

EXPERIMENTAL STUDY GROUP (ES)

ESG Science Subjects

Biology

ES.7012 Introductory Biology

Prereq: None

U (Fall)

5-0-7 units. BIOLOGY

Credit cannot also be received for 7.012, 7.013, 7.014, 7.015, 7.016, ES.7013

Equivalent to 7.012; see 7.012 for description. Instruction provided through small, interactive classes. Limited to students in ESG.

P. Christie

ES.7013 Introductory Biology

Prereq: None

U (Spring)

5-0-7 units. BIOLOGY

Credit cannot also be received for 7.012, 7.013, 7.014, 7.015, 7.016, ES.7012

Equivalent to 7.013; see 7.013 for description. Instruction provided through small, interactive classes. Limited to students in ESG.

P. Christie

Chemistry

ES.5111 Principles of Chemical Science

Prereq: None

U (Fall, Spring)

5-0-7 units. CHEMISTRY

Credit cannot also be received for 3.091, 5.111, 5.112, CC.5111, ES.5112

Equivalent to 5.111; see 5.111 for description. Instruction provided through small, interactive classes taught by ESG staff. Limited to students in ESG.

P. Christie

ES.5112 Principles of Chemical Science

Prereq: None

U (Fall)

5-0-7 units. CHEMISTRY

Credit cannot also be received for 3.091, 5.111, 5.112, CC.5111, ES.5111

Equivalent to 5.112; see 5.112 for description. Instruction provided through small, interactive classes taught by ESG staff. Limited to students in ESG.

N. Boekelheide

Mathematics

ES.1801 Calculus

Prereq: None

U (Fall)

5-0-7 units. CALC I

Credit cannot also be received for 18.01, 18.01A, CC.181A, ES.181A

Equivalent to 18.01; see 18.01 for description. Instruction provided through small, interactive classes. Limited to students in ESG.

G. Stoy

ES.1802 Calculus

Prereq: Calculus I (GIR)

U (Fall, Spring)

5-0-7 units. CALC II

Credit cannot also be received for 18.02, 18.022, 18.02A, CC.1802, CC.182A, ES.182A

Equivalent to 18.02; see 18.02 for description. Instruction provided through small, interactive classes. Limited to students in ESG.

G. Stoy

ES.1803 Differential Equations

Prereq: None. *Coreq: Calculus II (GIR)*

U (Fall, Spring)

5-0-7 units. REST

Credit cannot also be received for 18.03, 18.032, CC.1803

Equivalent to 18.03; see 18.03 for description. Instruction provided through small, interactive classes. Limited to students in ESG.

J. Orloff

ES.181A Calculus

Prereq: Knowledge of differentiation and elementary integration

U (Fall; first half of term)

5-0-7 units. CALC I

Credit cannot also be received for 18.01, 18.01A, CC.181A, ES.1801

Equivalent to 18.01A; see 18.01A for description. Instruction provided through small, interactive classes. Limited to students in ESG.

J. Orloff

ES.182A Calculus

Prereq: Calculus I (GIR)

U (Fall, IAP)

5-0-7 units. CALC II

Credit cannot also be received for 18.02, 18.022, 18.02A, CC.1802, CC.182A, ES.1802

Equivalent to 18.02A; see 18.02A for description. Instruction provided through small, interactive classes. Limited to students in ESG.

J. Orloff

Physics

ES.801 Physics I

Prereq: None

U (Fall)

5-0-7 units. PHYSICS I

Credit cannot also be received for 8.01, 8.011, 8.012, 8.01L, CC.801, CC.8012, ES.8012

Equivalent to 8.01; see 8.01 for description. Instruction provided through small, interactive classes. Limited to students in ESG.

P. Rebusco

ES.8012 Physics I

Prereq: None

U (Fall)

5-0-7 units. PHYSICS I

Credit cannot also be received for 8.01, 8.011, 8.012, 8.01L, CC.801, CC.8012, ES.801

Equivalent to 8.012; see 8.012 for description. Also covers connections to astrophysics; students complete individual and group projects. Limited to students in ESG.

A. Barrantes

ES.802 Physics II

Prereq: Calculus I (GIR) and Physics I (GIR)

U (Fall, Spring)

5-0-7 units. PHYSICS II

Credit cannot also be received for 8.02, 8.021, 8.022, CC.802, CC.8022, ES.8022

Equivalent to 8.02; see 8.02 for description. Instruction done through small, interactive classes. Limited to students in ESG.

