

24.410–24.419 Topics in the History of Philosophy

Prereq.: Permission of instructor

Acad Year 1996-97: Not offered

Acad Year 1997-98: G (Fall)

3-0-9 H-LEVEL Grad Credit

Can be repeated for credit

Intensive study of a philosopher or philosophical movement. Content varies from year to year, and subject may be taken repeatedly with permission of instructor and advisor.

Staff

24.500 Consciousness

Prereq.: Permission of instructor

Acad Year 1996-97: Not offered

Acad Year 1997-98: G (Fall)

3-0-9 H-LEVEL Grad Credit

Can be repeated for credit

What consciousness is; what it is for; why it is so hard to study scientifically; whether it is unified; its relation to the self. Blind-sight and other "defects" of consciousness; relation to attention; temporal phenomena.

Epiphenomenalism, eliminativism, zombies, the inverted spectrum hypothesis, anesthetics, unconscious pain. Relation to mind-body identity and functionalist theses. Meets with Wellesley Philosophy 345, taught jointly at MIT with Owen Flanagan.

Staff

24.501 Problems In Metaphysics

Prereq.: Permission of instructor

Acad Year 1996-97: Not offered

Acad Year 1997-98: G (Spring)

3-0-9 H-LEVEL Grad Credit

Can be repeated for credit

Systematic examination of selected problems in metaphysics. Content varies from year to year and subject may be taken repeatedly with permission of instructor and advisor. Topic for this year: metaphysical issues concerning necessity and possibility.

A. Byrne, E. Hall

24.518J Problems of Mental Representation

(Same subject as 9.671J)

Prereq.: Two Philosophy subjects and permission of instructor

G (Spring)

3-0-9 H-LEVEL Grad Credit

Can be repeated for credit

Selected philosophical problems about representational mental states. The nature of intentional content: narrow vs wide content, conceptual vs nonconceptual content; skepticism about the content of one's own thoughts, the relation between the intentionality of language and the intentionality of thought, representational theories of phenomenal consciousness. Specific topics may vary from year to year.

R. Stalnaker

24.601 Topics in Moral Philosophy

Prereq.: Permission of instructor

G (Spring)

3-0-9 H-LEVEL Grad Credit

Systematic examination of selected problems in moral philosophy. Content varies from year to year. Subject may be taken repeatedly with permission of instructor and advisor.

R. Wedgwood

24.611J Political Philosophy

(Same subject as 17.106J)

Prereq.: One subject in Modern Political Philosophy

G (Fall)

3-0-9 H-LEVEL Grad Credit

See description under subject 17.106J.

J. Cohen

24.701 Topics in Logic

Prereq.: 24.241 or equivalent

G (Fall)

Units arranged H-LEVEL Grad Credit

Can be repeated for credit

Soundness, completeness, and compactness of first-order logic; Skolem-Löwenheim theorems; Craig interpolation lemma; Beth definability theorem; decidability of monadic logic with identity; Turing machines; recursive functions and their definitions; Gödel incompleteness and extensions; undecidability of dyadic logic; Tarski's theorem; nonstandard models of arithmetic.

M. Glanzberg

24.711 Topics in Philosophical Logic

Prereq.: Permission of instructor

G (Spring)

3-0-9 H-LEVEL Grad Credit

Can be repeated for credit

Problems of ontology, epistemology, and philosophy of language that bear directly on questions about the nature of logic and the analysis of concepts of logical theory, such as logical truth, logical consequence, proof. Content varies from year to year, and subject may be taken repeatedly upon permission of instructor and advisor.

V. McGee

24.728 Topics in Semantics

(Subject meets with 24.979)

Prereq.: Permission of instructor

G (Spring)

3-0-9 H-LEVEL Grad Credit

Can be repeated for credit

Seminar on current research in semantics and generative grammar. Topics may vary from year to year. Meets with subject 24.979.

I. Heim, K. von Fintel

24.729 Topics in Philosophy of Language

Prereq.: Permission of instructor

G (Fall)

3-0-9 H-LEVEL Grad Credit

Can be repeated for credit

Major issues in the philosophy of language. Topics change each year and subject may be taken repeatedly with permission of instructor.

J. Higginbotham

24.801 Philosophy of Mathematics

Prereq.: Permission of instructor

Acad Year 1996-97: Not offered

Acad Year 1997-98: G (Fall)

3-0-9 H-LEVEL Grad Credit

Can be repeated for credit

Examination of major philosophies of mathematics — logicism, formalism, intuitionism — on the nature of mathematical proof, existence of mathematical entities, and related issues. It is strongly recommended that students have taken 24.241 or equivalent.

Staff

24.805 Topics in Theory of Knowledge

Prereq.: Permission of instructor

Acad Year 1996-97: Not offered

Acad Year 1997-98: G (Fall)

3-0-9 H-LEVEL Grad Credit

Can be repeated for credit

Major issues in Theory of Knowledge. Topics change each year and subject may be taken repeatedly with permission of instructor.

E. Hall

24.808 Rationality and Action

(New)

Prereq.: —

G (Spring)

3-0-9

The distinction between practical and theoretical reasoning; the roles of logic, probability, prudence, and emotion in setting norms of rationality; varieties of agency (causing vs allowing a result, intended vs merely foreseen consequences) and their significance in practical deliberation.

A. MacIntyre

24.809J Objectivity, Truth, and Scientific Rationality

(Same subject as STS.190J)

Prereq.: One subject in history or philosophy

Acad Year 1996-97: Not offered

Acad Year 1997-98: G (Spring)

3-0-9 H-LEVEL Grad Credit

Are there ahistorical standards of scientific rationality? Many philosophers working within the mainstream tradition of Anglo-American analytic philosophy would like to think so; yet their attempts at precisely elucidating such standards have met with rather spectacular failure when tested against the history of science. One response to this failure is to insist that all scientific knowledge is "socially constructed." But is this really the only response available? Subject seeks to answer — or at least to develop — this question via the study of some recent philosophical work on scientific rationality, together with detailed examination of one or two relevant episodes in the history of physics.

E. Hall, J. Buchwald

24.810 Topics in Philosophy of Science

Prereq.: Permission of instructor

G (Fall)

3-0-9 H-LEVEL Grad Credit

Can be repeated for credit

Topics in the foundations of science: the nature of concepts and theories, the distinction between empirical and theoretical knowledge claims, realist and instrumentalist interpretation of such claims, and the analysis of scientific explanation. The central topic varies from year to year; subject may be taken repeatedly with the permission of instructor and advisor.

E. Hall

24.891 Special Graduate Topics in Philosophy

Prereq.: —

G (Fall, Summer)

Units arranged H-LEVEL Grad Credit

Can be repeated for credit

24.892 Special Graduate Topics in Philosophy

Prereq.: —

G (Spring)

Units arranged H-LEVEL Grad Credit

Can be repeated for credit

Open to qualified graduate students in philosophy who wish to pursue special studies or projects.

Consult Department Headquarters.

Linguistics**24.900J The Study of Language**

(Same subject as 21F.237J)

Prereq.: —

U (Fall)

3-0-9 HASS

What is language? What does knowledge of a language consist of? How do children learn languages? Is language unique to humans? Why are there many languages? How do languages change? Is any language or dialect superior to another? How are speech and writing related? Context for these and similar questions provided by basic examination of internal organization of sentences, words, and sound systems. Assumes no prior training in linguistics.

S. Flynn, Staff

24.901J Language and its Structure I: Phonology

(Same subject as 21F.240J)

Prereq.: 24.900J/21F 237J

U (Spring)

3-0-9 HASS

Introduction to fundamental concepts in phonological theory and their relation to issues in philosophy and cognitive psychology. Articulatory and acoustic phonetics, distinctive features and the structure of feature systems, underlying representations and underspecification, phonological rules and derivations, syllable structure, accentual systems, the morphology-phonology interface. Examples and exercises from a variety of languages.

W. O'Neil

24.902 Language and its Structure II: Syntax

Prereq.: 24.900J/21F 237J

U (Spring)

3-0-9 HASS

Introduction to fundamental concepts in syntactic theory and their relation to issues in philosophy and cognitive psychology. Examples and exercises from a variety of languages.

M. DeGraff

24.903 Language and its Structure III: Semantics and Pragmatics

Prereq.: 24.900J/21F 237J

U (Fall)

3-0-9 HASS

Introduction to fundamental concepts in semantic and pragmatic theory. (i) Basic issues of form and meaning in natural languages. Ambiguities of structure and of meaning. Compositionality. Word meaning. Quantification and logical form. (ii) Contexts: indexicality, discourse, and presupposition. Literal meaning vs speaker's meaning. Speech acts, conversational implicature meaning. Speech acts. Conversational implicature.

K. von Fintel

24.905J Psycholinguistics

(Same subject as 9.59J)

Prereq.: 9.62 or 24.900J

U (Fall)

3-0-9 HASS

See description under subject 9.59J.

E. Gibson, K. Wexler

24.910 Topics in Linguistic Theory

Prereq.: Four subjects in linguistics

U (Spring)

3-0-9 HASS

Can be repeated for credit

Review in depth of a major interface topic in current linguistic theory.

W. O'Neil

24.921 Special Graduate Topics in Linguistics

Prereq.: —

G (Fall, Summer)

Units arranged H-LEVEL Grad Credit

Can be repeated for credit

Open to qualified graduate students in linguistics who wish to pursue special studies or projects.

Consult Department Headquarters.

24.922 Special Graduate Topics in Linguistics

Prereq.: —

G (Spring)

Units arranged H-LEVEL Grad Credit

Can be repeated for credit

Open to qualified graduate students in linguistics who wish to pursue special studies or projects.

Consult Department Headquarters.

24.942 Topics in the Grammar of a Less Familiar Language

Prereq.: 24.951

G (Spring)

3-0-6 H-LEVEL Grad Credit

Can be repeated for credit

Detailed examination of the grammar of a language whose structure is significantly different from English, with special emphasis on problems of interest in the study of linguistic universals. A native speaker of the language assists when possible.

K. Hale, M. Kenstowicz

24.946 Linguistic Theory and Japanese Language

(Subject meets with 21F.514)

Prereq.: Permission of instructor

Acad Year 1996-97: Not offered

Acad Year 1997-98: G (Spring)

3-0-6

See description under subject 21F.514.

S. Miyagawa

24.948J Linguistic Theory and Second Language Acquisition

(Same subject as 21F.236J)

Prereq.: Permission of instructor

Acad Year 1996-97: Not offered

Acad Year 1997-98: G (Spring)

3-0-6

Reading and discussion of current linguistic theory, first language acquisition research, and data concerning adult second language acquisition. Focus on development of a theory of second language acquisition within a theory of Universal Grammar. Emphasis on syntactic, lexical, and phonological development. Examination of ways in which this body of data confronts theories of language.

*S. Flynn, W. O'Neill***24.949J Language Acquisition I**

(Same subject as 9.601J)

Prereq.: Permission of instructor

Acad Year 1996-97: G (Fall)

Acad Year 1997-98: Not offered

3-0-6 H-LEVEL Grad Credit

See description under subject 9.601J.

*K. Wexler***24.950J Language Acquisition II**

(Same subject as 9.602J)

Prereq.: Permission of instructor

Acad Year 1996-97: Not offered

Acad Year 1997-98: G (Spring)

3-0-6 H-LEVEL Grad Credit

See description under subject 9.602J.

*K. Wexler***24.951 Introduction to Syntax**

Prereq.: 24.901J

G (Fall)

3-0-9 H-LEVEL Grad Credit

Introduction to theories of syntax underlying work currently being done within the lexical-functional and government-binding frameworks. Organized into three interrelated parts, each focused upon a particular area of concern: 1) phrase structure, 2) the lexicon, and 3) principles and parameters. Grammatical rules and processes constitute a focus of attention throughout the course, serving to reveal both modular structure of grammar and interaction of grammatical components.

*M. DeGraff, D. Pesetsky***24.952 Advanced Syntax**

Prereq.: 24.951

G (Spring)

3-0-9 H-LEVEL Grad Credit

Problems in constructing an explanatory theory of grammatical representation. Topics drawn from current work on anaphora, casemarking, control, argument structure, Wh-and related constructions. Study of language-particular parameters in the formulation of linguistic universals.

*S. Miyagawa, D. Pesetsky***24.956 Topics in Syntax**

Prereq.: 24.951

G (Fall, Spring)

3-0-9 H-LEVEL Grad Credit

Can be repeated for credit

The nature of linguistic universals that make it possible for languages to differ and place limits on these differences. Study of selected problem areas, showing how data from particular languages contribute to the development of a strong theory of universal grammar and how such a theory dictates solutions to traditional problems in the syntax of particular languages.

*M. DeGraff, D. Pesetsky***24.957 Introduction to Linguistic Theory at an Advanced Level**

Prereq.: Permission of instructor

G (Spring)

3-0-9 H-LEVEL Grad Credit

Discussion of conceptual and methodological issues: goals of linguistic theory and its place in the study of thought and behavior; descriptive and explanatory theories; the nature, use, and acquisition of knowledge of language compared with other cognitive systems; relations of form, meaning, and language use. Examination of theories of transformational generative grammar as they have evolved and are now being pursued: theory of base, transformations, semantic interpretation of formal structures, logical form, and conditions on the form and functioning of rules.

*N. Chomsky***24.958 Linguistic Structure**

Prereq.: 24.952 or 24.957

Acad Year 1996-97: Not offered

Acad Year 1997-98: G (Fall)

3-0-9 H-LEVEL Grad Credit

Current work on topics in syntax and semantics. Permission of instructor required.

*N. Chomsky***24.959 Workshop in Syntax and Semantics**

Prereq.: Permission of instructor

G (Spring)

3-0-9 H-LEVEL Grad Credit

An intensive group tutorial/seminar for discussion of research being conducted by participants. No listeners allowed.

*I. Heim, D. Pesetsky***24.961 Introduction to Phonology**

Prereq.: Permission of instructor

G (Fall)

4-0-5 H-LEVEL Grad Credit

Introduction to the current research questions in phonological theory. Topics include metrical and prosodic structure; features and their phonetic basis in speech; acquisition and parsing; phonological domains; morphology; language change and reconstruction. Activities include problem solving, squibs, and data collection.

*M. Kenstowicz***24.962 Advanced Phonology**

Prereq.: 24.961

G (Spring)

3-0-9 H-LEVEL Grad Credit

Continuation of 24.961.

*M. Kenstowicz, C. Zoll***24.964 Topics in Phonology**

Prereq.: 24.961

G (Fall)

3-0-9 H-LEVEL Grad Credit

Can be repeated for credit

In-depth study of a topic in current phonological theory.

*C. Zoll***24.965 Morphology**

Prereq.: Permission of instructor

Acad Year 1996-97: Not offered

Acad Year 1997-98: G (Spring)

3-0-9 H-LEVEL Grad Credit

Structure of the lexicon and its function in grammar. Properties of word-formation rules. Problems of selection, productivity, compositionality. Systems of inflectional categories: case, tense. Phonological aspects of word structure: allomorphy, cyclic phonology, constituent structure, boundaries. Detailed analysis of languages with complex morphology.

*A. Marantz***24.966J Laboratory on the Physiology, Acoustics, and Perception of Speech**

(Same subject as 6.542J, HST.712J)

Prereq.: Permission of instructor

Acad Year 1996-97: Not offered

Acad Year 1997-98: G (Fall)

2-2-8 H-LEVEL Grad Credit

See description under subject 6.542J.

*K. N. Stevens, S. Shattuck-Hufnagel,**J. S. Perkell***24.968J Speech Communication**

(Same subject as 6.541J, HST.710J)

Prereq.: Permission of instructor

G (Spring)

3-1-8 H-LEVEL Grad Credit

See description under subject 6.541J.

*K. N. Stevens, S. J. Keyser***24.969 Workshop in Phonology and Morphology**

Prereq.: Permission of instructor

G (Fall)

3-0-9 H-LEVEL Grad Credit

An intensive group tutorial/seminar for discussion of research being conducted by participants. No auditors are allowed.

M. Kenstowicz, C. Zoll

HST**Health Sciences and Technology**

For degree requirements, see listing in Chapter VII under the Harvard-MIT Division of Health Sciences and Technology.

Students wishing to take HST.011-091 must obtain permission of the instructor.

HST subjects numbered 011 through 300 are scheduled according to the Harvard Medical School academic calendar, which is different from that of MIT. Students whose graduation depends upon completing one or more of these subjects should take particular care regarding the schedule.

HST.011 Human Functional Anatomy

(Subject meets with HST.010)

Prereq.: Permission of instructor

G (Fall)

2-9-10 H-LEVEL Grad Credit

Lectures, detailed laboratory dissections and prosections provide a thorough exploration of the gross structure and function of the human body. Fundamental principles of bioengineering are employed to promote analytical approaches to understanding the body's design. The embryology of major organ systems is presented, together with certain references to phylogenetic development, as a basis for comprehending anatomical complexity. Correlation clinics stress both normal and abnormal functions of the body; guest lecturers focus on current problems in organ system research. (Only HST students may register under HST.010, graded P/D/F.)

