

**Chemistry 4010/6010**  
**Chromatography Summer 2017**  
**1:50-4:20 (Mon/Wed) Class Room South 407**  
**Natural Science Center (NSC)**  
**Office Hours (Mon/Wed 4:30-6:00) in Room 573 NSC**  
**Lecture Instructor: Professor Shahab A. Shamsi**  
**Room 573 Natural Science Center (NSC)**  
**Email: [sshamsi@gsu.edu](mailto:sshamsi@gsu.edu); Phone: 404-413-5512**

**Reference Book and Resources:** "Chromatographic Methods" written by A. Braithwaite and F. J. Smith (available in GSU Book Store); Lecture Notes (All notes will be provided via electronic e-mail).

**Appointment time: You can see me right after the class or set an appointment time by sending an e-mail. Please be courteous and do not request appointment 30 minutes before the lecture and come to my office to ask questions at that time. This is the time I spend preparing for my lecture**

**Learning Objectives:**

- \*To learn basic principles governing separation techniques.
- \*To learn fundamentals of chromatographic techniques.
- \*To learn to apply basic principles, which may help develop a chromatographic method(s) to achieve a particular separation and analysis of real world chemical compounds

**Enhance Learning:** \*E-learning video modules will be shown, discussed or assigned and students are expected/required to do homework assignments on E-learning modules on various topics

**Tentative content and schedule: This is a tentative schedule and may be modified as needed.**

**Module I: The Basic Theory of Chromatography (Total 2 lectures)**

<u>Date</u>	<u>Suggested Readings</u>	<u>Sub-Topic</u>
Jun 5	Chapter 1, Lect Notes	Introduction, History and Type of Chromatography Plate Theory of Chromatography, Calculation of Zone Spreading, Calculation of Theoretical Plates Short Comings of Plate Theory
Jun 5	Chapter 1, Lect Notes	Introduction to Chromatographic Parameters, (Retention, Capacity Factor, Resolution, Symmetry and Peak Capacity), Factors Affecting Resolution
Jun 7	Chapter 2 Lecture Notes	Rate Theory of Chromatography, Van Deemter Equation, Factors Affecting the Van Deemter Plot and Equation

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**Module II: Qualitative and Quantitative Analysis in Chromatography/ Gas Chromatography (Total = 4 lectures)**

<u>Date</u>	<u>Suggested Readings</u>	<u>Sub-Topic</u>
Jun 12	Chapter 2, Lect Notes	Qualitative Methods, Kovat Retention Index
	Chapter 2, Lect Notes	Quantitation Methods in Chromatography Temp Effects in Chromatography

June 14	Chapter 5, Lect Notes	Principles and Instrumentation in Gas Chromatography
June 19	Chapter 5 Lecture Notes	Choice of Mobile Phases and Stationary Phases in Gas Chromatography, Carrier Gas and Injection Modes
June 21	Chapter 5 Lecture Notes	Detector Properties, Types of GC detectors

**Jun 26 (Monday ) Exam I (200 pts) (Maximum 3hr allocation) 1:40-4:40 (Module I and II only)**

**Module III: Principles and Methodologies in Liquid Chromatography (5 Lectures)**

<b><u>Date</u></b>	<b><u>Suggested Readings</u></b>	<b><u>Sub-Topic</u></b>
Jun 28	Lecture Notes	Thin Layer Chromatography (TLC)
	Chapter 6, Lecture Notes	Instrumentation in HPLC
July 3	Chapter 6, Lecture Notes	Pump, Injector, Column and HPLC Detectors HPLC Detectors (Contd)
July 5	Chapter 6, Lecture Notes	Normal Phase HPLC Methodology
July 5	Chapter 6, Lecture Notes	Reversed Phase HPLC Methodology
July 10	Chapter 6, Lecture Notes	Size Exclusion/Gradient Elution in HPLC Ion Exchange HPLC
July 12	Chapter 6, Lecture Notes	Ion Exchange HPLC and Ion Chromatography
July 12	Chapter 6, Lecture Notes	IC (Continued)

**\*July 17 (Monday Exam II (200 pts) Maximum 3 hrs exam) 1:40-4:40 (Module III only )**

**Module IV Chromatographic Analysis of Samples (Introduction and Class Presentations)**

July 19	Lecture Notes/HW Problems	Chromatographic Analysis of Samples
July 19	Lecture Notes/Literature/HW	Chromatographic Analysis of Samples (Group I)
July 24	Lecture Notes/Literature/HW	Chromatographic Analysis of Samples (Group II)
July 24	Lecture Notes/Literature/HW	Chromatographic Analysis of Samples (Group III)

**\*July 26 (Wednesday) Final Exam 150 pts (Maximum 2 ½ allocation) 1:30-4:00 P.M**

**Home Work Problems:** Assigned homework problems will also be given during the course of the semester; Homework problem sets will need to be turned in and will be graded. They can be discussed on the electronic discussion board or you can talk to the instructor about the home work. It should be noted that questions similar to home work problems may be asked in the exam. Hence, it should be reviewed carefully.