A. Barrantes

ES.8022 Physics II

Prereq: Physics I (GIR); Coreq: Calculus II (GIR)

U (Fall, Spring)

5-0-7 units. PHYSICS II

Credit cannot also be received for 8.02, 8.021, 8.022, CC.802, CC.8022, ES.802

Equivalent to 8.022; see 8.022 for description. Students complete individual and group projects; content for the last week of the term is decided by students. Limited to students in ESG.

P. Rebusco

ESG Writing Program

ES.333[J] Production of Educational Videos: Skills for Communicating Academic and Professional Content

Same subject as CMS.333[J]

Prereq: None

U (Spring)

3-1-8 units. HASS-E; CI-H

Develops communication and media skills through the production of educational videos. Students conceive, plan, script, shoot and edit video content to teach elements of MIT's curriculum. Each student creates a series of short videos that concisely explains and contextualizes specific problems of importance to disciplines at MIT, especially physics, math, chemistry, biology, or the humanities. The resulting videos present these problems through compelling use of illustrations, demonstrations, animations, and commentary, all from the student's perspective. Empowers students specifically to communicate their MIT expertise to communities of learners and generally to reach broad audiences with quality, accessible online content. Limited to 12; preference to students in ESG.

D. Custer, G. Ramsay

ES.729[[Engineering Communication in Context

Same subject as 21W.729[[

Prereq: None

U (Fall)

3-1-8 units. HASS-E; CI-H

Introduces writing, graphics, meetings, reading, oral presentation, collaboration, and design as tools for product development. Students work in teams to conceive, design, prototype, and evaluate energy-related mechanical engineering products. Instruction focuses on communication tasks that are integral to the design process, including design notebooks, email, informal and formal presentations, meeting etiquette, literature searches, white papers, proposals, and reports. Other assignments address the cultural situation of engineers and engineering in the world at large. Limited to 18; preference to ESG students.

D. Custer

ESG HASS Subjects**ES.112 Philosophy of Love**

Prereq: None

U (Spring)

4-0-8 units. HASS-H; CI-H

Credit cannot also be received for ES.9112

Explores the nature of love through works of philosophy, literature, film, poetry, and individual experience. Investigates the distinction among eros (desiring or appreciative love), philia (mutuality), and agape (love as pure giving). Students discuss ideas of love as a feeling, an action, a species of 'knowing someone,' or a way to give or take. Authors include Plato, Kant, Buber, D. H. Lawrence, Rumi, and Aristotle. Preference to students in ESG and Concourse.

L. Perlman

ES.113 Ancient Greek Philosophy and Mathematics

Prereq: None

U (Spring)

Not offered regularly; consult department

3-0-9 units. HASS-H; CI-H

Explores the relationship between ancient Greek philosophy and mathematics. Investigates how ideas of definition, reason, argument and proof, rationality/irrationality, number, quality and quantity, truth, and even the idea of an idea were shaped by the interplay of philosophic and mathematical inquiry. Examines how discovery of the incommensurability of magnitudes challenged the Greek presumption that the cosmos is fully understandable. Explores the influence of mathematics on ancient Greek ethical theories. Authors: Euclid, Plato, Aristotle, Nicomachus, Theon of Smyrna, Bacon, Descartes, Dedekind, and Newton. Preference to students in Concourse and ESG.

L. Perlman

ES.114 Non-violence as a Way of Life (New)

Prereq: None

U (Fall)

3-0-9 units. HASS-H; CI-H

Credit cannot also be received for ES.9114

Addresses the philosophical question of what a non-violent life entails. Investigates its ethical dimensions and challenges, and considers whether we can derive a comprehensive moral theory from the principle of non-violence. Discusses the issues of lying, the duty to forgive, non-violent communication, the ethics of our relationship to anger, the possibility of loving enemies, and the ethics of punishment and rehabilitation. Includes readings from primary exponents of non-violence, such as Tolstoy, Gandhi and King.

L. Perlman

ES.9112 Philosophy of Love - MIT Prison Initiative (New)

Prereq: None

U (Spring)

Not offered regularly; consult department

3-0-9 units. HASS-H; CI-H

Credit cannot also be received for ES.112

Explores the nature of love through works of philosophy, literature, film, poetry, and individual experience. Investigates the distinction among eros (desiring or appreciative love), philia (mutuality), and agape (love as pure giving). Students discuss ideas of love as a feeling, an action, a species of 'knowing someone,' or a way to give or take. Authors include Plato, Kant, Buber, D. H. Lawrence, Rumi, and Aristotle. Taught inside a secure Massachusetts correctional facility with a mix of MIT students and incarcerated students. Limited to 10.