F. A. Jenkins, Jr., L. Gehrke, W. C. Hayes, S. W. Kennedy, Associates

HST.021 Musculoskeletal Pathophysiology

(Subject meets with HST.020)

Prereq.: Permission of instructor

G (IAP)

3-0-3 H-LEVEL Grad Credit

Growth and development of normal bone and joints, the process of mineralization, the biophysics of bone and response to stress and fracture, calcium and phosphate homeostasis and regulation by parathyroid hormone and vitamin D, and the pathogenesis of metabolic bone diseases and disease of connective tissue, joints, and muscles, with consideration of possible mechanisms and underlying metabolic derangements. Enrollment limited. (Only HST students may register under HST.020, graded P/D/F.)

D. R. Robinson, W. C. Hayes, J. T. Potts, Jr., A. L. Schiller, C. B. Sledge, Associates

HST.031 Human Pathology

(Subject meets with HST.030)

Prereq.: 7.012 or 7.013 or 7.014, 8.01, 8.02

G (Fall)

4-4-8 H-LEVEL Grad Credit

Introduction to the functional structure of normal cells and tissues; pathologic principles of cellular adaptation and injury, inflammation, circulatory disorders, immunologic injury, infection, genetic disorders, and neoplasia in humans. Lectures, conferences emphasizing clinical correlations and contemporary experimental biology, laboratories with examination of microscopic and gross specimens, and autopsy case studies emphasizing modern pathology practice. Enrollment limited. Permission of instructor required. (Only HST students may register under HST.030, graded P/D/F.)
F. J. Schoen, R. N. Mitchell

HST.041 Mechanisms of Microbial Pathogenesis

(Subject meets with HST.040)

Prereq.: 7.012 or 7.013 or 7.014, 7.05

G (Fall)

3-6-5 H-LEVEL Grad Credit

Deals with the mechanisms of pathogenesis of bacteria, viruses, and other microorganisms. Approach spans mechanisms from molecular to clinical aspects of disease. Topics selected for intrinsic interest and cover the demonstrated spectrum of pathophysiologic mechanisms. Enrollment limited. Permission of instructor required. (Only HST students may register under HST.040, graded P/D/F.)
C. Crumpacker II, S. Miller, H. Simon

HST.061 Endocrinology

(Subject meets with HST.060)

Prereq.: 7.012 or 7.013 or 7.014, 7.05

G (Spring)

6-0-6 H-LEVEL Grad Credit

Physiology and pathophysiology of the human endocrine system. Three hours of lecture and section each week concern individual parts of the endocrine system. Topics also include assay techniques, physiological integration, etc. At frequent clinic sessions, patients are presented who demonstrate clinical problems considered in the didactic lectures. Enrollment limited, permission of instructor required. (Only HST students may register under HST.060, graded P/D/F.)
J. Flier, F. Wondisford, W. Kettye

HST.071 Human Reproductive Biology

(Subject meets with HST.070)

Prereq.: 7.012 or 7.013 or 7.014, 7.05, permission of instructor

G (Fall)

2-4-3 H-LEVEL Grad Credit

Lectures, laboratory sessions, and clinical case discussions designed to provide the student with a clear understanding of the physiology, endocrinology, and pathology of human reproduction. Emphasis is on quantitative analytic techniques and the role of technology in reproductive science. The course also involves the student in the wider aspects of reproduction, such as prenatal diagnosis, *in vitro* fertilization, abortion, menopause, and contraception. (Only HST students may register under HST.070, graded P/D/F.)
H. Klapholz, Associates

HST.081 Hematology

(Subject meets with HST.080)

Prereq.: 7.05

G (Fall)

3-6-4 H-LEVEL Grad Credit

An intensive survey of the biology, physiology, and pathophysiology of blood with systematic consideration of hematopoiesis, white blood cells, red blood cells, platelets, coagulation, plasma proteins, and hematologic malignancies. Emphasis given equally to didactic discussion and analysis of clinical problems. Meets second half of the term. Enrollment limited. Permission of instructor required. (Only HST students may register under HST.080, graded P/D/F.)
D. J. Kuter, I. Kuter, W. Aird, W. H. Churchill

HST.091 Cardiovascular Pathophysiology

(Subject meets with HST.090)

Prereq.: 7.012 or 7.013 or 7.014, 8.02, 18.03

G (Spring)

3-3-9 H-LEVEL Grad Credit

Normal and pathologic physiology of the heart and vascular system. Emphasis includes hemodynamics, electrophysiology, gross pathology, and clinical correlates of cardiovascular function in normal and in a variety of disease states. Special attention given to congenital, rheumatic, valvular heart disease and cardiomyopathy. Enrollment limited. Permission of instructor required. (Only HST students may register under HST.090, graded P/D/F.)
R. Cohen, W. Gamble, P. Saul, E. Edelman, Associates

HST.101 Respiratory Pathophysiology

(Subject meets with HST.100)
Prereq.: 7.012 or 7.013 or 7.014, 7.05, 8.01
G (Spring)
4-0-8 H-LEVEL Grad Credit

Lectures, seminars, and laboratories cover the histology and cellular function of the lung. The physics of gases, mechanics, physiology, and gas exchange as it relates to health and disease is covered. Problems of gas transport are reviewed; pathophysiology of common respiratory disorders presented. For M.D. candidates and other students with background in science. Enrollment limited. Permission of instructor required. (Only HST students may register under HST.100, graded P/D/F.)
J. Drazen, S. Loring

HST.111 Renal Pathophysiology

(Subject meets with HST.110)
Prereq.: 7.012 or 7.013 or 7.014, 7.05
G (Spring)
4-0-8 H-LEVEL Grad Credit

Considers the normal physiology of the kidney and the pathophysiology of renal disease. Renal regulation of sodium, potassium, acid, and water balance emphasized as are the mechanism and consequences of renal failure. Included also are the pathology and pathophysiology of clinical renal disorders such as acute and chronic glomerulonephritis, pyelonephritis, and vascular disease. Enrollment limited. Permission of instructor required. (Only HST students may register under HST.110, graded P/D/F.)

C. Coggins, H. Rennke, J. V. Bonventre, M. Gray

HST.121 Gastroenterology

(Subject meets with HST.120)
Prereq.: 7.012 or 7.013 or 7.014, 7.05, 8.01
G (Fall)
3-6-4 H-LEVEL Grad Credit

Presents the anatomy, physiology, biochemistry, biophysics, and bioengineering of the gastrointestinal tract and associated pancreatic, liver, and biliary systems. Emphasis on the molecular and pathophysiological basis of disease where known. Covers gross and microscopic pathology and clinical aspects. Formal lectures given by core faculty, with some guest lectures by local experts. Selected seminars conducted by students with supervision of faculty. Enrollment limited. Permission of instructor required. (Only HST students may register under HST.120, graded P/D/F.)

M. C. Carey, R. H. Schapiro, J. R. Wands, J. M. Crawford

HST.523J Mechanical Forces in Organ Development and Regeneration

(Same subject as 2.795J, 3.97J)
Prereq.: 3.091 or 5.711, 2.005 or 5.007, 7.012 or 7.010
G (Spring)
3-0-9 H-LEVEL Grad Credit

See description under subject 2.795J.
J. V. Yannas, M. Sano

HST.131 Introduction to Neuroscience

(Subject meets with HST.130)
Prereq.: Permission of instructor
G (Fall)
6-3-6 H-LEVEL Grad Credit

Explores major concepts in neuroscience on several levels ranging from molecules and cells through neural systems, perception, cognition, and behavior. Aspects of neuropharmacology, pathophysiology, neurology, and psychiatry covered as well. Lectures supplemented by conferences and labs. Labs review neuroanatomy at the gross and microscopic levels. (Only HST students may register under HST.130, graded P/D/F.)
R. H. Masland

HST.141 The Molecular and Biochemical Basis of Some Clinical Disorders

(Subject meets with HST.140)
Prereq.: 7.05
G (IAP)
4-0-6 H-LEVEL Grad Credit

Conducted as a seminar to study a variety of human diseases and the underlying molecular and biological basis for the pathogenesis and pathophysiology of the disorders. Lectures by faculty and seminars conducted by students, with tutorials and supervision by faculty. Whenever possible, appropriate patients presented and discussed. Appropriate for students who have had a course in biochemistry and/or molecular biology. (Only HST students may register under HST.140, graded P/D/F.)
P. M. Gallop, I. M. London, Associates

HST.151 Principles of Pharmacology

(Subject meets with HST.150)
Prereq.: 7.012 or 7.013 or 7.014, 7.05, 8.01
G (Spring)
3-0-9 H-LEVEL Grad Credit

An introduction to pharmacology. Topics to be covered include mechanisms of drug action, dose-response relations, pharmacokinetics, drug delivery systems, drug metabolism, toxicity of pharmacological agents, drug interactions, and substance abuse. Selected agents and classes of agents will be examined in detail. (Only HST students may register under HST.150, graded P/D/F.)
C. Rosow, R. Lees, G. Strichartz

HST.161 Molecular Biology and Genetics in Modern Medicine (Revised Content)

(Subject meets with HST.160)
Prereq.: 7.012 or 7.013 or 7.014, 7.05
G (Fall)
4-0-8 H-LEVEL Grad Credit

Focuses on the scientific, clinical, and ethical aspects of human genetics. Basic science lectures covering molecular genetics are integrated with patient presentations and discussion. An outside project puts each student in direct contact with clinicians, researchers, and patients. During the first part of the class, background for this and other basic science subjects is introduced, while students with stronger backgrounds meet in alternative sections to discuss related advance topics based on reading primary literature. (Only HST students may register under HST.160, graded P/D/F.)
C. Tabin, D. Housman

HST.176 Cellular and Molecular Immunology

(Subject meets with HST.175)
Prereq.: 7.05
G (Fall)
4-0-8 H-LEVEL Grad Credit
Credit cannot also be received for HST.175

Covers cells and tissues of the immune system, the structure and function of antigen receptors and the general principles governing expression of antigen receptor genes, the cell biology of antigen processing and presentation including molecular structure and assembly of MHC molecules, the biology of cytokines, leukocyte-endothelial interactions, and the pathogenesis of immunologically mediated diseases. Consists of lectures and conferences based on clinical cases which illustrate basic concepts. Sections are integrated with HST.030 Human Pathology. Enrollment is limited to 40 students. (Only HST students may register under HST.175, graded P/D/F.)
A. H. Lichtman, A. K. Abbas, K. L. Rock, Associates

HST.181J Genetics and Molecular Medicine

(Subject meets with 7.57J, HST.180)
Prereq.: 7.012 or 7.013 or 7.014, 7.05
G (IAP)
4-0-8

Introduction to central issues in medical genetics. Significance of karyotypic analysis in clinical genetics and oncology. In-depth consideration of well-defined, genetically based illnesses including cystic fibrosis, muscular dystrophies, and Huntington's disease. Clinical issues posed by predisposition to common forms of illness such as diabetes, atherosclerosis, and specific forms of cancer addressed from a molecular genetic perspective. Includes patient presentations, consideration of genetic counseling issues, and the likely clinical impact of new genetic diagnostic techniques. (Only HST students may register under HST.180, graded P/D/F.)
D. E. Housman, L. Holmes

HST.191 Statistical Planning and Analysis of Biomedical Investigations

(Subject meets with HST.190)

Prereq.: 18.02

G (IAP)

3-0-3 H-LEVEL Grad Credit

Introduces statistical logic and technique as a basis for clinical decisions and scientific inference. Students learn to perform elementary statistical calculations and acquire the concepts and vocabulary to read biomedical literature critically and communicate productively with statistical professionals. Includes probability theory, normal sampling, chi-square and t-tests, analysis of variance, linear regression, and survival analysis. Case studies include applications to diagnostic screening, clinical drug trials, and physiological experiments. Emphasis on experimental studies rather than epidemiology. (Only HST students may register under HST.190, graded P/D/F.)
D. Finkelstein

HST.196 Teaching Health Sciences and Technology

Prereq.: —

G (Fall, Spring, Summer)

Units arranged [P/D/F]

Can be repeated for credit

For teaching assistants in HST where the teaching assignment is approved for academic credit by the Department.

*M. L. Gray***HST.198 Special Topics in Health Sciences and Technology**

Prereq.: —

G (Fall, Spring, Summer)

Units arranged H-LEVEL Grad Credit

Can be repeated for credit

Opportunity for study of graduate-level topics related to HST but not included elsewhere in the catalogue. Registration under this subject normally used for situations involving individual study under supervision of a faculty member, but may, when appropriate, be used for small study groups. Normal registration is for 12 units. Registration is subject to the approval of the professor in charge.

*R. G. Mark***HST.199 Research in Health Sciences and Technology**

Prereq.: Permission of instructor

G (Fall, Spring, Summer)

Units arranged [P/D/F]

Can be repeated for credit

For research assistants in HST where the assigned research is approved for academic credit by the Department. Hours are arranged with research supervisor.

*A. D. D'Andrea, G. Daley***HST.200 Introduction to Clinical Medicine**

Prereq.: Permission of instructor

G (Spring)

9-25-12 [P/D/F] H-LEVEL Grad Credit

February through May, Monday, Wednesday, Friday. Students learn the basic skills involved in examination of the patient and are introduced to history taking and patient interview. Students exposed to clinical problems in medicine, surgery, and pediatrics in groups of two or three students under one faculty member. Findings reported through history taking and oral presentation of the cases to the class. An intensive subject serving as prerequisite to clinical clerkships. Enrollment limited to students in M.D. Program.

*W. H. Churchill, M. Donaldson, S. Kohler, Associates***HST.201 Introduction to Clinical Medicine and Medical Engineering I**

Prereq.: HST.011, HST.031, HST.091,

HST.101, HST.111, HST.131, 7.05

G (IAP)

0-20-0 [P/D/F] H-LEVEL Grad Credit

Required for doctoral students in MEMP program. Students 1) develop skill in patient interviewing and physical examination; 2) become proficient at organizing and communicating clinical information in both written and oral forms; 3) begin integrating history, physical, and laboratory data with pathophysiologic principles; and 4) become familiar with the clinical decision-making process and broad economic, ethical, and sociological issues involved in patient care. Permission of instructor required.

*R. G. Mark, C. J. Hatem, E. Spar***HST.202 Introduction to Clinical Medicine and Medical Engineering II**

Prereq.: HST.201

G (Spring)

0-20-0 [P/D/F] H-LEVEL Grad Credit

Strengthens the skills developed in HST.201 through a six-week clerkship in medicine at Mount Auburn Hospital. Students serve as full-time members of a ward team and participate in longitudinal patient care. In addition, students participate in regularly scheduled teaching conferences focused on principles of patient management.

*E. Spar, C. J. Hatem, R. G. Mark, Associates***HST.203 Clinical Experience in Medical Engineering and Medical Physics**

Prereq.: HST.201, HST.202

G (Fall, Spring, Summer)

0-12-0 [P/D/F] H-LEVEL Grad Credit

An individually arranged full-time one-month directed study in a clinical environment where active medical engineering/medical physics investigation is in progress. Students are actively engaged in patient care, particularly those aspects that interface closely with technology. Students also focus on in-depth exploration of the technical and research area. Term paper required.

*W. C. Hayes***HST.220 Introduction to the Care of Patients**

Prereq.: —

G (Fall, Spring)

2-0-2 [P/D/F] H-LEVEL Grad Credit

Elective subject for HST/MD candidates only. Year-long subject: students must register for both Fall and Spring terms. Provides an introduction to the care of patients through opportunities to observe and participate in doctor-patient interaction in an outpatient, office-based environment and through patient-oriented seminars. Students are exposed to some of the practical realities of providing patient care. Topics covered include basic interviewing, issues of ethics and confidentiality, and other aspects of the doctor-patient relationship. Requirements include regular attendance, and a short paper on patient care. Enrollment limited to 15.

*W. M. Kettyle, A. N. Weinberg, MIT Medical Department Staff***HST.230 Real Medicine**

Prereq.: Permission of instructor

G (Fall, IAP, Spring, Summer)

1-3-2 [P/D/F] H-LEVEL Grad Credit

An elective subject for HST/MD candidates only. Students form a group medical practice and participate in the longitudinal management of medically fragile patients. Under the supervision of physician-preceptors, students regularly visit patients at home and in the hospital, and address relevant medical, ethical, financial, and organizational issues. Students begin the subject in the fall of the second year of the MD curriculum and are expected to continue the subject for a minimum of one year.

