

ประมวลรายวิชา เทคนิคการใช้เครื่องมือสำหรับการวิจัยทางเภสัชศาสตร์ 1
ภาควิชาเภสัชเคมีและเภสัชเวท
คณะเภสัชศาสตร์ มหาวิทยาลัยนเรศวร

Course title	Instrumental Techniques in Pharmaceutical Sciences Research (เทคนิคการใช้เครื่องมือสำหรับการวิจัยทางเภสัชศาสตร์ 1)	
Code	162701	
Credits	3 (2-3)	
Prerequisite	-	
Course Description	Theory and practical techniques on essential instruments using in Pharmaceutical sciences research such as chromatographic, spectroscopic and thermal analysis instruments	
Objectives	After completing this course, students will understand and be able to perform the analytical techniques based on instrumental techniques.	
Evaluations	Students' performance is evaluated by the following means: 1) laboratory work (35% of total score) 2) two examination (65% of total score)	
Grading:	score	
	>80%	A
	75-79.99%	B+
	70-74.99%	B
	65-69.99%	C+
	60-64.99%	C
	55-59.99%	D+
	50-54.99%	D
	<50%	F
	In case of attending as S/U	
	score $\geq 70\%$	S
	<70%	U

References

1. Braithwaite, A. and Smith, F.J. Chromatographic methods. London : Blackie Academic & Professional. 1996.
2. Conors, K.A. A textbook of pharmaceutical analysis. New York : John Wiley & Sons. 1982.

3. Braun, R.D. Introduction to instrumental analysis. Singapore : McGraw-Hill Book Company. 1987.
4. Skoog, D.A., West, D.M. and Holler, F.J. Fundamentals of analytical chemistry 7th edition. Fort Worth : Saunders College Publishing. 1996.
5. Fritz, J.S. and Schenk, G.H. Quantitative analytical chemistry. New Jersey : Prentice Hall. 1987.
6. Christian, G.D. Analytical Chemistry 4th edition. Singapore: John Wiley & Sons. 1986.
7. Silverstein, R.M., Bassler, G.C. and Morrill, T.C. Spectrometric identification of organic compounds 5th edition. Singapore: John Wiley & Sons. 1991.
8. Pavia, D.L., Lampman, G.M., Kriz, G.S. Introduction to spectroscopy 2nd edition. Fort Worth : Saunders College Publishing. 1996.

Course Director: Dr. Nutsawadee Apichatwatana

Instructors:

1. Assoc. Prof. Dr. Nantaka Khorana
2. Assoc. Prof. Dr. Pattana Sripalakit
3. Assist. Prof. Dr. Chalerm Saiin
4. Dr. Sudaporn Wongwan
5. Dr. Nutsawadee Apichatwatana

Lecture: Room 2103

Lab: Room 5103 and/or 5203

Day: Lecture Wednesday 10.00 – 12.00
 Lab Thursday 9.00 – 12.00

Lecture

Hour	Time	Date	Topic	Content	Teaching method	Lecturer
1	<u>10.00-11.00</u>	10 Aug 16	- Course orientation	- Course detail, evaluation		Nutsawadee
2-7	<u>9.00-12.00</u> <u>9.00-12.00</u>	<u>11 Aug</u> <u>16</u>	- Chromatography	-Introduction and theory of chromatography	Lecture/discussion	Nutsawadee (13.00%)

		<u>17 Aug</u> <u>16</u>		-Type of chromatography -Sample separation and preparation		
8-13	<u>9.00-12.00</u>	24 Aug 16 31 Sep 16	High Performance Liquid Chromatography (HPLC)	-Introduction and theory of HPLC -Basic parameters -Instruments (packings, pumps, detectors, solvents, column, injectors) -Mode of chromatography Method development and optimization -Applications -HPLC troubleshooting	Lecture	Sudaporn (13.00%)
14-15	10.00-11.50	07 Sep 16	Gas Chromatography	-Principle of GC -column and stationary phase -Instruments -Sampling technique -Applications	Lecture	Nutsawadee (4.33%)
16-17	10.00-12.00	14 Sep 16	Polarimetry	-Introduction and principle -Instruments -Applications	Lecture	Sudaporn (4.33%)
18-19	10.00-12.00	21 Sep 16	Refractometry	-Introduction and principle -Instruments -Applications	Lecture	Nutsawadee (4.33%)
	24 Sep- 2 Oct 16		Midterm examination (Hour 2-19)			38.99%

