedical Science Room 327  
561-297-0713  
rtao@fau.edu