*C. DuBeau, R. Mark, P. McArdle, Associates***HST.240 Physician/Scientist Preceptorship**

Prereq.: Clerkships in medicine and surgery

G (Fall, Spring, Summer)

0-20-20 [P/D/F] H-LEVEL Grad Credit

Two-month course required for all HST/MD students. Students learn both the fundamental clinical principles and practices of a medical or surgical subspecialty and are exposed to a related area of research in sufficient detail to understand the issues and methods of cutting-edge research. Half devoted to clinical experiences; the other half to scholarly work in basic or clinical science. Arranged individually by the students.

*E. Edelman**R. Cohen, W. Goralski, P. Gaul, E. Edelman, Associates*

HST.300 Clinical Management and Physiology of Surgical Intensive Care Patients

Prereq.: Clerkship in Medicine and permission of instructor
G (Fall, Spring, Summer)
0-15-0 [P/D/F] H-LEVEL Grad Credit

One-month course designed to teach quantitative applications of basic physiologic and pharmacologic concepts to synthesize diagnoses and treatments for critically ill patients. Emphasis also on principles, applications, and limitations of equipment used to monitor and treat patients in intensive care units. Students participate in individual and group discussions, and are assigned clinically relevant basic science readings and given supervised responsibilities for one or more ICU patients. Students are expected to give brief oral reports weekly and a more comprehensive presentation integrating physiologic concepts with clinical problems at the end of the month.

R. S. Teplick

HST.410J Biochemistry Laboratory

(Subject meets with 5.071J, TOX.209)

Prereq.: 5.07, and 5.310 or 5.311
U (Spring)
2-8-2

Meets with graduate subject TOX.209, but assignments differ. See description under subject 5.071J.

J. Williamson, P. Dedon

HST.511 Principles of Human Gross Anatomy

(Subject meets with HST.510)

Prereq.: Permission of instructor
G (Spring)
1-3-5 H-LEVEL Grad Credit

Consists of lectures and demonstrations of previously dissected materials, emphasizing terminology and organizational principles of human gross anatomy. Issues of modern imaging receive particular emphasis. Limited enrollment. (Only HST students may register under HST.510, graded P/D/F.)

S. W. Kennedy

HST.522J Biomaterials — Tissue Interactions

(Same subject as 2.79J, 3.96J)

Prereq.: 3.091 or 5.11; 2.005 or 5.60; 7.012 or 7.013
G (Fall)

3-0-9 H-LEVEL Grad Credit

See description under subject 2.79J.

I. V. Yannas, M. Spector

HST.523J Mechanical Forces in Organ Development and Remodeling

(Same subject as 2.785J, 3.97J)

Prereq.: 3.091 or 5.11; 2.005 or 5.60; 7.012 or 7.013

G (Spring)

3-0-9 H-LEVEL Grad Credit

See description under subject 2.785J.

I. V. Yannas, M. Spector

HST.524J Design of Medical Devices and Implants

(Same subject as 2.782J)

Prereq.: Permission of instructor
G (Spring)
3-0-9 H-LEVEL Grad Credit

Solution of clinical problems by use of implants and other medical devices. Systematic use of cell-matrix control volumes. The role of stress analysis in the design process. Anatomic fit: shape and size of implants. Selection of biomaterials. Instrumentation for surgical implantation procedures. Preclinical testing for safety and efficacy: risk/benefit ratio assessment. Evaluation of clinical performance: design of clinical trials. Project materials drawn from orthopedic devices, soft tissue implants, artificial organs, and dental implants.

I. Yannas, M. Spector

HST.525J Transport Phenomena and Tumor Pathophysiology

(Same subject as 10.548J)

Prereq.: 18.03; 2.20 or 10.301 or equivalent
G (Spring)
2-0-4 H-LEVEL Grad Credit

Tumor pathophysiology plays a central role in the growth, metastasis, detection, and treatment of solid tumors. Principles of transport phenomena are applied to develop a quantitative understanding of angiogenesis (formation of new blood vessels), blood flow and microcirculation, metabolism and microenvironment, transport and binding of small and large molecules, movement of cancer and immune cells, metastatic process, radiotherapy, chemotherapy, immunotherapy, hyperthermia, and photodynamic therapy of solid tumors.

R. K. Jain

HST.532J Hyperthermia: Biology, Technology, and Cancer Therapy

(Same subject as 2.763J)

Prereq.: —
G (Spring)
4-1-7

See description under subject 2.763J.

H. F. Bowman, Staff

HST.541J Quantitative Physiology: Cells and Tissues

(Subject meets with 6.021J, 2.791J, 2.794J, 6.521J)

Prereq.: 2.003 or 6.002 or 6.071 or 10.301;
8.02, 18.03
G (Fall)
5-2-5

Meets with undergraduate subject 6.021J. Requires the completion of more advanced home problems and/or an additional project. See description under subject 6.021J.

T. F. Weiss, D. M. Freeman

HST.542J Quantitative Physiology: Organ Transport Systems

(Subject meets with 6.022J, 2.792J, 2.796J, 6.522J)

Prereq.: 2.006 or 6.013, HST.541J
U (Spring)
4-2-6

See description under subject 6.022J.
R. G. Mark, R. Kamm

HST.543J Quantitative Physiology: Sensory and Motor Systems

(Same subject as 6.023J, 2.793J, 16.401J)

Prereq.: 2.003 or 6.003 or 16.060
U (Spring)
3-2-7

See description under subject 6.023J.
L. S. Frishkopf, C. Wall III, N. Hogan, L. Young

HST.544J Fields, Forces, and Flows: Background for Physiology

(Same subject as 6.561J, 2.795J)

Prereq.: Permission of instructor
G (Spring)
3-0-9 H-LEVEL Grad Credit

See description under subject 6.561J.
A. J. Grodzinsky

HST.560J Principles of Radiation Applications

(Same subject as 22.55J)

Prereq.: Permission of instructor
G (Spring)
4-0-8 H-LEVEL Grad Credit

See description under subject 22.55J.
X. L. Zhou

HST.561J Principles of Medical Imaging

(Same subject as 22.56J, 2.761J)

Prereq.: Permission of instructor
G (Spring)
4-0-8 H-LEVEL Grad Credit

See description under subject 22.56J.
D. Cory, D. Rowell

HST.562J Spatial Aspects of Nuclear Magnetic Resonance Spectroscopy

(Same subject as 22.562J)

Prereq.: 22.56J or permission of instructor
G (Fall)
3-0-9 H-LEVEL Grad Credit

See description under subject 22.562J.
D. G. Cory

HST.568J Radiation Biophysics

(Same subject as 22.57J)

Prereq.: 22.101
G (Fall)
4-0-8 H-LEVEL Grad Credit

See description under subject 22.57J.
J. C. Yanch

HST.570J Biomedical Instrumentation Electronics

(Same subject as 2.781J, 16.458J)

Prereq.: Permission of instructor

G (Summer)

6-6-6

Introduction to modern computer-based instrumentation through a major bioengineering laboratory project in which each student develops electronic circuits, interfaces them to a microcomputer, and combines them to form an instrument. Classroom material focuses on electronic circuit elements, networks, signal and system representations, logic and digital design, elementary programming, and physiological background. No background in electrical engineering or programming required.

S. K. Burns, D. Rowell

HST.572 Future Medical Technologies

Prereq.: Permission of instructor

G (Spring)

2-0-4 [P/D/F]

Helps medical and graduate students to develop an understanding of the limitations of current technology and the problems of creating new medical technology from research. Representative topics include drug delivery, biotechnology, and non-invasive diagnostic methods. Students interact with their peers and local research leaders in these fields in a seminar setting, and are encouraged to generate their own solutions to the problems discussed. Students may find this subject helpful in evaluating possible theses. Open to advanced undergraduates with permission of instructor.

*J. C. Weaver***HST.573 Biological Control Systems**

Prereq.: 6.003 or 2.02 or permission of instructor

G (Spring)

3-0-9 H-LEVEL Grad Credit

Application of control theory to the modeling and analysis of biological systems. Dynamics and system identification of compartmental models. Feedback, feedforward, adaptive, and optimal and fuzzy control mechanisms in physiological control. Oscillation, chaos, and catastrophe phenomena in nonlinear biological systems. Neuronal and neural network models. Emphasis on mathematical analysis and computer simulation with examples from a wide variety of biological and clinical applications.

*C.-S. Poon***HST.575J Bioelectronics Project Laboratory**

(Same subject as 6.121J)

Prereq.: 6.002 or 6.071

U (Spring)

2-8-2 Institute LAB

See description under subject 6.121J.

*S. K. Burns, R. G. Mark***HST.582J Biomedical Signal and Image Processing**

(Same subject as 6.555J, 16.456J)

Prereq.: 6.003 or 2.003 or 18.085

G (Spring)

3-6-3 H-LEVEL Grad Credit

Fundamentals of digital signal processing with particular emphasis on problems in biomedical research and clinical medicine. Basic principles and algorithms for data acquisition, imaging, filtering, and feature extraction. Laboratory projects provide practical experience in processing physiological data, with examples from neurophysiology, cardiology, speech processing, and medical imaging.

L. Braida, B. Delgutte, A. Dobrzeniecki, J. Greenberg

HST.584J Magnetic Resonance — Analytic, Biochemical, and Imaging Techniques

(Same subject as 22.561J)

Prereq.: Permission of instructor

G (Spring)

3-0-12 H-LEVEL Grad Credit

Introduction to basic NMR theory, including a quantum mechanical description of the NMR experiment. Examples of biochemical data obtained using NMR summarized along with other related experiments. Detailed study of NMR imaging techniques includes discussions of basic cross-sectional image reconstruction, image contrast, flow and real-time imaging, and hardware design considerations. Exposure to laboratory NMR spectroscopic and imaging equipment included.

*B. R. Rosen***HST.585J Biosensors, Signal Processing, and Biomedical Applications**

(Same subject as 6.566J)

Prereq.: Permission of instructor

Acad Year 1996-97: Not offered

Acad Year 1997-98: G (Fall)

3-3-6 H-LEVEL Grad Credit

Principles of measurements and instrumentation, emphasizing quantitative modelling of basic transduction (sensing) processes, interaction of sensors with biological systems (e.g. human body, clinical specimens), and both fundamental and practical limitations on the signal-to-noise ratio. Emphasis on modern signal processing strategies involving intensive real-time computation as an integral part of the measurement process. Some background in life sciences and electronics assumed.

*J. C. Weaver, S. K. Burns***HST.586–589 Special Subjects in Medical Engineering and Medical Physics**

Prereq.: Permission of instructor

G (Fall, IAP, Spring, Summer)

Units arranged H-LEVEL Grad Credit

Can be repeated for credit

Opportunity for group study of advanced subjects related to the Medical Engineering and Medical Physics Program not otherwise included in the curriculum. Offerings are initiated by MEMP faculty on an ad hoc basis subject to program approval. Prerequisites may vary by topic; consult faculty at time of offering.

*H. F. Bowman***HST.590 Biomedical Engineering Seminar (Revised Content)**

Prereq.: —

G (Fall, Spring)

1-0-0 [P/D/F]

Can be repeated for credit

Seminars presented by HST graduate students, by prominent outside speakers, and by focus groups of HST faculty and students. Designed to provide students with a broad exposure to current research in biomedical engineering and medical physics.

*M. L. Yarmush***HST.591 Biomedical Engineering Research Seminar**

Prereq.: —

G (Fall, Spring)

2-0-0 H-LEVEL Grad Credit

Can be repeated for credit

Development of professional speaking skills in the communication of research progress. Students present their research, emphasizing clear statement of the goals, significance, and current status of their work. Confidential, written feedback given by each member of the audience. Required of all students affiliated with the HST Biomedical Engineering Center.

*J. C. Weaver***HST.595 Tutorial in Medical Engineering and Medical Physics I**

(Revised Content)

Prereq.: —

G (Fall)

2-0-0 [P/D/F]

HST.596 Tutorial in Medical Engineering and Medical Physics II

(Revised Content)

Prereq.: —

G (Fall, Spring, Summer)

0-2-0 [P/D/F]

An exposure to the breadth and depth of biomedical engineering in the HST community through: (1) detailed discussions of technical, social, and ethical aspects of cutting-edge research and modern health care with HST faculty; and (2) visits to academic research laboratories, clinical facilities at HMS hospitals, and industrial sites involved in medical technology development. Topics to be covered include: tissue engineering, biomolecular design, functional imaging, biomechanics, gene therapy, cryopreservation, micromachines, and minimally invasive therapies.

*M. L. Yarmush, M. Toner***HST.598 Special Topics in Medical Engineering and Medical Physics**

Prereq.: —

U (Fall, Spring, Summer)

Units arranged

Can be repeated for credit

For undergraduates desiring to carry on substantial projects of their own choosing in medical engineering or medical physics. Work may be of experimental, theoretical, or design nature. A project proposal is required at time of registration.

E. G. Cravalho

HST.599 Special Topics in Medical Engineering and Medical Physics

Prereq.: Permission of instructor
G (Fall, Spring, Summer)
Units arranged H-LEVEL Grad Credit
Can be repeated for credit

Assigned reading or research on special topics in theoretical, experimental, or clinical aspects of medical engineering and medical physics. Arranged on individual basis with instructor. A project proposal is required at time of registration. Approval of coordinator required. Coordinator: M. L. Gray.

HST.710J Speech Communication

(Same subject as 6.541J, 24.968J)
Prereq.: Permission of instructor
G (Spring)
3-1-8 H-LEVEL Grad Credit

See description under subject 6.541J.
K. N. Stevens, S. J. Keyser

HST.712J Laboratory on the Physiology, Acoustics, and Perception of Speech

(Same subject as 6.542J, 24.966J)
Prereq.: Permission of instructor
Acad Year 1996-97: Not offered
Acad Year 1997-98: G (Fall)
2-2-8 H-LEVEL Grad Credit

See description under subject 6.542J.
K. N. Stevens, J. S. Perkell, S. Shattuck-Huf-nagel

HST.714J Acoustics of Speech and Hearing

(Same subject as 6.551J)
Prereq.: 8.03 and 6.003 or permission of instructor
G (Fall)
4-2-6 H-LEVEL Grad Credit

See description under subject 6.551J.
*W. T. Peake, J. J. Rosowski,
W. M. Rabinowitz, K. N. Stevens*

HST.716J Signal Processing by the Auditory System: Perception

(Same subject as 6.552J)
Prereq.: 6.003; 6.041 or 6.431 and permission of instructor
G (Fall)
3-0-9 H-LEVEL Grad Credit

See description under subject 6.552J.
L. D. Braida

HST.718 Anatomy of Speech and Hearing

Prereq.: 7.012 or 7.013 or 7.014
G (Fall)
3-3-6 H-LEVEL Grad Credit

The anatomical structures that are key to speech production and hearing are presented. Laboratory exercises provide students with dissection experience and study of microscopic specimens. Topics include gross anatomy of head and neck structures, cranial nerves, and the central nervous system. Special techniques such as chemical markers, imaging, and electron microscopy are demonstrated.

*J. C. Adams, J. B. Kobler, P. Janfaza,
B. C. Fullerton*

HST.720 Physiology of the Ear

Prereq.: HST.718, HST.714J
G (Spring)
4-0-8 H-LEVEL Grad Credit

Physiological mechanisms underlying the transmission and processing of signals in the auditory periphery. Topics include comparative anatomy; acoustics, mechanics, and hydrodynamics of sound transmission; physiology of transduction and synaptic transmission; neural coding of simple and complex sounds; feedback control; and the physiological bases for hearing disorders. Emphasis on experimental observations, theories, quantitative models, and clinical relevance.

M. C. Liberman, D. Freeman, Staff

HST.722 Brain Mechanisms for Hearing and Speech

Prereq.: HST.720
G (Fall)
4-0-8 H-LEVEL Grad Credit

The anatomy and physiology of the central nervous system relevant to speech and hearing. Specific topics include: the anatomy, connections, neurochemistry and single-neuron physiology of the brainstem auditory system including the feedback control systems; the midbrain and forebrain auditory system; auditory evoked potentials; motor control and the control of the muscles of speech; cortical representation of speech and language function.

J. J. Guinan, Jr., M. C. Brown

HST.724 Clinical Aspects of Speech and Hearing

Prereq.: HST.714J, HST.718, HST.720, and HST.722
G (Spring)
12-0-12 H-LEVEL Grad Credit

Clinical approaches to speech and hearing problems. Lectures, discussion sessions, and presentations of patients by otolaryngologists, audiologists, speech clinicians, pathologists, rehabilitation specialists, and bioengineers. Principles of clinical research.

J. B. Nadol, Staff

HST.730 Molecular Biology of the Auditory System

Prereq.: 7.012 or 7.013 or 7.014 or equivalent
G (Fall)
3-0-9 H-LEVEL Grad Credit

An introductory tutorial-based approach to the auditory system. First half focuses on human genetics and molecular biology, covering fundamentals of pedigree analysis, linkage analysis, molecular cloning, and gene analysis as well as ethical/legal issues, all in the context of an auditory disorder. Second half emphasizes molecular approaches to function and dysfunction of the cochlea, and is based on readings and discussion of research literature.

