

## SUBJECTS

- Aeronautics and Astronautics (Course 16) (<https://catalog.mit.edu/subjects/16>)
- Aerospace Studies (AS) (<https://catalog.mit.edu/subjects/as>)
- Anthropology (Course 21A) (<https://catalog.mit.edu/subjects/21a>)
- Architecture (Course 4) (<https://catalog.mit.edu/subjects/4>)
- Biological Engineering (Course 20) (<https://catalog.mit.edu/subjects/20>)
- Biology (Course 7) (<https://catalog.mit.edu/subjects/7>)
- Brain and Cognitive Sciences (Course 9) (<https://catalog.mit.edu/subjects/9>)
- Chemical Engineering (Course 10) (<https://catalog.mit.edu/subjects/10>)
- Chemistry (Course 5) (<https://catalog.mit.edu/subjects/5>)
- Civil and Environmental Engineering (Course 1) (<https://catalog.mit.edu/subjects/1>)
- Comparative Media Studies / Writing (CMS) (<https://catalog.mit.edu/subjects/cms>)
- Comparative Media Studies / Writing (Course 21W) (<https://catalog.mit.edu/subjects/21w>)
- Computational and Systems Biology (CSB) (<https://catalog.mit.edu/subjects/csb>)
- Computational Science and Engineering (CSE) (<https://catalog.mit.edu/subjects/cse>)
- Concourse (CC) (<https://catalog.mit.edu/subjects/cc>)
- Data, Systems, and Society (IDS) (<https://catalog.mit.edu/subjects/ids>)
- Earth, Atmospheric, and Planetary Sciences (Course 12) (<https://catalog.mit.edu/subjects/12>)
- Economics (Course 14) (<https://catalog.mit.edu/subjects/14>)
- Edgerton Center (EC) (<https://catalog.mit.edu/subjects/ec>)
- Electrical Engineering and Computer Science (Course 6) (<https://catalog.mit.edu/subjects/6>)
- Engineering Management (EM) (<https://catalog.mit.edu/subjects/em>)
- Experimental Study Group (ES) (<https://catalog.mit.edu/subjects/es>)
- Global Languages (Course 21G) (<https://catalog.mit.edu/subjects/21g>)
- Health Sciences and Technology (HST) (<https://catalog.mit.edu/subjects/hst>)
- History (Course 21H) (<https://catalog.mit.edu/subjects/21h>)
- Humanities (Course 21) (<https://catalog.mit.edu/subjects/21>)
- Linguistics and Philosophy (Course 24) (<https://catalog.mit.edu/subjects/24>)
- Literature (Course 21L) (<https://catalog.mit.edu/subjects/21l>)
- Management (Course 15) (<https://catalog.mit.edu/subjects/15>)
- Materials Science and Engineering (Course 3) (<https://catalog.mit.edu/subjects/3>)
- Mathematics (Course 18) (<https://catalog.mit.edu/subjects/18>)
- Mechanical Engineering (Course 2) (<https://catalog.mit.edu/subjects/2>)
- Media Arts and Sciences (MAS) (<https://catalog.mit.edu/subjects/mas>)
- Military Science (MS) (<https://catalog.mit.edu/subjects/ms>)
- Music (Course 21M) (<https://catalog.mit.edu/subjects/21m>)
- Naval Science (NS) (<https://catalog.mit.edu/subjects/ns>)
- Nuclear Science and Engineering (Course 22) (<https://catalog.mit.edu/subjects/22>)
- Physics (Course 8) (<https://catalog.mit.edu/subjects/8>)
- Political Science (Course 17) (<https://catalog.mit.edu/subjects/17>)
- Science, Technology, and Society (STS) (<https://catalog.mit.edu/subjects/sts>)
- Special Programs (<https://catalog.mit.edu/subjects/sp>)
- Supply Chain Management (SCM) (<https://catalog.mit.edu/subjects/scm>)
- Theater Arts (21T) (<https://catalog.mit.edu/subjects/21t>)
- Urban Studies and Planning (Course 11) (<https://catalog.mit.edu/subjects/11>)
- Women's and Gender Studies (WGS) (<https://catalog.mit.edu/subjects/wgs>)

### How to Read Subject Descriptions

A subject description consists of four parts:

- Subject name (p. 4)
- Subject information (p. 4)
- Subject content (p. 5)
- Instructor(s) (p. 5)

**Examples:**

**11.003[J] Methods of Policy Analysis**

Same subject as 17.303[J]  
 Prereq: 11.002[J]; *Coreq: 14.01*  
 Acad Year 2024-2025: U (Spring)  
 Acad Year 2025-2026: Not offered  
 3-0-9 units. HASS-S

Provides students with an introduction to public policy analysis. Examines various approaches to policy analysis by considering the concepts, tools, and methods used in economics, political science, and other disciplines. Students apply and critique these approaches through case studies of current public policy problems.

*C. Abbanat*

**20.110[J] Thermodynamics of Biomolecular Systems**

Same subject as 2.772[J]  
 Prereq: (Biology (GIR), Calculus II (GIR), Chemistry (GIR), and Physics I (GIR)) or permission of instructor  
 U (Fall)  
 5-0-7 units. REST

Equilibrium properties of macroscopic and microscopic systems. Basic thermodynamics: state of a system, state variables. Work, heat, first law of thermodynamics, thermochemistry. Second and third law of thermodynamics: entropy and its statistical basis, Gibbs function. Chemical equilibrium of reactions in gas and solution phase. Macromolecular structure and interactions in solution. Driving forces for molecular self-assembly. Binding cooperativity, solvation, titration of macromolecules.

