

BOROUGH OF MANHATTAN COMMUNITY COLLEGE

City University of New York

Department of Science

Title of Course FUNDAMENTALS OF GENERAL ORGANIC &
BIOLOGICAL CHEMISTRY II
CHE 122 Section _____

Class hours 3

Credits 4

Lab hours 3
Instructor Information
Name:
Office Number:
Room Number:
Email Address:

Course Description

This course is the first semester of a two-semester course sequence that introduces principles and concepts of general, organic and biological chemistry.

The laboratory will provide experimental applications of these chemical topics.

CHE 121-CHE 122 two terms required. Liberal Arts Elective. Recommended for Students intending to transfer to bachelor degree allied health science curricula.

CHE 121-CHE 122 cannot be granted credit to fulfill degree requirements for .S. (Science) and for A.S. (Engineering science).

CHE 121-CHE122 does not meet science requirement for AA (Liberal Arts).

Prerequisites/Co-requisites

CHE 121 or Permission of the Department

Student Learning Outcomes

1. Students will be able to understand the chemistry of living cells.
2. Students will be able to incorporate chemical applications that demonstrate chemistry as a prerequisite to how living organisms work.
3. Students will be able to demonstrate that the diverse topics of chemistry are logical and coherent when considered in the context of principles.
4. Students will be able to describe applications of chemical principles to the life sciences.

Required Text & Readings

1. Stoker, H.S., General, Organic and Biochemistry 3rd., Houghton Mifflin, 2004
2. Segauer, S.L, and Slabaugh, M.R., Laboratory Experiments for General, Organic and Biochemistry, 5th Ed., Brooks\Cole

Other Resources

Use of Technology (if applicable)

Evaluation & Requirements of Students

Each semester there will be a minimum of four one-hour examinations, a comprehensive final examination, and fulfillment of laboratory requirement.

Ch/ Sec	Outline of Topics Topic	Pages
Unsaturated Hydrocarbons		
13.1	Unsaturated Hydrocarbons	327 - 328
13.2	Characteristics of Alkenes and Cycloalkenes	328 - 329
13.3	Names for Alkenes and Cycloalkenes	329 - 331
13.4	Isomerism in Alkenes	331 - 334
13.5	Naturally Occuring Alkenes	335 - 337
13.6	Physical Properties of Alkenes	337 - 337
13.7	Chemical Reactions of Alkenes	337 - 341
13.8	Polymerization of Alkenes: Addition Polymers	342 - 345
13.9	Alkynes	345 - 347
13.10	Aromatic Hydrocarbons	347 - 348
13.11	Names for Aromatic Hydrocarbons	348 - 350
13.12	Aromatic Hydrocarbons: Physical Properties	352 - 352
13.13	Chemical Reactions of Aromatic Hydrocarbons	352 - 353
13.14	Fused Ring Aromatic Compounds	353 - 353
Alcohols , Phenols and Ethers		
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14.2	Structural Characteristics of Alcohols	362 - 362
14.3	Nomenclature for Alcohols	362 - 365
14.4	Important Commonly Encountered Alcohols	365 - 368
14.5	Physical Properties of Alcohols	369 - 371
14.6	Preparation of Alcohols	371 - 372
14.7	Reactions of Alcohols	372 - 377
14.8	Polymeric Alcohols	377 - 377
14.9	Structural Characteristics of Phenols	378 - 378
14.10	Nomenclature for Phenols	378 - 379
14.11	Physical and Chemical Properties of Phenols	379 - 380
14.12	Occurrences and Uses for Phenols	380 - 382
14.13	Structural Characteristics of Ethers	382 - 382
14.14	Nomenclature for Ethers	382 - 385
14.15	Physical and Chemical Properties of Ethers	385 - 385
14.16	Cyclic Ethers	386 - 386
14.17	Sulfur Analogs of Alcohols and Ethers	386 - 388
Aldehydes and Ketones		
15.1	The Carbonyl Group	397 - 397
15.2	Structure of Aldehydes and Ketones	398 - 398
15.3	Nomenclature for Aldehydes	399 - 401
15.4	Nomenclature for Ketones	401 - 402
15.5	Selected Common Aldehydes and Ketones	402 - 405
15.6	Physical Properties of Aldehydes and Ketones	405 - 407
15.7	Preparation of Aldehydes and Ketones	407 - 408
15.8	Oxidation and Reduction of Aldehydes and Ketones	408 - 411
15.9	Reactions of Aldehydes and Ketones with Alcohols	411 - 415
15.10	Formaldehyde Based Polymers	416 - 417
15.11	Sulfur Containing Carbonyl Groups	417 - 418