20-25	10.00-11.50	05 Oct 16 12 Oct 16 19 Oct 16	Spectroscopic techniques (UV/VIS)	-Introduction to spectroscopy -Principles ultraviolet and visible spectroscopy -Instruments, presentation of spectra, and applications	Lecture	Chalerm (13.00%)
26-27	10.00-11.50	26 Oct 16	Spectroscopic techniques (fluorescence)	-Principles of fluorescence spectroscopy -Instruments and applications	Lecture	Pattana (4.34%)
28-29	10.00-11.50	02 Nov 16	Infrared Spectroscopy	-Introduction and principle -Instruments -Interpretation of spectra -Applications	Lecture/ discussion	Nantaka (4.33%)
30-31	10.00-11.50	09 Nov 16	-Thermal analysis	-Introduction and principle -Instruments -Applications	Lecture	Nutsawadee (4.34%)
		26 Nov-11 Dec 2016	Final examination (Hour 20-31)			26.01%

Lab

Hour	Time	Date	Topic	Content	Teaching method	Supervisor
1	9.00-12.00	18 Aug 16	Solvent extraction	Plant extraction by solvent extraction technique (Curcuminoid extraction)	Practice (R. 5103)	Nutsawadee (2.69%)
2	9.00-12.00	25 Aug 16	Planar chromatography	Techniques of TLC	Practice (R. 5103)	Nutsawadee (2.69%)

				(exercise: using TLC for the detection of simple organic compounds in plant extracts)		
3	<u>13.00-16.00</u>	<u>25 Aug 16</u>	Liquid Chromatography on Open Columns	Techniques of column chromatography (exercise: separation of simple organic compounds in plant extracts)	Practice (R. 5103)	Nutsawadee (2.70%)
4	9.00-12.00	01 Sep 16	High Performance Liquid Chromatography (HPLC)	HPLC analysis 1 (System suitability)	Practice (R 5203)	Sudaporn (2.69%)
5	9.00-12.00	08 Sep 16	High Performance Liquid Chromatography (HPLC)	HPLC analysis 2 (Comparison of solvent, pH and buffer effect)	Practice (R 5203)	Sudaporn (2.69%)
6	9.00-12.00	15 Sep 16	High Performance Liquid Chromatography (HPLC)	HPLC analysis 3 (Analysis of sample)	Practice (R 5203)	Sudaporn (2.70%)
7	9.00-12.00	22 Sep 16	Gas Chromatography (GC)	Applications of GC (Alcohol determination)	Practice (R 5203)	Nutsawadee (2.69%)
8	9.00-12.00	13 Oct 16	UV/VIS spectroscopy	Techniques of UV/VIS 1 (Simultaneous assay of combined	Practice/ Exercise (R 5203)	Chalerm (2.69%)

				preparation by derivative-different spectroscopy)		
9	9.00-12.00	20 Oct 16	ultraviolet/visible spectroscopy	Techniques of UV/Vis 2 (continued)	Practice/Exercise (R 5203)	Chalerm (2.69%)
10	9.00-12.00	27 Oct 16	ultraviolet/visible spectroscopy	Techniques of UV/Vis 3 (continued)	Practice/Exercise (R 5203)	Chalerm (2.70%)
11	9.00-12.00	03 Nov 16	Spectroscopic technique (Fluorescence)	Techniques of Fluorescence (Determination of Riboflavin)	Practice (R 5203)	Pattana (2.69%)
12	9.00-12.00	10 Nov 16	Infrared Spectroscopy (IR)	-Sample preparation techniques of IR -spectrum interpretation	Practice/Exercise (R 5203)	Nantaka (2.69%)
13	<u>10.00-12.00</u>	<u>16 Nov 16</u>	Thermal analysis	-Visit the science lab center at the faculty of sciences to observe the TA operation -Thermogram interpretation	Exercise (R 5203)	Nutsawadee (2.69%)
				Total lab work		35%