C. C. Morton, W. F. Sewell

HST.780-789 Special Subjects in the Speech and Hearing Sciences (New)

Prereq.: Permission of instructor
G (Fall, IAP, Spring, Summer)
Units arranged H-LEVEL Grad Credit
Can be repeated for credit

Opportunity for group study of advanced subjects related to the Speech and Hearing Sciences not otherwise included in the curriculum. Offerings initiated by members of the SHS faculty on an ad hoc basis subject to program approval. Prerequisites may vary by topic; consult faculty at time of offering.

L. D. Braida

HST.790 Research Approaches to Speech and Hearing

Prereq.: 6.021J or 6.501 or 7.20 or 9.00
G (Spring)
6-0-6 H-LEVEL Grad Credit

Methods and ideas in research on speech and hearing. Approaches and techniques of various research groups are analyzed. Readings and discussions illustrate how knowledge has been gained in the speech and hearing sciences. Professional responsibilities of scientists and issues such as standards for conducting research, integrity in science, criteria for human and animal studies are examined in detail. A written research proposal is required of each student.

N. Y. S. Kiang, Staff

HST.791 Speech and Hearing Laboratory Visits

Prereq.: —
G (Fall, Spring)
0-1-0 [P/D/F]

A weekly meeting to acquaint first-year students in the Speech and Hearing Sciences with research opportunities. Meetings at different laboratories are hosted by faculty members of the program. These informal, introductory visits are designed to acquaint students with the kinds of work done in each laboratory.

N. Y. S. Kiang

HST.799 Special Topics in Speech and Hearing

Prereq.: Permission of Instructor
G (Fall, IAP, Spring, Summer)
Units arranged [P/D/F] H-LEVEL Grad Credit
Can be repeated for credit

Assigned reading or research on special topics in theoretical, experimental, or clinical aspects of speech and hearing science. Arranged on individual basis with a research supervisor. At time of registration, a project proposal is required and a concise written progress report endorsed by the supervisor must be submitted to the instructor in charge at the end of each term.

W. T. Peake

HST.901J Health Economics

(Same subject as 14.21J)

Prereq.: 14.01

U (Fall)

3-0-9 HASS

See description under subject 14.21J.

J. E. Harris

HST.903J Health Economics Seminar

(Same subject as 14.286J)

Prereq.: 14.04, permission of instructor

G (Spring)

3-0-9 H-LEVEL Grad Credit

Can be repeated for credit

See description under subject 14.286J.

J. E. Harris

HST.920J Health Technology

(Same subject as 15.136J, 10.547J)

Prereq.: Permission of instructor

Acad Year 1996-97: Not offered

Acad Year 1997-98: G (Spring)

3-0-6 H-LEVEL Grad Credit

See description under subject 15.136J.

S. N. Finkelstein, C. L. Cooney

HST.959 Research Topics in Medical Informatics

Prereq.: —

G (Fall, Spring, Summer)

Units arranged [P/D/F]

Can be repeated for credit

Research methods and ideas involved in addressing the information needs of medical education, medical practice, and biomedical research. Topics include clinical information system design, medical knowledge representation, clinical decision making, cost effectiveness analysis, image management, software engineering, and evaluation approaches for information systems. Activities in various research groups are analyzed, and supplemented by readings and discussions. A written proposal and supervised project work are required.

R. A. Greenes, P. Szolovits, G. O. Barnett, M. C. Weinstein, S. G. Pauker

HST.ThG Graduate Thesis

Prereq.: —

G (Fall, Spring, Summer)

Units arranged H-LEVEL Grad Credit

Can be repeated for credit

Program of graduate research leading to the writing of a Ph.D. or Sc.D. thesis or to the HST S.M. thesis; to be arranged by the student and an appropriate MIT faculty advisor.

M. L. Gray

HST.UR Undergraduate Research in Health Sciences and Technology

Prereq.: —

U (Fall, Spring, Summer)

Units arranged [P/D/F]

Can be repeated for credit

HST.URG Undergraduate Research in Health Sciences and Technology

Prereq.: —

U (Fall, Spring, Summer)

Units arranged

Can be repeated for credit

Extended participation in the work of a faculty member or research group. Research is arranged by mutual agreement between the student and a member of the faculty of the Harvard-MIT Division of Health Sciences and Technology, and may continue over several terms. Registration requires submission of a written proposal, signed by the faculty supervisor. A summary report must be submitted at the end of each term.

H. F. Bowman

Research methods and ideas involved in addressing the information needs of medical education, medical practice, and biomedical research. Topics include clinical information system design, medical knowledge representation, clinical decision making, cost effectiveness analysis, image management, software engineering, and evaluation approaches for information systems. Activities in various research groups are analyzed, and supplemented by readings and discussions. A written proposal and supervised project work are required.

R. A. Greenes, P. Szolovits, G. O. Barnett, M. C. Weinstein, S. G. Pauker

Program of graduate research leading to the writing of a Ph.D. or Sc.D. thesis or to the HST S.M. thesis; to be arranged by the student and an appropriate MIT faculty advisor.

M. L. Gray

Program of graduate research leading to the writing of a Ph.D. or Sc.D. thesis or to the HST S.M. thesis; to be arranged by the student and an appropriate MIT faculty advisor.

R. A. Greenes, P. Szolovits, G. O. Barnett, M. C. Weinstein, S. G. Pauker

Program of graduate research leading to the writing of a Ph.D. or Sc.D. thesis or to the HST S.M. thesis; to be arranged by the student and an appropriate MIT faculty advisor.

R. A. Greenes, P. Szolovits, G. O. Barnett, M. C. Weinstein, S. G. Pauker

Program of graduate research leading to the writing of a Ph.D. or Sc.D. thesis or to the HST S.M. thesis; to be arranged by the student and an appropriate MIT faculty advisor.

R. A. Greenes, P. Szolovits, G. O. Barnett, M. C. Weinstein, S. G. Pauker

Program of graduate research leading to the writing of a Ph.D. or Sc.D. thesis or to the HST S.M. thesis; to be arranged by the student and an appropriate MIT faculty advisor.

R. A. Greenes, P. Szolovits, G. O. Barnett, M. C. Weinstein, S. G. Pauker

Program of graduate research leading to the writing of a Ph.D. or Sc.D. thesis or to the HST S.M. thesis; to be arranged by the student and an appropriate MIT faculty advisor.

R. A. Greenes, P. Szolovits, G. O. Barnett, M. C. Weinstein, S. G. Pauker

Program of graduate research leading to the writing of a Ph.D. or Sc.D. thesis or to the HST S.M. thesis; to be arranged by the student and an appropriate MIT faculty advisor.

R. A. Greenes, P. Szolovits, G. O. Barnett, M. C. Weinstein, S. G. Pauker

Program of graduate research leading to the writing of a Ph.D. or Sc.D. thesis or to the HST S.M. thesis; to be arranged by the student and an appropriate MIT faculty advisor.

R. A. Greenes, P. Szolovits, G. O. Barnett, M. C. Weinstein, S. G. Pauker

Program of graduate research leading to the writing of a Ph.D. or Sc.D. thesis or to the HST S.M. thesis; to be arranged by the student and an appropriate MIT faculty advisor.

R. A. Greenes, P. Szolovits, G. O. Barnett, M. C. Weinstein, S. G. Pauker

Program of graduate research leading to the writing of a Ph.D. or Sc.D. thesis or to the HST S.M. thesis; to be arranged by the student and an appropriate MIT faculty advisor.

R. A. Greenes, P. Szolovits, G. O. Barnett, M. C. Weinstein, S. G. Pauker

Program of graduate research leading to the writing of a Ph.D. or Sc.D. thesis or to the HST S.M. thesis; to be arranged by the student and an appropriate MIT faculty advisor.

R. A. Greenes, P. Szolovits, G. O. Barnett, M. C. Weinstein, S. G. Pauker

Program of graduate research leading to the writing of a Ph.D. or Sc.D. thesis or to the HST S.M. thesis; to be arranged by the student and an appropriate MIT faculty advisor.

R. A. Greenes, P. Szolovits, G. O. Barnett, M. C. Weinstein, S. G. Pauker

Program of graduate research leading to the writing of a Ph.D. or Sc.D. thesis or to the HST S.M. thesis; to be arranged by the student and an appropriate MIT faculty advisor.

R. A. Greenes, P. Szolovits, G. O. Barnett, M. C. Weinstein, S. G. Pauker

MAS**Media Arts and Sciences**

For degree requirements, see listing in Chapter VII under the School of Architecture and Planning.

Undergraduate Subjects**MAS.UR Undergraduate Research in Media Arts and Sciences**

Prereq.: —
U (Fall, Spring, Summer)
Units arranged [P/D/F]
Can be repeated for credit

MAS.URG Undergraduate Research in Media Arts and Sciences

Prereq.: —
U (Fall, Spring, Summer)
Units arranged
Can be repeated for credit

Individual or group study, research, or laboratory investigations under faculty supervision, including individual participation in an ongoing research project. See UROP coordinator for further information.

C. Schmandt

MAS.100 Introduction to Media Arts and Sciences

Prereq.: —
U (Spring)
3-0-3

Examines new technologies and applications in information and entertainment, perceptual computing, learning and common sense. Explores the convergence of computing, communications, and consumer electronics, with emphasis on the human interface, machine intelligence, and personalized media. Includes introductions to holography, computer graphics, interactive cinema, electronic music, digital television, machine vision, speech processing, interface agents, and interface physics. Large lecture format accompanied by team research projects on world activities in these areas.

N. P. Negroponte

MAS.123 Tools for Thought

Prereq.: —
U (Spring)
3-3-6

Examines how technological tools support new ways of thinking and learning. Considers the role of toys, microworlds, "intelligent" tutors, and virtual communities in the learning process. Emphasizes the use of artifacts as representational and expressive aids for learning, problem-solving, and communication. Students explore tools-to-think with, analyze them, and design new ones.

M. Resnick, M. Brand, J. Cassell

MAS.124 Intentionality (New)

Prereq.: —
U (Spring)
2-4-6

Often it is not what is said, but what one does that communicates one's intentions. Facial expressions, body or hand movements, gaze, tone of voice, pauses, or other sounds are examples. Similarly, the intentions of a group are read from the patterns of individual interactions and movements. Subject explores the basic forms of expressing intentionality both in individual and group settings, in both humans and other animals. Projects show how correct recognition and interpretation of intentional acts may be recovered, using situations such as conversation, strolling down the street, driving, dance (including animal behaviors), and sports such as soccer or football.

A. Pentland, W. Richards

MAS.134 Story: Representation and Process

Prereq.: 6.001, MAS 100
U (Fall)
3-3-6

Principles of narrative and presentation taught in a studio context. Expression in multiple media. Design and analysis of representation of media content and narrative structure. Basic techniques of visual design, video storytelling, information retrieval, and personalization. Class requirements include readings and a series of group and individual projects in several different media. Limited enrollment.

G. Davenport, K. Haase

MAS.142 Performance

Prereq.: —
U (Fall)
2-4-6

Introduction to interactive performance systems in a variety of media (with emphasis on music), from the theoretical, interface, and creative expression points of view. Subject covers real-time control issues, unobtrusive monitoring of physical gesture and human voice, intelligent interpretation of human expressive intention, and mapping of user control to performance results. Class projects include systems that demand various types and levels of skill in interactive environments that support collaboration and collective performance. Final project is an interactive performance, designed and created by groups of students.

T. Machover

MAS.160 Signals, Systems, and Information for Media Technology

(Subject meets with MAS.510)
Prereq.: 18.02
U (Fall)
4-0-8

Fundamentals of signals, systems, and information theory with emphasis on modeling both the audio/visual message and the human recipient. Linear systems, difference equations, Z-transforms, sampling and sampling rate conversion, convolution, filtering, modulation, Fourier analysis, entropy, noise, Shannon's fundamental theorems. Additional topics may include data compression, filter design, and feature detection. Meets with graduate subject MAS.510, but assignments differ.

V. M. Bove, Jr., R. W. Picard

Perceptual Computing**MAS.210 High-Level Computer Vision: Methods and Models**

(Subject meets with MAS.624)
Prereq.: 6.801 or permission of instructor
Acad Year 1996-97: U (Spring)
Acad Year 1997-98: Not offered
3-0-9

Addresses high-level computer vision issues such as geometric reconstruction, vision for autonomous navigation, recognition, scene labeling, and scene monitoring. Consideration of vision as an inference problem where the system is attempting to make decisions about the scene. Second half emphasizes image sequences where variation over time is important. Focus is on both the fundamental research problems addressed as well as the specific mathematical and artificial intelligence techniques applied. Meets with graduate subject MAS.624, but assignments differ.

A. Bobick, Staff

MAS.234J Cognitive Architectures

(Same subject as 9.34J, MAS.654)
Prereq.: 9.62 or 9.00
U (Fall)
3-0-6

See description under subject 9.34J.
W. A. Richards

MAS.241 Audio Processing by People and Machines (New)

(Subject meets with 21M.566J, MAS.641J)

Prereq.: Permission of instructor

U (Fall)

3-0-6

Principles of information processing by the human auditory system, from detection of frequency, intensity, and spectrum, to the development of their perceptual correlates as pitch, loudness, and timbre. Machine models of the human auditory and musical experience using perceptually-based sensor and interpreter constructs, sufficient to enable machines to experience sound and music in a manner related to our own. Exploring auditory and music cognition with the aid of real-time audio processors. Modeling musical common sense.

B. Vercoe

MAS.290 Special Projects in Perceptual Computing

Prereq.: Permission of instructor

U (Fall, Spring, Summer)

Units arranged

Can be repeated for credit

MAS.291 Special Projects in Perceptual Computing

Prereq.: Permission of instructor

U (Fall, Spring, Summer)

Units arranged [P/D/F]

Can be repeated for credit

Special projects on group or individual basis. Registration subject to prior arrangement of subject matter and supervision by staff.

Staff

Learning and Common Sense**MAS.334 Software Agents Seminar**

(Subject meets with MAS.737)

Prereq.: Permission of instructor

U (Fall)

Units arranged

Can be repeated for credit

Work on an individual or group basis in the area of intelligent software which helps users deal with information and work overload. Assorted readings from the literature. Students required to participate actively in the class discussions. Final project. Meets with graduate subject MAS.737, but assignments differ.

P. Maes

MAS.390 Special Projects in Learning and Common Sense

Prereq.: Permission of instructor

U (Fall, Spring, Summer)

Units arranged

Can be repeated for credit

MAS.391 Special Projects in Learning and Common Sense

Prereq.: Permission of instructor

U (Fall, Spring, Summer)

Units arranged [P/D/F]

Can be repeated for credit

Special projects on group or individual basis. Registration subject to prior arrangement of subject matter and supervision by staff.

Staff

Information and Entertainment**MAS.432, MAS 433 Graphics/Imaging Media Projects**

Prereq.: Permission of instructor

U (Fall, Spring)

Units arranged

Can be repeated for credit

Special work on an individual or group basis combining research and projects of multidimensional graphics, typography, imaging, static or dynamic, 2- or 3-D, and audio in an intelligent electronic design environment. Registration subject to prior acceptance of project, supervision by VLW staff. Completion dependent on successful demonstration and documentation of semester's project.

Staff

MAS.440 Workshop in Elastic Movie Time

(Subject meets with MAS.848)

Prereq.: Permission of instructor

U (Fall)

3-3-6

A workshop in methods for the design and production of interactive multimedia. Establishes the interactive system as an expressive and dynamically adjustable object. Considers a range of topics including collaborative authorship, cinematic journalism, techniques of video shooting and editing, and interface design. Students work in teams of three or four to design, produce, and program segments of the collaborative publication. Meets with MAS.848, but assignments differ.

G. Davenport

MAS.450 Holographic Imaging

(Subject meets with MAS.854)

Prereq.: Permission of instructor

U (Fall)

3-5-4 Institute LAB

A laboratory-based exploration of the principles, techniques, and applications of holography as a 3-D image communication medium. Begins with interference and diffraction, and proceeds through laser off-axis holography to white-light "rainbow" and reflection holography. Term project required, with oral presentation and written report. Lab fee. Limited enrollment with preference given to freshmen and sophomores. Meets with graduate subject MAS.854, but assignments differ.

S. Benton

MAS.490 Special Projects in Information and Entertainment

Prereq.: Permission of instructor

U (Fall, Spring, Summer)

Units arranged

Can be repeated for credit

MAS.491 Special Projects in Information and Entertainment

Prereq.: Permission of instructor

U (Fall, Spring, Summer)

Units arranged [P/D/F]

Can be repeated for credit

Special projects on group or individual basis. Registration subject to prior arrangement of subject matter and supervision by staff.