**\*There will be penalty for 2%/day. Homework, which is more than 4 days late will not be accepted under any circumstances.**

**Pop Quizzes:** Will be given throughout the semester at the end of the class. They are mandatory and will contribute to your overall grade of the semester. **Please understand that there is no make-up pop quizzes that will be offered. However, you are allowed to have one drop quiz (with the lowest grade)**

### PLEASE READ THE FOLLOWING IMPORTANT POLICIES AND PROCEDURES

1. No make-up exam will be given unless the situation is such that the whole class did poorly in the exam.
2. If a student misses any exam (**without a legitimate excuse**), he/she will receive a grade zero for that exam.
3. If a student misses any short exam (**with a legitimate excuse**), he/she can either choose to receive a grade zero for that exam or apply the grade to the following exam for the missed exam.
4. If a student misses **Final Exam (with a legitimate excuse)**, he/she can either choose to receive a grade zero for that exam or choose to receive INC as a semester grade.

\*Legitimate reasons for excuse are the following:

<b>Cause</b>	<b>Required</b>
Due to illness	illness note from the doctor
Due to business	business note from the supervisor
Death in family	note of death from a family member
Other	On a case by case basis

\* I must be informed **before the exam** to count as an excused absence. If you cannot reach me, send me an email ([sshamsi@gsu.edu](mailto:sshamsi@gsu.edu)) or leave a message on my answering machine at my office (Indicate the time and the day).

**Please note that notifying me after the exam will result in a grade of zero for that exam.**

5. Although I do not expect cheating in my classroom, the penalty is an **F for the course**. Plagiarism is also considered cheating, therefore, copying large sections of another author's material without paraphrasing and referencing it will result in grade F.
6. Attendance will be taken regularly. I strongly urge to attend class. Otherwise you may miss the pop quizzes and lecture part (that may not be there in your textbook).
7. Although I will try to maintain the class schedule and objectives, I may need to make adjustments.

### GRADING POINT DISTRIBUTION

#### **UNDERGRADUATE (4010)**

\*Lab reports 30%  
2-Short exams 40% (200 pts each)  
+Final exam 15% (150 pts)  
\*Electronic Board Discussions (5%, 50 pts)  
Pop Quizzes (5%)  
Homework (5%)

#### **GRADUATE (6010)**

\*Lab reports 25%  
2-Short exams 40% (200 pts each)  
+Final exam 15% (150 pts)  
\*Electronic Board Discussion (5%. 50 pts)  
Pop Quizzes (5%), Homework (2.5%)  
†Literature Project (7.5%)

The laboratory instructor will grade their respective sections on laboratory reports. Therefore, student should collect graded report from the laboratory instructors. Dr. Shamsi may review the lab grading for any issues that students may have. OR Graded lab reports may be requested by Dr. Shamsi for review and to improve learning outcomes for final assessment.

**+ Final exam will be comprehensive**

**\*Electronic Board Discussion Topic will be posted and given in class lecture. You can asked question. The points will be assigned based on the quality of the questions and critical thinking. Asking simple questions right off the notes for the sake of gaining points will not be awarded. Please ask questions on topic or slides that are not very obvious or conceptual to you or may have critical thinking component**

**≠ Extra question may be added to the short exams for graduate students only but the total points stays the same.**

**† Literature project will be due on the day of the Final exam and is required only by graduate students ---→ Student can take at least two final exams within 24 hours. However, if a student has more than two exams please let me know in writing by sending an e-mail at [sshamsi@gsu.edu](mailto:sshamsi@gsu.edu) at least 14 days before the final to reschedule.**

### **GRADING SCALE**

Grading may be curved (depending on the class performance), but the most probable break down will be as follows:

95-100	A <sup>+</sup>
90-95	A
85-89	A <sup>-</sup>
80-84	B <sup>+</sup>
75-79	B
70-74	B <sup>-</sup>
65-69	C <sup>+</sup>
60-64	C
55-59	C <sup>-</sup>
50-54	D <sup>+</sup>
45-49	D
40-44	D <sup>-</sup>
<40	F

### **Course Withdrawl**

The last day to withdraw from the course at the midpoint is June 14 (Wednesday) , and withdrawl policies should be checked by student from Registerar Office

### **Professional Behavior Guidelines:**

1. **Tardiness:** Please arrive on time. If you are late, please enter the class without disturbing your classmates and my concentration.

2. **Side Conversation:** Side conversations make it difficult for your class mates to actively listen and learn. If you have trouble reading the board or any of my slide please ask me without any hesitation.
3. **Sleeping:** Falling asleep in class (unless the course focuses on dysfunctional sleep behaviors) is not considered professional attitude.
4. **Lack of attention/Boredom:** Please do not read other books or newspapers or study for other courses during my class. It is not polite. If the material that you are taught is familiar to you please write down some specific questions in your notebook and discuss with me about the advances in this topic (**only after the class**).
5. If you cannot see me during my office hours please send me an e-mail (sshamsi@gsu.edu) for help any day.