L. Perlman

ES.9114 Non-violence as a Way of Life - MIT Prison Initiative (New)

Prereq: None

U (Fall, Spring)

3-0-9 units. HASS-H; CI-H

Credit cannot also be received for ES.114

Addresses the philosophical question of what a non-violent life entails. Investigates its ethical dimensions and challenges, and considers whether we can derive a comprehensive moral theory from the principle of non-violence. Discusses the issues of lying, the duty to forgive, non-violent communication, the ethics of our relationship to anger, the possibility of loving enemies, and the ethics of punishment and rehabilitation. Includes readings from primary exponents of non-violence, such as Tolstoy, Gandhi and King. Taught inside a secure Massachusetts correctional facility with a mix of MIT students and incarcerated students. Limited to 10.

L. Perlman

ESG Seminars

ES.010 Chemistry of Sports: Understanding How Exercise Affects Your Body

Prereq: None

U (Spring)

2-1-3 units

Students apply chemistry knowledge to physical fitness through the study of three sports: swimming, cycling, and running. Classroom component focuses on nutrition, exercise, anatomy, physiology, and the chemistry of supplements and sports equipment. Laboratory component focuses on training for and completion of triathlon competition. Students may earn up to 2 PE points during the term by attending supervised triathlon training workouts. Preference to students in ESG.

P. Christie, S. Lyons

ES.011 Kitchen Chemistry

Prereq: None

U (Spring)

Not offered regularly; consult department

2-1-3 units

An experimental and "hands-on" approach to applied chemistry in cooking. Students perform experiments to illustrate chemical principles, such as extraction, denaturation, and phase changes. Preference to students in ESG.

P. Christie

ESG Teaching and Research

ES.200 ESG Undergraduate Teaching

Prereq: Permission of instructor

U (Fall, Spring)

2-0-4 units

Can be repeated for credit.

An opportunity to assist in the teaching of subjects in ESG in biology, chemistry, humanities and social sciences, mathematics, and physics. Student instructors may be involved in grading, running problemsolving sessions, or teaching classes depending on experience and interest. Qualified students may also develop and teach undergraduate seminars under the supervision of an appropriate faculty or staff member. Student instructors meet weekly with staff to discuss their teaching and cover a variety of topics related to effective teaching techniques. Limited to students in ESG.

P. Christie, G. Stoy

ES.210 ESG Independent Study

Prereq: Permission of instructor

U (Fall, IAP, Spring, Summer)

Units arranged [P/D/F]

Can be repeated for credit.

Opportunity for independent study under regular supervision by a staff member. Projects require prior approval, as well as a written proposal and a final report. Limited to students in ESG.

L. Royden

ES.UR Undergraduate Research in ESG

Prereq: None

U (Fall, IAP, Spring, Summer)

Units arranged [P/D/F]

Can be repeated for credit.

For students wishing to pursue undergraduate research opportunities in the Experimental Study Group. Limited to students in ESG.

L. Royden

ESG Special Subjects

ES.S10 Special Seminar in Science

Prereq: None

U (Spring)

Units arranged [P/D/F]

Can be repeated for credit.

Covers topics not included in the permanent curriculum. May not be used for GIR credit, but may be repeated for credit with permission of instructor. Preference to students in ESG.

Staff

ES.S11 Special Seminar in Science

Prereq: None

U (Spring)

Not offered regularly; consult department

Units arranged [P/D/F]

Can be repeated for credit.

Covers topics not included in the permanent curriculum. May not be used for GIR credit, but may be repeated for credit with permission of instructor. Preference to students in ESG.

Staff

ES.S20 Special Seminar in Mathematics

Prereq: None

U (Spring)

Units arranged [P/D/F]

Can be repeated for credit.

Covers topics not included in the permanent curriculum. May not be used for GIR credit, but may be repeated for credit with permission of instructor. Preference to students in ESG.

*Staff***ES.S21 Special Seminar in Mathematics**

Prereq: None

U (Fall, IAP, Spring)

Not offered regularly; consult department

Units arranged [P/D/F]

Can be repeated for credit.