Staff

MAS.497 Research in Media Technology

Prereq.: —

U (Fall, IAP, Spring, Summer)

Units arranged

Can be repeated for credit

For advanced undergraduate research in Media Arts and Sciences.

Staff

Graduate Subjects**MAS.ThG Graduate Thesis**

Prereq.: —

G (Fall, IAP, Spring, Summer)

Units arranged H-LEVEL Grad Credit

Can be repeated for credit

Program of graduate research and writing of thesis; to be arranged by the student with supervising committee.

MAS.510 Signals, Systems, and Information for Media Technology

(Subject meets with MAS.160)

Prereq.: 18.02

G (Fall)

4-0-8

Meets with undergraduate subject MAS.160. Requires the completion of additional advanced homework problems. See description under subject MAS.160.

V. M. Bove, Jr., R. W. Picard

Perceptual Computing

MAS.622J Pattern Recognition and Analysis

(Same subject as 1.126J)

Prereq.: A working knowledge of probability theory and linear algebra

Acad Year 1996-97: Not offered

Acad Year 1997-98: G (Spring)

3-0-9 H-LEVEL Grad Credit

Fundamentals of characterizing and recognizing patterns and features of interest in numerical data. Basic tools and theory for signal understanding problems with examples from multi-media, environmental monitoring, computer vision, remote sensing, medical and biological image processing. Decision theory, statistical classification, maximum likelihood and Bayesian estimation, non-parametric methods, unsupervised learning and clustering, context-dependent methods. Additional topics from active research.

A. Bobick, R. W. Picard

MAS.624 High-Level Computer Vision: Methods and Models

(Subject meets with MAS.210)

Prereq.: Permission of instructor

Acad Year 1996-97: G (Spring)

Acad Year 1997-98: Not offered

3-0-9

Meets with undergraduate subject MAS.210. Additional attendance at occasional seminars is required along with a research paper or project involving high-level vision. See description under subject MAS.210.

A. Bobick, Staff

MAS.626J Image Representations for Vision

(Same subject as 9.358J)

Prereq.: MAS.510 or permission of instructor

G (Fall)

2-0-7 H-LEVEL Grad Credit

Natural and artificial vision systems begin by transforming an image into a set of representations, thus choosing the "languages" to be used at each stage of visual processing. This seminar surveys a variety of representations proposed in the context of human perception, neurophysiology, machine vision, and image processing, and explores how these representations can be used in such tasks as object recognition, image data compression, motion analysis, texture analysis, and so on. A reasonable facility with mathematics and computation will be expected.

E. H. Adelson, A. Pentland, A. Bobick

MAS.627J Special Topics in Vision Science

(Same subject as 9.359J)

Prereq.: Permission of instructor

G (Spring)

2-0-7 H-LEVEL Grad Credit

Can be repeated for credit

See description under subject 9.359J.

E. H. Adelson

MAS.630 Advanced Seminar in Affective Computing (New)

Prereq.: Permission of instructor

Acad Year 1996-97: G (Spring)

Acad Year 1997-98: Not offered

2-0-7 [P/D/F] H-LEVEL Grad Credit

Can be repeated for credit

An advanced seminar on issues of current interest involving computers which can recognize, express, and "have" emotions. Topics vary from year to year. Participants discuss the current literature.

R. W. Picard

MAS.632 Conversational Computer Systems

Prereq.: Permission of instructor

G (Fall)

3-0-6 H-LEVEL Grad Credit

Interaction with computer systems by voice, including speech synthesis, recognition, and digital recording techniques. Emphasis on human interface design issues and interaction techniques to successfully exploit the speech medium for computer applications, including extensive reading from current research literature. Topics include human speech production and perception, isolated and connected speech recognition, text-to-speech synthesis algorithms, telephone technologies, parsers, and dialogue generation.

C. Schmandt

MAS.641J Audio Processing by People and Machines

(Subject meets with MAS.241, 21M.566J)

Prereq.: Permission of instructor

G (Fall)

3-0-6 H-LEVEL Grad Credit

Lectures same as MAS.241, with additional readings and a group or individual project. See description under subject MAS.241.

B. Vercoe

MAS.642J Writing for Computer Performance

(Same subject as 21M.565J)

Prereq.: MAS.641J

G (Spring)

3-0-6 H-LEVEL Grad Credit

Use of current tools and techniques for creating audio soundtracks that can be synthesized by computer in real time. Techniques of compact definition and efficient, global dissemination, such as via the World Wide Web. Development and use of global standards for audio and music rendering on remote sites. Participants are expected to create an original work, performed in at least three remote sites to positive commentary, using the above principles.

B. Vercoe

MAS.654 Cognitive Artifacts

(Subject meets with 9.34J, MAS.234J)

Prereq.: Permission of instructor

G (Fall)

3-3-6 H-LEVEL Grad Credit

Lectures same as MAS.234J, supplemented by individual or group projects and additional readings. Stresses the role of external representations in guiding thought and imagination. Term project required. See description under subject 9.34J.

W. Richards

MAS.690 Special Projects in Perceptual Computing

Prereq.: Permission of instructor

G (Fall, Spring)

Units arranged H-LEVEL Grad Credit

Can be repeated for credit

Special projects on individual or group basis. Registration subject to prior arrangement of subject matter and supervision by staff.

Staff

Learning and Common Sense

MAS.712 Technological Tools for Learning

Prereq.: —

G (Spring)

2-0-7

Examines how new computational tools and activities can help people learn new things in new ways. Discusses theories of learning and education underlying the design and use of these tools, and explores how new tools can change the ways people think about learning and education. Special emphasis on "constructionist" approaches to learning (represented by tools such as Logo and LEGO/Logo). Final project involves the design and observation of learning activities.

M. Resnick

MAS.713 Learning Environments

Prereq.: Permission of instructor

G (Spring)

3-0-6 H-LEVEL Grad Credit

Can be repeated for credit

Seminar to develop a framework for understanding the entry of new technologies — computers, video technologies, communications — into the process of learning. Reading covers a broad range of topics in human sciences, epistemology, and computer sciences; research projects, either self-initiated or assigned.

S. A. Papert

MAS.714 Evolving Conceptions of Systems and Self

(Same subject as STS.528J)

Prereq.: —

G (Fall)

2-0-7

See description under subject STS.528J.

M. Resnick, S. Turkle

MAS.718 Research Seminar in Learning Environments

Prereq.: Permission of instructor
G (Fall, Spring)
3-0-3 H-LEVEL Grad Credit
Can be repeated for credit

Presentations of research projects in learning and epistemology; discussions of work in progress; formulation of methodological and conceptual guidelines.

Staff

MAS.731J The Society of Mind

(Same subject as 6.868J)
Prereq.: Must have read *The Society of Mind*, permission of instructor
G (Spring)
3-0-9 H-LEVEL Grad Credit

See description under subject 6.868J.
M. Minsky

MAS.734 Projects in Knowledge Representation

Prereq.: 6.170 or equivalent
G (Spring)
3-0-6 H-LEVEL Grad Credit
Can be repeated for credit

Focus on building practical domain representations for intelligent systems and introducing students to a variety of representation toolkits. Students gain sophistication in the design and critique of representation systems as well as practical skills in application specification and interface design. Students complete a substantial project involving representation, application, and interface components.

K. Haase, Jr.

MAS.736 Discourse (New)

Prereq.: Permission of instructor
G (Fall)
4-0-8 H-LEVEL Grad Credit

How discourse works, with emphasis on the structure of spoken and written discourse — primarily conversation, story, and news. Interpretation and generation of cohesive discourse by humans, and how we can build systems to interpret and generate cohesive discourse, e.g., the main problem areas encountered in building dialogue systems, text generation and interpretation systems, and conversational interfaces of all sorts. Students read and discuss current theoretical papers, and carry out a series of on-paper and implementation assignments analyzing existent corpora, and problems and data brought in by students. Individual final project.

J. Cassell

MAS.737 Software Agents Seminar

(Subject meets with MAS.334)
Prereq.: Permission of instructor
G (Fall)
Units arranged
Can be repeated for credit

See description under subject MAS.334.
P. Maes

MAS.738 Modeling Adaptive Behavior

Prereq.: One subject in introductory artificial intelligence
G (Spring)
2-0-7 H-LEVEL Grad Credit

Examines models, algorithms and techniques for modeling systems that demonstrate adaptive behavior over short or long periods of time. Topics covered include: adaptive behavior in autonomous agents, learning from experience, simulated evolution, social or "cultural" learning. Three papers and final project.

P. Maes

MAS.790 Special Projects in Learning and Common Sense

Prereq.: Permission of instructor
G (Fall, Spring)
Units arranged H-LEVEL Grad Credit
Can be repeated for credit

Special projects on individual or group basis. Registration subject to prior arrangement of subject matter and supervision by staff.

Staff

Information and Entertainment**MAS.813 Structured Video Communications**

Prereq.: Permission of instructor
G (Spring)
2-0-7 H-LEVEL Grad Credit

Representations of motion picture information and associated sound for distribution, production and interaction in a networked environment. Topics include 2-D waveform and object based coding, three dimensional representations models, scalable imagery, intergration and extension of existing and emerging picture formats and processing architectures, and on-the-fly delivery systems. Discussion will also address the relationship of television to information infrastructures and societal interests.

A. Lippman

MAS.814 Digital Image Processing for Hard Copy

Prereq.: MAS 510 or MAS 160 or 6.003 or permission of instructor
G (Spring)
2-0-7 H-LEVEL Grad Credit

An examination of the electronic processing of images for hard copy and of the technologies associated with document production. Topics to be covered include two-dimensional Fourier transforms, halftoning, digital typography, output processes, color, psychophysics, and still image coding. Term paper or project with both written and oral presentation required. A reasonable facility with mathematics is assumed. Open to qualified undergraduates.

V. M. Bove, Jr.

MAS.815 Issues of Color in Media Technology

Prereq.: —
G (Fall)
2-0-7

The technical aspects of color for use in practical applications of media technology. Color is discussed from three distinct points of view: human vision, visual processing, and digital displays. Topics include: the production of color, physiology and psychophysics of color, the sensation of color, color systems, coding and processing, color vision, rendering in graphics environments, color as an interface, semantics and aesthetics of color. Weekly reading, lab work, and individual term projects.

W. Bender

MAS.825J Musical Aesthetics and Media Technology

(Same subject as 21M.580J)
Prereq.: Permission of instructor
G (Fall)
3-3-3 H-LEVEL Grad Credit

In-depth exploration of contemporary concepts in music and media. Studies recent music that uses advanced technology, and the artistic motivations and concerns implied by the new media. Practical hands-on experience with computer music technology, with special emphasis on MIDI-based synthesizers and samplers and real-time performance systems. Term project required.

T. Machover

MAS.826J Projects in Media and Music

(Same subject as 21M.581J)
Prereq.: MAS 825J
G (Spring)
3-3-3 H-LEVEL Grad Credit
Can be repeated for credit

Current computer music concepts and practice. Project-based work on research or production projects using the Media Lab's computer music resources. Requires significant studio work and a term project. May be repeated for credit with permission of instructor.

T. Machover

MAS.837 Collaboration Between People, Computers, and Things (New)

Prereq.: Permission of instructor
G (Spring)
3-0-6 H-LEVEL Grad Credit

Explores aspects of media design that facilitate dynamic interactions between: 1) humans and computers, 2) human collaborators, and 3) humans and physical/virtual environments. Students investigate the design space of media for seamless interaction using concept sketches, mockups, and simple prototyping. Regular readings, papers, and small projects also required.

H. Ishii

MAS.838, MAS 839 Graphic Imaging Media Projects

Prereq.: Permission of instructor

G (Fall, Spring)

Units arranged H-LEVEL Grad Credit

Can be repeated for credit

Special work on an individual or group basis combining research and projects of multidimensional graphics, typography, imaging, static or dynamic, 2- or 3-D, and audio in an intelligent electronic design environment. Registration subject to prior acceptance of project, supervision by VLW staff. Completion dependent on successful demonstration and documentation of semester's project.

Staff

MAS.845 Special Topics in Cinematic Storytelling

Prereq.: Permission of instructor

G (Spring)

Units arranged H-LEVEL Grad Credit

Seminar explores approaches to representation for computer-assisted cinematic storytelling. The relationship of the moviemaking process to form and content is analyzed. Concepts of "expert editor" and "expert viewer" are introduced. Using sample material (a story/some footage), a constraint-based approach to shot design and editing conventions is considered, and symbolic representations for story structures are evolved. Individual projects in content representation and tool design.

G. Davenport

MAS.848 Workshop in Elastic Movie Time

(Subject meets with MAS.440)

Prereq.: Permission of instructor

G (Fall)

3-3-6 H-LEVEL Grad Credit

Meets with undergraduate subject MAS.440.

See description under subject MAS.440.

G. Davenport

MAS.849 Special Topics in Multimedia Production

Prereq.: Permission of instructor

G (Fall, Spring)

Units arranged H-LEVEL Grad Credit

Can be repeated for credit

Individual or group work of advanced and experimental scope. Registration contingent upon prior determination of subject matter and plan for treatment, as well as arrangement for staff supervision and project funding.

G. Davenport

MAS.853 Spatial Imaging Systems

Prereq.: Permission of instructor

Acad Year 1996-97: Not offered

Acad Year 1997-98: G (Spring)

3-2-4 H-LEVEL Grad Credit

Surveys the technology of spatial imaging from stereoscopes to holograms, emphasizing unaided viewing systems, and explores the perceptual, technical, and aesthetic bases of satisfying three-dimensional image communication. Includes a review of the elements of imaging optics. Lab fee. Open to qualified undergraduates.

S. Benton

MAS.854 Holographic Imaging

(Subject meets with MAS.450)

Prereq.: Permission of instructor

G (Fall)

3-5-4

Meets with undergraduate subject MAS.450. See description under subject MAS.450.

S. Benton

MAS.856 Synthetic Holography

Prereq.: MAS.854

Acad Year 1996-97: G (Spring)

Acad Year 1997-98: Not offered

3-3-3 H-LEVEL Grad Credit

An introduction to the synthesis of holographic 3-D images from digital, video, and photographic data, and their applications. Limited enrollment.

S. Benton

MAS.858 Creative Holography Workshop

Prereq.: Permission of instructor

G (Spring)

3-3-3

An introduction to the history, methods, and aesthetics of holographic image making. Students create holograms in the lab on a weekly basis, learning to use holography as a medium of expression and as a tool for the investigation of three-dimensional ideas in design, architecture, environmental design, and engineering studies. Lab fee. Limited enrollment.

B. Connors

MAS.862 The Physics of Information Technology (Revised Units)

Prereq.: Permission of instructor

G (Spring)

4-0-8

Familiar devices such as computers and telephones that collect, store, manipulate, transmit, and present information operate near many fundamental physical limits. Subject studies the relationship between their design and the underlying physical principles, in order to understand how they operate, what their limits are, and how they can be improved. Assumes a general physics background.

N. Gershenfeld

MAS.864 The Nature of Mathematical Modeling (Revised Units)

Prereq.: Permission of instructor

G (Fall)

4-0-8 H-LEVEL Grad Credit

Surveys the range of levels of description useful for the computer modeling of natural phenomena, including: analytical solutions and approximations for difference and differential equations; finite difference, finite element, and cellular automata numerical models; and stochastic processes, nonlinear function fitting and model inference. The emphasis is on the practical implementation of these ideas.

N. Gershenfeld

MAS.890 Special Projects in Information and Entertainment

Prereq.: Permission of instructor

G (Fall, Spring)

Units arranged H-LEVEL Grad Credit

Can be repeated for credit

Special projects on individual or group basis. Registration subject to prior arrangement of subject matter and supervision by staff.

Staff

General**MAS.910 Research in Media Technology**

Prereq.: —

G (Fall, Spring, Summer)

Units arranged H-LEVEL Grad Credit

Can be repeated for credit

For research assistants in Media Arts and Sciences, where the assigned research is approved for academic credit by the Department.

S. Benton

MAS.912 Teaching in Media Arts and Sciences

Prereq.: —

G (Fall, Spring)

Units arranged [P/D/F]

Can be repeated for credit

Laboratory, tutorial, or classroom teaching under the supervision of a Media Arts and Sciences faculty member. Students selected by interview. Enrollment is limited by the availability of suitable teaching assignments.

Staff

MAS.921 Proseminar in Media Arts and Sciences

(Revised Units)

Prereq.: Permission of instructor

G (Fall)

3-0-9 H-LEVEL Grad Credit

A seminar on Media Arts and Sciences, an emerging discipline. The seminar is conceived of as participation in the development of a new discipline as much as the study of it. Extensive reading list touches on antecedent disciplines (e.g., technologies of computational media, cognitive sciences, AI, theory of communication, design) and on the sociological, historical, and epistemological study of intellectual disciplines. Required of Ph.D. students in the Media Arts and Sciences Program. Restricted to doctoral candidates.