Carboxylic Acids and Esters

16.1	Structure of Carboxylic Acids	426 – 427
16.2	IUPAC Nomenclature for Carboxylic Acids	427 – 429
16.3	Common Names for Carboxylic Acids	429 – 431
16.4	Polyfunctional Carboxylic Acids	432 – 433
16.5	Metabolic Acids	434 – 435
16.6	Physical Properties of Carboxylic Acids	435 – 436
16.7	Preparation of Carboxylic Acids	436 – 436
16.8	Acidity of Carboxylic Acids	436 – 437
16.9	Carboxylic Acid Salts	437 – 439
16.10	Structure of Esters	439 – 440
16.11	Preparation of Esters	440 – 442
16.12	Nomenclature for Esters	442 – 444
16.13	Selected Common Esters	444 – 446
16.14	Physical Properties of Esters	446 – 447
16.15	Chemical Reactions of Esters	447 – 449
16.16	Sulfur Analogs of Esters	449 – 449
16.17	Polyesters	449 – 451
16.18	Esters of Inorganic Acids	452 – 452

Amines and Amides

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17.4	Physical Properties of Amines	466 – 467
17.5	Basicity of Amines	467 – 468
17.6	Amine Salts	469 – 470
17.7	Preparation of Amines and Quaternary Ammonium Salts	470 – 472
17.8	Heterocyclic Amines	472 – 473
17.9	Selectively Biochemically Important Amines	473 – 476
17.10	Alkaloids	476 – 477
17.11	Structure and Classification of Amides	478 – 479
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17.14	Properties of Amides	481 – 482
17.15	Preparation of Amides	482 – 485
17.16	Hydrolysis of Amides	485 – 486
17.17	Polyamides and Polyurethanes	486 – 489

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18.8	Classification of Monosaccharides	511 – 514
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18.11	Haworth Projection Formulas	519 – 520
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18.13	Disaccharides	525 – 530
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Biochemical Energy Production

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23.3	Important Intermediate Compounds in Metabolic Pathways	696 - 700
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23.6	The Citric Acid Cycle	702 – 707
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23.9	ATP Production for the Common Metabolic Pathway	714 – 714
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Lipid Metabolism

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Laboratory Syllabus

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3.	Isolation and Purification	Expt 17
4.	Hydrocarbons	Expt 18
5.	Alcohols and Phenols	Expt 19
6.	Aldehydes and Ketones	Expt 20
7.	Carboxylic Acids, Amines and Amides	Expt 21
8.	Functional Groups in Unknowns	Expt 23
9.	Dyes, Inks and Food Colorings	Expt 25
10.	Carbohydrates	Expt 27
11.	Trimyristin and Cholesterol	Expt 28
12.	Amino Acids and Proteins	Expt 29
13.	Enzymes	Expt 30
14.	Enzyme Activity	Expt 31

College Attendance Policy

At BMCC, the maximum number of absences is limited to one more hour than the number of hours a class meets in one week. For example, you may be enrolled in a three-hour class. In that class, you would be allowed 4 hours of absence (not 4 days). In the case of excessive absences, the instructor has the option to lower the grade or assign an F or WU grade.

Academic Adjustments for Students with Disabilities

Students with disabilities who require reasonable accommodations or academic adjustments for this course must contact the Office of Services for Students with Disabilities. BMCC is committed to providing equal access to all programs and curricula to all students.

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Students who are unsure how and when to provide documentation are advised to consult with their instructors. The library has guides designed to help students to appropriately identify a cited work. The full policy can be found on BMCC's web site, www.bmcc.cuny.edu. For further information on integrity and behavior, please consult the college bulletin (also available online).