Covers topics not included in the permanent curriculum. May not be used for GIR credit, but may be repeated for credit with permission of instructor. Preference to students in ESG.

*Staff***ES.S30 Special Seminar in Engineering and Computer Science**

Prereq: None

U (Spring)

Units arranged [P/D/F]

Can be repeated for credit.

Covers topics not included in the permanent curriculum. May not be used for GIR credit, but may be repeated for credit with permission of instructor. Preference to students in ESG.

*Staff***ES.S31 Special Seminar in Engineering and Computer Science**

Prereq: None

U (Fall, IAP, Spring)

Not offered regularly; consult department

Units arranged [P/D/F]

Can be repeated for credit.

Covers topics not included in the permanent curriculum. May not be used for GIR credit, but may be repeated for credit with permission of instructor. Preference to students in ESG.

*Staff***ES.S40 Special Seminar in the Humanities**

Prereq: None

U (Fall, Spring)

Units arranged [P/D/F]

Can be repeated for credit.

Covers topics not included in the permanent curriculum. May not be used for GIR credit, but may be repeated for credit with permission of instructor. Preference to students in ESG.

*Staff***ES.S41 Special Seminar in the Humanities**

Prereq: None

U (Fall, Spring)

Not offered regularly; consult department

Units arranged

Can be repeated for credit.

Covers topics not included in the permanent curriculum. May not be used for GIR credit, but may be repeated for credit with permission of instructor. Preference to students in ESG.

*Staff***ES.S42 Special Seminar in the Humanities**

Prereq: None

U (Fall, Spring)

Not offered regularly; consult department

Units arranged

Can be repeated for credit.

Covers topics not included in the permanent curriculum. May not be used for GIR credit, but may be repeated for credit with permission of instructor. Preference to students in ESG.

*Staff***ES.S50 Special Seminar in the Arts**

Prereq: None

U (Fall)

Not offered regularly; consult department

Units arranged [P/D/F]

Can be repeated for credit.

Covers topics not included in the permanent curriculum. May not be used for GIR credit, but may be repeated for credit with permission of instructor. Preference to students in ESG.

Staff

ES.S51 Special Seminar in the Arts

Prereq: None
U (Fall, IAP, Spring)
Not offered regularly; consult department
Units arranged [P/D/F]
Can be repeated for credit.

Covers topics not included in the permanent curriculum. May not be used for GIR credit, but may be repeated for credit with permission of instructor. Preference to students in ESG.

Staff

ES.S60 Special Seminar in Social Science

Prereq: None
U (Spring)
Not offered regularly; consult department
Units arranged [P/D/F]
Can be repeated for credit.

Covers topics not included in the permanent curriculum. May not be used for GIR credit, but may be repeated for credit with permission of instructor. Preference to students in ESG.

Staff

ES.S61 Special Seminar in Social Science

Prereq: None
U (Spring)
Not offered regularly; consult department
Units arranged [P/D/F]
Can be repeated for credit.

Covers topics not included in the permanent curriculum. May not be used for GIR credit, but may be repeated for credit with permission of instructor. Preference to students in ESG.

Staff

ES.S70 Special Seminar in Interdisciplinary Studies

Prereq: None
U (Fall, Spring)
Units arranged [P/D/F]
Can be repeated for credit.

Covers topics not included in the permanent curriculum. May not be used for GIR credit, but may be repeated for credit with permission of instructor. Preference to students in ESG.

Staff

ES.S71 Special Seminar in Interdisciplinary Studies

Prereq: None
U (Spring)
Units arranged [P/D/F]
Can be repeated for credit.

Covers topics not included in the permanent curriculum. May not be used for GIR credit, but may be repeated for credit with permission of instructor. Preference to students in ESG.

Staff

ES.S90 Special Studies in the MIT Initiative for Teaching Incarcerated Individuals (New)

Prereq: None
U (Fall, Spring)
Units arranged [P/D/F]
Can be repeated for credit.

Seminar taught inside a secure Massachusetts correctional facility with a mix of MIT students and incarcerated students. Topics vary from year to year. Limited to 10.

Staff

ES.S91 Special Studies in the MIT Initiative for Teaching Incarcerated Individuals (New)

Prereq: None
U (Fall, Spring)
Units arranged [P/D/F]
Can be repeated for credit.

Seminar taught inside a secure Massachusetts correctional facility with a mix of MIT students and incarcerated students. Topics vary from year to year. Limited to 10.

Staff