*M. Birnbaum, C. Voigt*

**Subject Name**

The subject name consists of its number and title.

|            |   |
|------------|---|
| J          | A "J" in brackets appears at the end of a subject number to indicate that it is jointly offered by or cross-listed with more than one department. |
| (New)      | Follows the subject number and title to indicate a subject that is new in the current academic year.  |
| (###.####) | If a subject has been renumbered, its former number appears after the title in parentheses.   |

**Subject Information**

The subject information section may include the following:

|                 |  |
|-----------------|--|
| Same subject as | Appears in parentheses, with the subject's other number(s), if a subject is jointly offered by or cross-listed with one or more departments.                               |
| Offered under   | Appears in parentheses, with all the cross-listed subject numbers that comprise a School-Wide Elective (SWE); this type of listing is unique to the School of Engineering. |

**Subject meets with** Denotes a subject that is taught with one or more subjects at a different level, or with all or a significant part of one or more subjects at the same level. Subjects that meet together have different coursework requirements.

**Prereq:** Introduces prerequisites (additional prereqs may be listed in the subject content). Students who have not completed the stated prerequisites must obtain the instructor's permission to register. Prerequisites are listed before corequisites, which are subjects that should be taken simultaneously with the subject described and are introduced by "Coreq:" and noted in italics. A list of prerequisites with no additional text denotes that all of the subjects in a series are required, for example:

Prereq: 6.1220[J], 6.4100, 6.4810[J], 18.417

The use of "or" denotes that just one of a series of prerequisites is required. When there are more than two options, commas are used, for example:

Prereq: 7.03, 7.05, 7.06, or 7.28

Parentheses are used to separate individual prerequisites from one of a series of prerequisites, or to separate several series of prerequisites, for example:

Prereq: 18.06 and (6.1220[J] or 6.3800)

Implicit prerequisites are not listed. For example, it is not necessary to list 7.05 as a prerequisite if 7.06 is already listed.

Because there are multiple versions of the subjects that satisfy General Institute Requirements (GIRs) in Science, those subjects are identified as GIRs when they appear as prerequisites and corequisites. The subjects that currently fulfill each requirement are listed below:

Biology (GIR): 7.012, 7.013, 7.014, 7.015, 7.016

Calculus I (GIR): 18.01, 18.01A

Calculus II (GIR): 18.02, 18.02A, 18.022

Chemistry (GIR): 3.091, 5.111, 5.112

Physics I (GIR) 8.01, 8.01L, 8.011, 8.012

Physics II (GIR): 8.02, 8.021, 8.022

**Acad Year** May indicate "2024-2025: Not offered" or "2025-2026: Not offered." There is no comment if the subject is offered in both academic years.

**U or G, plus (Fall, IAP, Spring, and/or Summer)** Indicates a subject's level and the terms in which it is offered. U denotes an undergraduate subject; G denotes a graduate subject. IAP is MIT's Independent Activities Period, which takes place in January.

|                                    |  |
|------------------------------------|--|
| #-#-# units or Units arranged      | Credit units (hours) indicate the total amount of time spent in class and laboratory, plus the estimated time that the average student spends on outside preparation, for one regular term subject. Credit hours are represented by three numbers separated by dashes (for example, 3-3-6). First is the number of units assigned for class time (lecture and/or recitation); second, the number of units for laboratory, design, or fieldwork; and third, the number of units for preparation. Each unit represents about 14 hours of work per term, or about one hour of work per week for a subject that spans an entire term. The total unit credit for a subject is obtained by adding together all the units shown. <b>Units arranged</b> indicates that units are specially arranged with the instructor. |
| BIOLOGY, PHYSICS I and II, etc.    | Subjects that fulfill the General Institute Requirements, such as BIOLOGY, PHYSICS I and II, CALCULUS I and II, CHEMISTRY, REST (Restricted Electives in Science and Technology), Institute LAB, Partial LAB, or HASS (Humanities, Arts, and Social Sciences) are so designated to the right of the credit units.  |
| HASS-H, etc.                       | Subjects that fulfill the HASS Requirement are designated HASS-H (Humanities), HASS-A (Arts), HASS-S (Social Sciences), or HASS-E (Elective).  |
| CI-H or CI-HW                      | Subjects fulfilling HASS component of the Communication Requirement are designated CI-H or CI-HW. See degree charts to identify communication-intensive subjects in each major (CI-M).   |
| P/D/F                              | Appears to the right of the credit units if the subject is graded on a P, D, or F basis (where P means C or better performance).   |
| Can be repeated for credit         | Appears under the credit units if the subject can be taken more than once for academic credit.   |
| Credit cannot also be received for | Indicates subjects whose content is substantively similar to the subject described. Interested students should take care to register for credit for only one of the subjects indicated.  |

### ***Subject Content***

If a description of the subject content is not given, the associated subject number under which the description can be found appears instead. Any subject open only to special groups is so noted at the end of its content description.

### ***Instructor(s)***

The name of the instructor(s) or department contact appears in italics at the end of the subject description.