W. Richards, Staff

MAS.940 Preparation for S.M. Thesis

Prereq.: Permission of instructor

G (Fall, Spring)

Units arranged H-LEVEL Grad Credit

Can be repeated for credit

Selection of thesis topic, definition of method of approach, and preparation of thesis proposal. Independent study supplemented by individual conferences with faculty. Co-registration with 21W.793 or equivalent required.

S. Benton

MAS.945 Preparation for General Exams (New)

Prereq.: Permission of instructor

G (Fall, IAP, Spring, Summer)

0-12-0 [P/D/F] H-LEVEL Grad Credit

Can be repeated for credit

Selected readings for Media Arts and Sciences doctoral students in preparation for their qualifying exams.

Staff

MAS.950 Preparation for Ph.D. Thesis

Prereq.: Permission of instructor

G (Fall, Spring)

Units arranged H-LEVEL Grad Credit

Can be repeated for credit

Selects thesis subject, defines method of approach, and prepares preliminary thesis outline. Independent study, supplemented by frequent individual conferences with staff members. Restricted to doctoral candidates.

S. Benton

MAS.961–964 Special Topics in Media Technology

Prereq.: Permission of instructor

G (Fall, Spring)

Units arranged H-LEVEL Grad Credit

Can be repeated for credit

Supplementary work on individual or group basis. Registration subject to prior arrangement for subject matter and supervision by staff.

Staff

See description under individual topics.

For details

SP

Project Interphase
Program XL
Experimental Study Group
Concourse Program
Integrated Studies Program
Women's Studies Program
Edgerton Center

Special Programs**Project Interphase: Pre-Freshman Summer Program****SP.100 Project Interphase**

Prereq.: Commitment to register as a freshman in the Fall
 U (Summer)
 Units arranged

Enrollment by invitation only. An eight-week academic and survival skills-honing program, Project Interphase is designed to enhance the preparedness of underrepresented minority students entering MIT in the fall semester. The program has a dual focus: academic readiness and general educational development. The program involves calculus, chemistry, physical education, physics, writing, and supporting academic activities, including small-group learning. The students can earn transcript credit for subjects taken in the program, sometimes resulting in advanced placement in corresponding subjects taken in the fall. Activities include day trips to area cultural, recreational, and business sites. Students participate in a range of personal educational development seminars and activities designed to insure their smooth transition to college life. The summer experience gives them increased opportunity to prepare for the rigors of an MIT full-subject load.

A. P. French

Program XL**SEM.XL1 Program XL: You Can Be a Success at MIT (Revised Units)**

Prereq.: First-year undergraduate standing
 U (Fall)
 Units arranged [P/D/F]

SEM.XL2 Program XL: You Can Be a Success at MIT

Prereq.: First-year undergraduate standing
 U (Spring)
 Units arranged [P/D/F]

An academic enrichment program for first-year students, XL utilizes the innovative and effective small-group learning concept to enhance students' academic performance in calculus and science. Students meet in study groups of five to six participants with facilitators trained in effective classroom techniques and concept focus. The study groups help students to reinforce concepts learned in the regular curriculum, and help them to gain mastery of concepts and problems that are often more challenging than those dealt with during lecture. The small study group format emphasizes the full participation of each student with the facilitator acting as a guide. The regularity of weekly meetings enhances the students' understanding of MIT's academic expectations. After the initial meetings, students are encouraged to take more responsibility and to lead the group in problem-solving sessions, which helps to maximize their own learning. Each study group meets for a minimum of three hours each week. The meeting time is set by the XL facilitator based on students' schedules.

K. Manning

Experimental Study Group**SP.211 ESG (Experimental Study Group)**

Prereq.: —
 U (Fall)
 Units arranged [P/D/F]

SP.212 ESG (Experimental Study Group)

Prereq.: —
 U (Spring)
 Units arranged [P/D/F]

A flexible and individualized academic program for first-year students which utilizes small classes, seminars, and tutorials as the primary methods of instruction for the freshman curriculum. Credit available in subjects in biology, chemistry, mathematics, and physics, as well as several HASS and HASS-D offerings and undergraduate seminars in a variety of areas. Students have the opportunity in these subjects to explore areas of special interest to them. Certain sophomore-level subjects can also be studied within ESG, depending on student and staff interest. One or two subjects may be taken in the regular curriculum in conjunction with work done in ESG. Staff includes MIT faculty, instructors, graduate students, and undergraduates who are interested in teaching in a small and informal academic community.

V. M. Ingram

SP.221 ESG (Experimental Study Group)

Prereq.: SP.211 and/or SP.212
 U (Fall)
 Units arranged [P/D/F]

SP.222 ESG (Experimental Study Group)

Prereq.: SP.211 and/or SP.212
 U (Spring)
 Units arranged [P/D/F]

Continuation of ESG for sophomores.

V. M. Ingram

SP.231 ESG Undergraduate Teaching

Prereq.: SP.211 and/or SP.212

U (Fall)

Units arranged [P/D/F]

SP.232 ESG Undergraduate Teaching

Prereq.: SP.211 and/or SP.212

U (Spring)

Units arranged [P/D/F]

An opportunity to tutor students, run study groups, and lead seminars in mathematics, biology, physics, chemistry, and humanities and social sciences in ESG under staff supervision. Permission of appropriate ESG staff member required.

V. M. Ingram

SP.290-SP.299 ESG Special Topics

Prereq.: —

U (Fall, IAP, Spring)

Units arranged [P/D/F]

Can be repeated for credit

Special topic seminars and independent study projects for students interested in experimental projects or research. Seminars are run by a staff member and meet weekly. Independent projects require approval and regular supervision by a staff member, as well as a written proposal and a final report.

V. M. Ingram

Concourse Program**SP.311 Concourse Program**

Prereq.: —

U (Fall)

Units arranged [P/D/F]

SP.312 Concourse Program

Prereq.: —

U (Spring)

Units arranged [P/D/F]

An integrative program for the freshman year. Staff includes faculty from the Schools of Science, Engineering, and Humanities and Social Science. Credits in Concourse fulfill the General Institute Requirements and are so recorded.

R. M. Rose

SP.315 Concourse Program Undergraduate Teaching

Prereq.: SP.311 or SP.312 and permission of instructor

U (Fall)

Units arranged

Can be repeated for credit

SP.316 Concourse Program Undergraduate Teaching

Prereq.: SP.311 or SP.312 and permission of instructor

U (Spring)

Units arranged

Can be repeated for credit

Tutoring, leadership of study and review groups, seminars and recitations in the Concourse Program, under the supervision of senior Concourse staff.

SP.330 The Meeting of Art and Science Through Method

Prereq.: —

U (Spring)

3-0-9 HASS-D, Category 3

Color is perceived, not measured: any composition of light can be made to appear as any hue. The views of scientists and artists on color are different and complementary. Modern image processing uses methods previously developed by artists and also used in protective coloration of animals. Ancient science is distinct from ancient practical knowledge as embodied in the arts. The interplays between architecture, astronomy, and astronomical myths are studied. Travesties on science are read as criticism.

J. Y. Lettin

SP.343 Concourse Special Topics

Prereq.: Permission of instructor

U (Fall)

Units arranged [P/D/F]

Can be repeated for credit

SP.344 Concourse Special Topics

Prereq.: Permission of instructor

U (Spring)

Units arranged [P/D/F]

Can be repeated for credit

Open to students enrolled in Concourse who wish to pursue topics not covered in the regular Concourse offerings. Topics change from year to year.

R. M. Rose

SP.345, SP.346, SP.347 Concourse Special Topics for IAP

Prereq.: Permission of instructor

U (IAP)

Units arranged [P/D/F]

Can be repeated for credit

Open to students who wish to pursue topics over IAP not covered in the regular Concourse offerings. Topics change from year to year.

R. M. Rose

Integrated Studies Program**SP.351 Integrated Studies Program**

Prereq.: —

U (Fall)

Units arranged [P/D/F]

SP.352 Integrated Studies Program

Prereq.: —

U (Spring)

Units arranged [P/D/F]

A program for the freshman year that satisfies the General Institute Requirements in mathematics, physics, chemistry, and two HASS-Distribution subjects on the interplay between technologies and societies, with hands-on workshops and linked calculus/physics sections. ISP may offer 6-unit undergraduate seminars. ISP includes faculty from the School of Humanities and Social Science, and from the Schools of Science and Engineering.

A. Steinberg

SP.353 Technologies and Cultures

Prereq.: —

U (Fall)

3-3-6 HASS-D, Category 4

Fall term 12-unit HASS-D in Cultural and Social Studies for the Integrated Studies Program. Examines how three technologies are practiced in different cultures. Focuses on complex relationships between what people do and the human environment in which they do it. Hands-on workshops to experience technologies; field trips to pertinent sites.

A. Steinberg

SP.354 Technologies in Historical Perspective

Prereq.: —

U (Spring)

3-3-6 HASS-D, Category 5

Spring term HASS-D in Historical Studies for the Integrated Studies Program. Examines three technologies in the cultural and historical frameworks in which they evolved. Issues include mass production, transnational corporations, cultural styles of design and production, and how these technologies affect society, family, and the individual. Hands-on workshops and field trips integral to the subject.

A. Steinberg

Women's Studies Program

SP.401 Introduction to Women's Studies

Prereq.: —
U (Fall)
3-0-9 HASS-D, Category 4

An interdisciplinary subject that draws on literature, history, psychology, philosophy, anthropology, and feminist theory to: 1) examine our cultural assumptions about gender, 2) trace the effects of the new scholarship on traditional disciplines, and 3) increase awareness of the history and experience of women as half the world's population.

Staff

SP.404 Special Topics in Women's Studies

Prereq.: Permission of instructor
U (Fall, Spring)
Units arranged
Can be repeated for credit

SP.405 Special Topics in Women's Studies

Prereq.: Permission of instructor
G (Fall, Spring)
Units arranged

Individual supervised work for students who wish to study topics not covered in the regular Women's Studies offerings. Before registering for this subject, students must plan a course of study with some member of the Women's Studies faculty and secure the Director's approval. HASS credit for Special Topics subjects awarded only by individual petitions to the Committee on Curricula. Normal maximum is 6 units; to count toward HASS Requirement, 9 units are required. Exceptional 9-unit projects occasionally approved.

Staff

SP.406 Violence Against Women in Contemporary US Society

Prereq.: —
Acad Year 1996-97: U (Fall)
Acad Year 1997-98: Not offered
3-0-9 HASS

Examines violence against women within the context of the sexual, racial, and economic climate in the United States. Specifically considers acquaintance, marital, and stranger rape, incest and child sexual abuse, wife battering, sexual harassment, pornography, prostitution, medical violence. Emphasis placed on both institutional and structural nature of sexual violence as well as on the experience of violence in women's lives. A variety of theoretical approaches will be used to examine sexual violence, including sociohistorical, psychological, criminological, legal, and feminist approaches.

Staff

SP.408 Gender Outlaws: Beyond Male and Female

Prereq.: —
U (IAP)
3-0-0 [P/D/F]

Surveys historical and anthropological investigations of cultures with more than two gender categories. Critically analyzes scientific research on reproductive development, focusing on evidence and arguments that there are more than two (biological) sexes. Examines clinical literature on medical treatment of intersexed infants. Surveys contemporary accounts by persons who refuse or do not fit binary sex/gender categories.

M. B. Parlee

SP.411 Gender, Theory, and Politics

Prereq.: —
Acad Year 1996-97: Not offered
Acad Year 1997-98: U (Fall)
3-0-9 HASS

SP.412J Gender, Theory, and Politics

(Same subject as 17.118J)
Prereq.: —
Acad Year 1996-97: Not offered
Acad Year 1997-98: G (Fall)
3-0-9 H-LEVEL Grad Credit

Analyzes theories of gender and politics, especially ideologies of gender and their construction; definitions of public and private spheres; gender issues in citizenship, the development of the welfare state, experiences of war and revolution, class formation, and the politics of sexuality. Graduate students are expected to pursue the subject in greater depth through reading and individual research.

E. Wood

SP.420J American Women's History

(Same subject as 21H.151J)
Prereq.: —
U (Fall)
3-0-9 HASS

See description under subject 21H.151J.
H. C. Richardson

SP.421J Race and Gender in Asian America

(Same subject as 21H.153J)
Prereq.: —
U (Fall)
3-0-9 HASS

See description under subject 21H.153J.
J. E. Teng

SP.431J International Women's Voices

(Same subject as 21F.822J)
Prereq.: —
U (Spring)
3-0-9 HASS-D, Category 1

See description under subject 21F.822J.
M. Resnick

SP.432J Sex Roles in Fiction: Europe and Latin America

(Same subject as 21F.828J)

Prereq.: —
Acad Year 1996-97: U (Fall)
Acad Year 1997-98: Not offered
3-0-9 HASS

See description under subject 21F.828J.
M. Resnick

SP.433J Black Women Writers: Texts and Critics

(Same subject as 21L.442J)

Prereq.: —
Acad Year 1996-97: U (Fall)
Acad Year 1997-98: Not offered
3-0-9 HASS

Examines selected works of fiction by Black women writers from the late nineteenth century to the 1980s in light of the critical interpretations of some of today's most influential Black women scholars. Authors and critics may include Zora Neale Hurston, Toni Morrison, Alice Walker, Deborah McDowell, and Barbara Smith, among others.

Staff

SP.437 Studies in Fiction

Prereq.: Two subjects in Literature
U (Fall, Spring)
3-0-9 HASS
Can be repeated for credit

Meets with subject 21L.702 when the topic is consistent with the requirements for Women's Studies subjects. Topics for 1996-97: Fall Term: Edith Wharton and Willa Cather: Women Novelists and Their Analyses of Women's Dilemmas. Spring Term: Jane Austen. See description under subject 21L.702.

Fall Term: C. Wolff

Spring Term: R. Perry

SP.443J Writing by US Women of Color

(Same subject as 21W.766J)
Prereq.: —
U (Fall)
3-0-9 HASS

See description under subject 21W.766J.
H. Lee

SP.452 The History and Politics of US Feminist Movements

Prereq.: —
Acad Year 1996-97: Not offered
Acad Year 1997-98: U (Fall)
3-0-9 HASS

Considers a variety of feminist and activist perspectives on contemporary women's lives — reproductive freedom, violence against women, the politics of sexual identity and practice, economic inequality and poverty, and international politics and war. Perspectives include liberal, radical and socialist, Black, Latina, and Asian, Third World, lesbian and bisexual. Local activists visit class to discuss their organizing theories and practice.

Staff

SP.455J Gender, Sexuality, and Society

(Same subject as 21A.231J)

Prereq.: —

U (Spring)

3-0-9 HASS

See description under subject 21A.231J.

J. Jackson

SP.456J The Contemporary Family

(Same subject as 21A.230J)

Prereq.: —

U (Spring)

3-0-9 HASS-D, Category 4

See description under subject 21A.230J.

J. Jackson

SP.460J Psychology of Gender

(Same subject as 9.75J)

Prereq.: —

Acad Year 1996-97: Not offered

Acad Year 1997-98: U (Spring)

3-0-9 HASS

See description under subject 9.75J.

M. Parlee

SP.470 Gender, Work, and Public Policy

(New)

(Subject meets with 11.237)

Prereq.: —

U (Spring)

3-0-9

See description under subject 11.237.

A. Cintrón

SP.471J Identity Politics in Performance

(New)

(Same subject as 21M.706J)

Prereq.: 21M.700 or permission of instructor

U (Fall)

4-3-2 HASS

See description under subject 21M.706J.

B. Cotto-Escalera

SP.476 Modern Art and Sexuality

(Subject meets with 4.643J, SP.477J)

Prereq.: Permission of instructor

Acad Year 1996-97: Not offered

Acad Year 1997-98: U (Fall)

Units arranged

Can be repeated for credit

SP.477J Modern Art and Sexuality

(Subject meets with 4.643J, SP.476)

Prereq.: Permission of instructor

Acad Year 1996-97: Not offered

Acad Year 1997-98: G (Fall)

Units arranged H-LEVEL Grad Credit

Can be repeated for credit

Topic to be announced. See description under subject 4.643J.

L. W. Kinney

SP.480J Gender, Technology, and Computer Culture

(Subject meets with STS.060J, SP.481J, STS.518J)

Prereq.: —

U (Spring)

3-0-9 HASS

SP.481J Gender, Technology, and Computer Culture

(Subject meets with STS.060J, SP.480J, STS.518J)

Prereq.: —

G (Spring)

3-0-9

Meets with STS.518J. Graduate students are expected to pursue the subject in greater depth. See description under subject STS.060J.

S. Turkle

SP.488J Gender and Science

(Same subject as STS.083J)

Prereq.: —

U (Spring)

3-0-9 HASS-D, Category 2

See description under subject STS.083J.

E. F. Keller

SP.490J Women and Health in America

(Same subject as STS.050J)

Prereq.: —

U (Spring)

3-0-9 HASS

See description under subject STS.050J.

E. M. Hammonds

Please refer to Chapter IV for admissions information for the Graduate Consortium in Women's Studies.

SP.502 Feminist Perspectives in Research and Practice: Interdisciplinary Practice in the Study of Gender

Prereq.: —

G (Spring)

3-0-9

Focuses on the visions and methods that feminist scholars use to study women and gender from the perspectives of history, literary theory, and sociology, and their interaction. Study of several major feminist works, with special attention to method. Examines how interdisciplinary feminist methodology has been brought to bear on a series of specific topics such as racism, violence, and sexualities.

Information: M. Oshima.

SP.551 Gender, Sexuality, and Culture in the United States and Latin America

Prereq.: —

Acad Year 1996-97: G (Fall)

Acad Year 1997-98: Not offered

3-0-9

Explores the construction, destruction, and resistance of sexual subjects in the US and Latin America using a variety of sources, including ethnography, film, testimony, narrative fiction, and autobiography.
Information: M. Oshima.**SP.560 Cultural Production: Women in Popular Art and Popular Theatre**

(New)

Prereq.: —

Acad Year 1996-97: G (Spring)

Acad Year 1997-98: Not offered

3-0-9

Studies women's participation in the production of Popular Art and Popular Theatre, and in the socio-artistic movements that result from this activity. Emphasis on the global context in which women of color and women from the developing world create art. The convergence of theoretical positions and artistic production is explored through the examination of visual arts and performance techniques as they are transformed by social, political, cultural, economic, and aesthetic paradigms.
B. Cotto-Escalera, R. Chandler**SP.570 Telling Lives: Genre and Gender in Women's Life Narratives**

(New)

Prereq.: —

Acad Year 1996-97: G (Fall)

Acad Year 1997-98: Not offered

3-0-9

How do women give meaning to their lives through written, narrative, and oral forms that focus on life experience? Using the lens of gender, explores the use, collection, and construction of autobiography, biography, ethnography, oral history, diaries, and other personal and collective narratives that highlight life experience. Examines the theoretical concerns that probe the relationship between authority/authorship; identity and gender/ethnicity/sexuality; and subjective/objective reality.
Information: M. Oshima.**Edgerton Center****SP.7UR Undergraduate Research**

Prereq.: —

U (Fall, IAP, Spring, Summer)

Units arranged [P/D/F]

Can be repeated for credit

Undergraduate research opportunities in the Edgerton Center.

C. Mazel

SP.704 Turning Ideas Into Inventions

Prereq.: —
U (Spring)
2-4-0

Special work on individual projects based on students' own ideas. Participants explore the feasibility of their novel project ideas both on paper and in practice. Work largely independent, with required weekly meetings. Teaching staff provides support in the form of advice and constructive criticism, access to equipment and shops, limited equipment budget, and access to expertise needed to develop project. Registration is subject to prior acceptance of project by teaching staff. Completion dependent on successful demonstration and documentation of work done on project.

project.
G. Mazel

SP.705J Electronics Project Laboratory

(Same subject as 6.070J)

Prereq.: —
U (IAP, Spring)
2.2.3

See description under subject 6.070J.

See description
J.K. Vandiver

**SP.731 Edgerton Center Undergraduate
Teaching**

Prereq.: —
U (Fall, IAP, Spring, Summer)
Units arranged [P/D/F]
Can be repeated for credit

An opportunity for undergraduates to participate in teaching and tutoring Center subjects and seminars. Students develop one-on-one teaching skills under the supervision of an Edgerton Center instructor.

J. K. Vandiver

SP.732 Edgerton Center Graduate Teaching

Prereq.: —
G (Fall, IAP, Spring, Summer)
Units arranged [P/D/F]
Can be repeated for credit

An opportunity for graduate students to participate in teaching and tutoring Edgerton Center subjects and seminars. Permission of Edgerton Center staff required.

STS**Science, Technology, and Society**

For degree requirements, see listing in Chapter VII under the School of Humanities and Social Science.

General Undergraduate Subjects**History of Science and Technology****STS.001 Technology in American History**

Prereq.: —
U (Spring)
3-0-9 HASS-D, Category 5

A survey of America's transition from a rural, agrarian, and artisan society to one of the world's leading industrial powers. Treats the emergence of industrial capitalism: the rise of the factory system, new forms of power, transport, and communication, the advent of the large industrial corporation, the social relations of production, and the hallmarks of science-based industry. Views technology as part of the larger culture and reveals innovation as a process consisting of a range of possibilities that are chosen or rejected according to social criteria of the time.

D. Fitzgerald

STS.002 Toward the Scientific Revolution

Prereq.: —
U (Spring)
3-0-9 HASS-D, Category 5

The emergence of Western science: the systematization of natural knowledge in the ancient world, the transmission of the classical legacy to the Latin West, and the revolt from classical thought during the scientific revolution. Examines scientific concepts in light of their cultural and historical contexts.

L. E. Kay

STS.003 The Rise of Modern Science

Prereq.: —
U (Fall)
3-0-9 HASS-D, Category 5

The development of major fields in the physical and life sciences, beginning with eighteenth-century Europe and ending with twentieth-century America. Examines ideas, institutions, and the social settings of the sciences, with emphasis on how cultural contexts influence scientific concepts and practices.

Staff

STS.009 Military Enterprise and Technological Change

Prereq.: —
U (Spring)
3-0-9 HASS

A history of the role of the military in promoting and developing new technologies (from medieval times to the present). Examines the design, deployment, and diffusion of new technologies; the behavioral/social problems that occurred with their introduction; and their influence on colonialism, industrialization, and warfare in the modern world.

L. Trilling

Social Study of Science and Technology**STS.011 American Science: Ethical Conflicts and Political Choices**

Prereq.: —
U (Fall)
3-0-9 HASS-D, Category 2

Explores the changing roles, ethical conflicts, and public perceptions of science and scientists in American society from World War II to the 1990s. Studies specific historical episodes, focusing on options, constraints, and incentives influencing responses of scientists to ethical conflicts. Examines political controversies over the support, goals, methods, and effects of research and its applications. Topics include the atomic bomb project, space race, environmental movements, whistleblowing, biomedical research, genetic engineering, and disputes about scientific fraud and misconduct.

Staff

Information about the course, including how interdisciplinary learning methodologies have been brought to bear on a series of topics such as nuclear, violence, and education.

Information: M. O'Connor

STS.012J Engineers, Scientists, and Public Controversies

(Same subject as 2.93J)

Prereq.: —

Acad Year 1996-97: **Not offered**

Acad Year 1997-98: U (Spring)

3-0-9 HASS

Investigates the nature of controversies surrounding the applications of science and technology, the roles technical specialists play in their resolution, and patterns of public participation. Students analyze the technical, social, political, and ethical context of public controversies through case studies documented by archival videotapes, readings, and testimony of guests. Cases include past and current local, national, and international environmental controversies, nuclear energy and waste, community perceptions of risk, and the relations among experts, regulators, lawyers, and citizens.

Staff

STS.019 The Profession of Engineering

Prereq.: —
U (Fall)
3-0-9 HASS

Practice and dilemmas of the engineering profession. Analyzes the role of engineers in the conception, design, manufacture, and marketing of a sophisticated consumer product. Studies the history of some major industries (e.g., automobile, communications, biomedical, aerospace) in twentieth-century US. Examines political, economic, social, and ethical implications. May also be taken as an undergraduate seminar (three short papers).

L. Trilling

Ergerton Center**2.701 Undergraduate Research**

Prereq.: —
U (Fall, Spring, Summer)
Arranged, P/D/F
When to register for credit

Undergraduate research opportunities in the Ergerton Center.

M. Hazel

Advanced Undergraduate Subjects

History of Science and Technology

STS.021 Russian Science, Technology, and Society

(Subject meets with 17.614J, STS.103J)

Prereq.: —
Acad Year 1996-97: Not offered
Acad Year 1997-98: U (Fall)
3-0-6 HASS

An introduction to the history of Russian, Soviet, and post-Soviet science. Topics: introduction of Western science to Russia, reception of Darwinism, influence of Marxism on Soviet scientific development, social and political context of Russian science, the impact of the fall of the Soviet Union on science, and organizational and policy questions. Required readings in English; supplementary readings in Russian also available.

L. R. Graham

STS.029J The Civil War and Reconstruction

(Same subject as 21H.116J)

Prereq.: —
Acad Year 1996-97: Not offered
Acad Year 1997-98: U (Spring)
3-0-6 HASS

See description under subject 21H.116J.

M. R. Smith

STS.040 Change in Medieval Society: Did Technology Play a Part?

(Subject meets with STS.140)

Prereq.: —
U (Fall)
3-0-9 HASS

Probes the relationship between social changes and technology in the Middle Ages, from about 300 to 1500 AD. Explores the entire cultural setting of Medieval Europe, emphasizing changes in demography, political organization, religion, education, urbanization, production/manufacturing, private life, and amusement, and their relationship to technologies that were invented, adopted, or adapted anew. Examination of pictorial and written documents to assess impact on medieval society of technologies affecting agriculture, manufacturing, construction, communication, and warfare.

B. B. Price

STS.045 History of Developmental Biology

Prereq.: —
U (Fall)
3-0-9 HASS

In the latter part of the nineteenth century, studies of inheritance and development were viewed as a single subject. That changed in the early part of the twentieth century, with the emergence of genetics as a separate discipline. Subject reviews the histories of genetics and developmental biology (or embryology) from the time of their initial divergence to their recent dramatic reconvergence. Focuses on questions of language, politics, and technical and intellectual resources in the intervening years. Readings include both historical and contemporary works. An advanced undergraduate seminar.

E. Fox Keller

STS.050J Women and Health in America

(Same subject as SP.490J)

Prereq.: —
U (Spring)
3-0-9 HASS

Examines the relationship between women and the health care system in the United States from the nineteenth century to the present. Focuses on contemporary and historical discussions of the medicalization of female biology. Topics include the history of women in the medical and health care professions; diseases that disproportionately affect women, such as breast cancer; women in the AIDS epidemic; women of color in the health care system; and the evolution of the feminist health movement.

E. M. Hammonds

Social Study of Science and Technology

STS.054 Biotechnology and Society

Prereq.: —
U (Spring)
3-0-9 HASS

See description under subject STS.510.

L. E. Kay

STS.059 Introduction to Cultural Criticism

(Subject meets with STS.507J, 21A.671J)

Prereq.: Permission of instructor
U (Spring)
2-0-7 HASS

See description under subject STS.507J.

H. Gusterson

STS.060J Gender, Technology, and Computer Culture

(Subject meets with SP.480J, SP.481J,
STS.518J)

Prereq.: —
U (Spring)
3-0-9 HASS

Examines psychological, anthropological, sociological, and imaginative literature that illuminates the role of gender in dealing with technological objects, especially computational objects. Topics include factors that may inhibit women's participation in the technical culture, gender issues on the Internet and in virtual communities, the representation of gender in science fiction, and the psychology of computer programming and computer interface design. Meets with STS.518J. Graduate students are expected to pursue the subject in greater depth.

S. Turkle

STS.065 Identity and the Internet

(Subject meets with STS.570)

Prereq.: —
U (Spring)
3-0-9 HASS

Examines empirical and theoretical literature that illuminates how new technologies have historically changed our ideas about and experience of personal identity, particularly the experience of identity on the Internet and the social psychology of virtual communities. Readings examine "traditional" perspectives on identity and their challenges in theories of "decentered" and multiple identity. Also included are writings on postmodern identity theory, the idea of person-as-cyborg, artificial intelligence and its challenge to the vision of the human "self," and science fiction as it reflects notions of human and machine identity.

S. Turkle

STS.071J US General Purpose Forces

(Subject meets with 17.483J, 17.482J,
STS.532J)

Prereq.: —
U (Spring)
3-0-9 HASS

See description under subject 17.483J.

B. Posen, T. Postol

STS.075J Technology and Culture

(Same subject as 21A.340J)

Prereq.: —
U (Spring)
3-0-9 HASS

See description under subject 21A.340J.

H. Gusterson

STS.076J Technology and Policy of Weapons Systems

(Same subject as 17.477J)

Prereq.: —
U (Spring)
3-0-9 HASS

Examines in detail the technology of nuclear weapons systems. Topics include nuclear weapons design, effects, targeting, and delivery; ballistic and air breathing missile propulsion and guidance; communications and early warning techniques and systems; and anti-missile, air, and submarine systems. Combines the discussion of technical materials with the national security policy issues raised by the capabilities of these technologies. Considers security issues from the distinct and often conflicting perspectives of technologists, military planners, and political leaders.

T. Postol

STS.080 The Work of Scientists and EngineersPrereq.: —
U (Spring)
3-0-6 HASS

Examines how scientists and engineers work in the laboratory and within the firm. Students draw upon their own experiences in a laboratory course, a UROP project, or a summer job in order to test and interpret the assigned readings. Books and other readings are drawn from the history and social study of science and technology and are taken from Kuhn's *The Structure of Scientific Revolutions*, Pirsig's *Zen and the Art of Motorcycle Maintenance*, and Kidder's *The Soul of a New Machine*.

L. L. Bucciarelli

STS.082J Science, Technology, and American Government

(Same subject as 17.301J)

Prereq.: —
U (Fall)
3-0-9 HASS

See description under subject 17.301J.
E. B. Skolnikoff

STS.083J Gender and Science

(Same subject as SP.488J)

Prereq.: —
U (Spring)
3-0-9 HASS-D, Category 2

An examination of the roles that gender norms have historically played in the construction of scientific norms and practices with particular attention to the role of gender ideology in twentieth-century science.

E. F. Keller

STS.085J Ethics and the Law on the Electronic Frontier

(Same subject as 6.805J)

Prereq.: —
Acad Year 1996-97: Not offered
Acad Year 1997-98: U (Fall)
3-0-9 HASS

See description under subject 6.805J.
H. Abelson, M. Fischer

Special Topics**STS.091 Reading Seminar in Humanities, Science, and Technology I**Prereq.: One STS HASS-D subject or permission of instructor
U (Fall)
2-0-7 HASS**STS.092 Reading Seminar in Humanities, Science, and Technology II**Prereq.: One STS HASS-D subject or permission of instructor
U (Spring)
2-0-7 HASS

Reading and discussion of major primary and secondary works that illustrate or examine the interactions of science, technology, and society.

L. L. Bucciarelli, D. Mindell

STS.UR Undergraduate ResearchPrereq.: —
U (Fall, Spring)
Units arranged [P/D/F]
Can be repeated for credit**STS.URG Undergraduate Research**Prereq.: —
U (Fall, Spring)
Units arranged
Can be repeated for credit

Undergraduate research opportunities in the STS Program.

L. L. Bucciarelli, D. Mindell

STS.095 Special Topics in Science, Technology, and SocietyPrereq.: —
U (Fall, IAP, Spring)
Units arranged
Can be repeated for credit

For students who wish to pursue special studies or projects with a member of the Program in Science, Technology, and Society.

L. L. Bucciarelli, D. Mindell

STS.ThT Undergraduate Thesis TutorialPrereq.: —
U (Fall, Spring)
1-0-5
Can be repeated for credit

Definition and early-stage work on thesis project leading to STS.ThU. Taken during first term of student's two-term commitment to thesis project. Student works closely with STS faculty tutor. Required of all candidates for an STS degree.

L. L. Bucciarelli, D. Mindell

STS.ThU Undergraduate ThesisPrereq.: —
U (Fall, Spring)
Units arranged
Can be repeated for credit

Completion of work of the senior major thesis under the supervision of a faculty tutor. Includes oral presentation of thesis progress early in the term, writing and revising the final text, and at the close of the term meeting with the faculty advisor to discuss the successes and limitations of the project. Required of all candidates for an STS degree.

Consult L. L. Bucciarelli, D. Mindell.

Graduate Subjects

History of Science and Technology

STS.101 Proseminar: History of Science and Technology

Prereq.: —
G (Fall)
3-0-9

Intensive reading and analysis of key works in the history and historiography of science and technology. Aims at exploring similarities and differences between the two fields and at introducing students to basic interpretive issues, bibliographic sources, and professional standards. Topics change from year to year.

D. Fitzgerald

STS.102J Proseminar: Theories and Methods in the Study of History

(Same subject as 21H.991J)
Prereq.: Permission of instructor
G (Spring)
3-0-9

See description under subject 21H.991J.
P. C. Perdue

STS.103J Russian Science, Technology, and Society

(Subject meets with STS.021, 17.614J)
Prereq.: —
Acad Year 1996-97: Not offered
Acad Year 1997-98: G (Fall)
3-0-9

See description under subject STS.021.
L. R. Graham

STS.104 Technology and Work in American History

Prereq.: —
Acad Year 1996-97: G (Fall)
Acad Year 1997-98: Not offered
2-0-10

Focuses on the relationship between emergent technologies and work/labor in late nineteenth- and twentieth-century America. Considers both industrial and non-industrial work and its replacement by machines; the extent to which human work is amenable to mechanization; the difference between mental and manual labor and their amenability to mechanization; the effect of mechanization on industrial managers and laborers, householders, farmers, office workers, white-collar workers, and others.

D. Fitzgerald

STS.113 Biopower: Biology and Society in Modern America

Prereq.: —
Acad Year 1996-97: Not offered
Acad Year 1997-98: G (Fall)
3-0-9

The rise of major fields in the life sciences in America from 1879 to 1950, with emphasis on the historical processes by which American culture, ideology, economics, and biology have become intertwined. Examines research programs in physiology, endocrinology, biochemistry, genetics, eugenics, "psychobiology," and molecular biology as embedded in power relations such as race, class, and gender. Studies the questions of nature vs nurture, pure vs applied science, and vested interests vs objectivity. May be taken by qualified undergraduates with permission of the instructor.

L. E. Kay

STS.114J Seminar on Early American History

(Same subject as 21H.951J)
Prereq.: —
Acad Year 1996-97: Not offered
Acad Year 1997-98: G (Fall)
3-0-9

See description under subject 21H.951J.
P. Maier, M. R. Smith

STS.118J Reading Seminar in American History, 1877 to the Present

(Same subject as 21H.952J)
Prereq.: —
Acad Year 1996-97: Not offered
Acad Year 1997-98: G (Spring)
3-0-9

See description under subject 21H.952J.
C. Appy

STS.120J Marx, Darwin, and Freud

(Same subject as 21H.966J)
Prereq.: —
G (Fall)
3-0-9

See description under subject 21H.966J.
B. Mazlish

STS.122 The History of Medicine in the United States

Prereq.: —
G (Spring)
3-0-9

Examines the development of American medicine from the colonial period to the present. Topics include medical education, medical practice and ideology with respect to race and gender, the rise of the modern hospital, science in medicine, the origins of the AMA, the establishment of the NIH, and the relationship between medicine, health care, and public health. Involves critical evaluation of historiographic methods in the field.

E. M. Hammonds

STS.140 Change in Medieval Society: Did Technology Play a Part?

(Subject meets with STS.040)
Prereq.: —
G (Fall)
3-0-9

See description under subject STS.040.
B. B. Price

STS.150 Aspects of 19th-Century Physics

Prereq.: —
G (Fall)
3-0-9

Can be repeated for credit

Topics vary from year to year. Examines technical and contextual aspects of selected developments in nineteenth-century physics. Focuses on the relationship between experimental skills and tacit and overt theoretical structures. Areas investigated include: the contagious spread of wave methods; the effects of energy-based conceptual and laboratory tools; group differences that orbit about electromagnetic skills and conceptions; and the nature and function of mathematical technique in practical work. Student interest and background influence the areas to be explored.

J. Z. Buchwald

STS.155 Topics in Early Modern Science

Prereq.: —
G (Spring)
3-0-9

Examines the emergence of modern science from the twelfth through the seventeenth centuries, concentrating on the content and nature of scientific practice. Readings from key primary and secondary sources. Topics vary from year to year; examples include Ptolemaic astronomy, seventeenth-century kinematics, early modern experiments, and the idea of mechanism. Open to advanced undergraduates with permission of instructor.

K. Manning, J. Z. Buchwald

STS.160 Computers and Organisms

Prereq.: —
G (Fall)
3-0-9

What, if anything, is the difference between an organism and a computer? Subject examines the growing convergence between computer science and molecular biology, investigates the role of metaphors of information in this convergence, and locates the contemporary discussion in its historical context. Open to advanced undergraduates as STS 095, Special Topics, with permission of instructors.

E. Fox Keller, E. M. Hammonds

STS.170 The Organization of Knowledge in American Science and Technology

Prereq.: —
G (Spring)
3-0-9

The historical emergence of social and natural scientific disciplines within the context of institutional forms. Considers the social and ideological structures designed to support, encourage, and challenge scientific and technological innovations and ideas, including the government; the military; philanthropic organizations, professional societies and trade groups; educational institutions; public interest groups; and research organizations. Examines the relationship between intellectual and institutional life in America since the late nineteenth century.

D. Fitzgerald

STS.175J Nature, Environment, Empire (New)

(Same subject as 21H.968J)

Prereq.: —
Acad Year 1996-97: G (Fall)
Acad Year 1997-98: Not offered
2-0-10

An exploration of the relationship between the study of natural history, both domestic and exotic, by Europeans and Americans, and concrete exploitation of the natural world, focusing on the eighteenth and nineteenth centuries. Readings exemplify a variety of contemporary sources, including formal works on zoology and botany, travel journals, official reports, periodical literature, and agricultural manuals.

H. Ritvo

STS.190J Objectivity, Truth, and Scientific Rationality

(Same subject as 24.809J)

Prereq.: One subject in history or philosophy
Acad Year 1996-97: Not offered
Acad Year 1997-98: G (Spring)
3-0-9 H-LEVEL Grad Credit

See description under subject 24.809J.

E. Hall, J. Z. Buchwald

STS.195 Life Stories: Meaning and Metaphor in 20th-Century Biology (New)

Prereq.: —
G (Spring)
3-0-0

Examination of a number of the central tropes of twentieth-century biology — e.g., life, machine, genes, regulation, organization — in their changing historical and social contexts. How have these metaphors structured research, permitting the importation of social expectations, while at the same time satisfying multiple, sometimes divergent, explanatory needs? To what extent have they relied on available technology, with new machines changing the meanings of life, machine, regulation, etc.? Readings include selected primary literature alongside 1) philosophical readings on metaphors in science and 2) various historiographic perspectives.

E. Fox Keller

Social Study of Science and Technology**STS.301 Integrative Seminar in the Social, Cultural, and Historical Studies of Science and Technology**

Prereq.: Permission of instructor for non-STS students
G (Fall)
3-0-9

Sociocultural studies of science and technology, emphasizing interdisciplinary approaches from anthropology, history, literature, psychoanalysis, and other fields. Examples from ecological and environmental issues, molecular biology and immunology, and computers and information technologies. Topics include ethnographic techniques, sociological questions about the role of science and technology in society, psychological questions about objects-to-think-with, and the presentation of complexities in scholarly texts.

M. Fischer, S. Turkle

STS.501 Proseminar: Social Study of Science and Technology

Prereq.: —
G (Fall)
3-0-9

Intensive reading and analysis of key works in the theory and methods of the social study of science and technology. Aims at understanding the different questions and methods social scientists have posed and used in exploring how social context and norms influence the work of scientists and engineers. The relationship of the methods used to the questions raised is studied. Implications for the practice of science and engineering as well as for further scholarly study of that practice are explored.

H. Gusterson

STS.502J Proseminar: Social Theory and Analysis

(Same subject as 21A.670J)
Prereq.: —
G (Spring)
3-0-9

See description under subject 21A.670J.
J. Jackson

STS.507J Introduction to Cultural Criticism

(Subject meets with 21A.671J, STS.059)
Prereq.: Permission of instructor
G (Spring)
2-0-7

Examines diverse examples of cultural criticism by anthropologists, historians, psychoanalysts, journalists, and cultural studies specialists. Students sample a broad variety of approaches to cultural critique informed by, for example, Marxist, feminist, post-structuralist, and psychoanalytic perspectives. Key texts deal with topics ranging from media studies and urban design to the classic themes of race, class and gender. Meets with undergraduate subject STS.059, but assignments differ.

H. Gusterson

STS.510 Biotechnology and Society

Prereq.: —
G (Spring)
3-0-9

Examines biotechnology and genetic engineering in social, political, and ethical contexts. Connects historical background with contemporary issues, relating medical, agricultural and industrial applications to university education and research, funding of science, academic-industrial links, and regulatory and patent policies. Explores roles and responsibilities of scientists, ethical conflicts, and public expectations and perceptions.

Evaluates professional, institutional, and public policy alternatives. Topics include eugenics, human genome project, genetic screening, and human gene therapy.

L. E. Kay

STS.515 Epidemics and Cities

Prereq.: —
G (Fall)
3-0-9

Treats historical and contemporary issues surrounding epidemics in urban communities. Attention given to several major epidemics throughout history, including: the bubonic plague, cholera, and syphilis. Historical analysis will serve as a perspective, examining how effectively, efficiently, and humanely three American cities — San Francisco, New York, and Philadelphia — are confronting the AIDS epidemic.

K. Manning

STS.516J Analysis of Strategic Nuclear Forces

(Same subject as 17.476J)

Prereq.: —
G (Fall)
3-0-9 H-LEVEL Grad Credit

See description under subject 17.476J.

T. Postol

STS.518J Gender, Technology, and Computer Culture

(Subject meets with STS.060J, SP.480J, SP.481J)

Prereq.: —
G (Spring)
3-0-9

Meets with undergraduate subject STS.060J. Graduate students are expected to pursue the subject in greater depth. See description under subject STS.060J.

S. Turkle

STS.524J Science, Technology, and Public Policy

(Same subject as 17.302J)
Prereq.: Permission of instructor
G (Fall)
3-0-9 H-LEVEL Grad Credit

See description under subject 17.302J.
E. B. Skolnikoff

STS.525J Science and Technology in International Affairs

(Same subject as 17.328J)

Prereq.: 17.302 or permission of instructor
Acad Year 1996-97: Not offered
Acad Year 1997-98: G (Spring)
3-0-9 H-LEVEL Grad CreditSee description under subject 17.328J.
*E. B. Skolnikoff***STS.528J Evolving Conceptions of Systems and Self**

(Same subject as MAS.714J)

Prereq.: —
G (Fall)
2-0-7Examines how recent computational movements (such as Artificial Life, Connectionism, and Virtual Reality) both reflect and contribute to broader intellectual movements that are changing the way people think about mind, self, nature, and society. Issues include: computation and postmodernism, trends toward decentralized thinking and notions of emergent phenomena, changing conceptions of "real" and "artificial," the growing role of biological metaphors, and popular receptions of new computational ideas.
*M. Resnick, S. Turkle***STS.529 Representing Nature in America**Prereq.: —
Acad Year 1996-97: Not offered
Acad Year 1997-98: G (Fall)
3-0-9An examination, in the context of the current conflict between ecocentric and anthropocentric approaches to environmental problems, of the representation of nature in America before the Civil War. Among the texts to be examined are Shakespeare's *The Tempest*, Jefferson's *Notes on Virginia*, Lewis and Clark's Journals, Emerson's Essays, Thoreau's *Walden*, and Melville's *Moby Dick*.
*L. Marx***STS.532J US General Purpose Forces**

(Subject meets with 17.483J, 17.482J, STS.071J)

Prereq.: —
G (Spring)
2-0-7 H-LEVEL Grad Credit

See description under subject 17.483J.

*B. Posen, T. Postol*TOX.705J Biotechnology and Engineering
(Same subject as 10.023, 10.024)
Prereq.: —
G (Spring)
2-0-6

See description under subject 10.023.

*J. M. Eisenmann, R. S. Langer***STS.540 Environmental Studies: Scientific and Cultural Perspectives (New)**Prereq.: —
G (Spring)
3-0-9Graduate introduction to environmental studies from a humanistic perspective. Examines the relative merits and compatibility of polar conceptions of environmental degradation: at one pole, scientists who locate the chief problems in the biophysical realm; at the other, humanists and social scientists who locate them within culture and society. Readings include Glacken, Thoreau, Carson, Naess, Worster, Commoner, Beck, Esterbrook, Ausubel, Botkin, *Global Change Newsletter*. Open to upper-level undergraduates with permission of instructor.
*J. Conway, K. Keniston, L. Marx***STS.570 Identity and the Internet (New)**(Subject meets with STS.065)
Prereq.: —
G (Spring)
3-0-9See description under subject STS.065.
*S. Turkle***Research****STS.901-910 Advanced Topics in Science, Technology, and Society**Prereq.: —
G (Fall, Spring)
Units arranged
Can be repeated for creditFor students who wish to pursue special studies or projects at an advanced level with a member of the Program in Science, Technology, and Society.
Consult D. Fitzgerald.**STS.950 Research Designs, Strategies, and Methods**Prereq.: Permission of instructor
G (Spring)
2-0-4 H-LEVEL Grad CreditThe design and execution of research in the history and social study of science and technology. Readings of exemplary research studies in both the social scientific and historical literature. Discussions emphasize relating specific studies to more general or theoretical perspectives, choice of methods appropriate to the questions being asked, and logic of explanation and interpretation. Students complete first draft of an original research paper, review subsequent drafts, and complete papers by end of the term.
*K. Keniston***STS.ThG Graduate Thesis**Prereq.: —
G (Fall, Spring)
Units arranged H-LEVEL Grad Credit
Can be repeated for credit

Program of graduate research, leading to the writing of a Ph.D. thesis; to be arranged by the student with an appropriate MIT faculty member, who is the thesis supervisor.

D. Fitzgerald

SWE**Engineering School-Wide Electives**

For further information, see listing in Chapter VII under the School of Engineering.

Computer Models of Physical and Engineering Systems

(Offered under: 1.12, 2.101, 3.05, 10.11, 13.51, 16.651, 22.006)

Prereq.: 18.03 or 18.034, 1.00

U (Spring)

3-1-8

Approaches to develop computer models of physical and engineering systems: object-oriented methodologies to model structure, numerical analysis approaches to model behavior. Introduction to object orientation, C++, and the Object-Oriented Modeling Technique. Numerical solutions to differentiation, integration, ordinary differential equations, partial differential equations, characteristic-value problems, and curve-fitting. These techniques used to model various engineering systems. Strong background in C programming, calculus, and differential equations recommended.

F. Peña-Mora

Inventions and Patents

(Offered under: 3.172, 6.901, 16.652, 22.084)

Prereq.: 14.02

U (Fall)

3-0-6

History of private and public rights in scientific discoveries and applied engineering, leading to the development of worldwide patent systems. The classes of invention protectable under the patent laws of the US, including the procedures in protecting inventions in the Patent Office and the courts. Reviews of past cases involving inventions and patents in a) the chemical process industry and medical and bio-engineering fields; b) devices in the mechanical, ocean exploration, civil, and/or aeronautical fields; c) the electrical, computer, software, and electronic areas, including key radio, solid-state, and computer inventions.

R. H. Rines

Management in Engineering

(Offered under: 2.96, 6.930, 10.806, 13.52, 16.653, 22.002)

Prereq.: —

U (Fall)

3-0-9

Introduction of engineering management in variety of settings: 1) role of engineering and its relationship to other functions, 2) managerial tools and concepts used in engineering organizations, 3) practice in handling short- and long-term problems, 4) career strategy and development. Topics: financial principles, management of innovation, engineering project planning and control, human factors, career planning, patents, and technical strategy. Case method of instruction emphasizes participation in class discussion. Juniors, seniors, or graduate students. Elective unit distribution: Advanced disciplinary, 6; Design, 6. Engineering School-Wide Elective subject.

J.-H. Chun

Engineering Risk-Benefit Analysis

(Offered under: 1.155, 2.943, 3.577, 6.938, 10.816, 13.621, 16.862, 22.82)

Prereq.: 18.02

G (Spring)

3-0-6 H-LEVEL Grad Credit

Risk assessment, decision and cost-benefit analysis, and fault-tree methods for describing and making decisions about societal risks (nuclear reactors, dams, carcinogens, transport and disposal of hazardous materials) associated with large engineering projects. Balancing risks and benefits in situations involving human safety, environmental risks, and financial uncertainties. Presentations of major risk assessments and the public decision processes associated with them.

G. Apostolakis, A. W. Drake, A. R. Odoni

Engineering Systems Analysis

(Offered under: 1.146, 2.192, 3.56, 13.62, 16.861, 22.821, TPP.21)

Prereq.: Permission of instructor

G (Fall)

3-0-6 H-LEVEL Grad Credit

Dynamic Strategic Planning as the synthesis of analytic procedures for identifying optimal large-scale systems designs in a risky, open environment. Review of economic framework for analysis. Application of mathematical optimization to engineering problems. Evaluation procedures for single and multi-attributed problems covering decision analysis in addition to discounted cash flow calculations. The subject culminates in a major practical exercise in dynamic strategic planning.

R. de Neuville, J. P. Clark, F. Field

Entrepreneurship

(Offered under: 2.942, 3.566, 6.936, 10.801, 13.78, 16.951, 22.86)

Prereq.: —

G (Spring)

4-0-5

Introduction to various issues faced by technical innovators/entrepreneurs. Topics include concept evaluation, patents and licensing, financing, marketing, business planning, accounting, and team building. Case studies are used. Term project required in which student ideas are developed into business plans.

Open to undergraduates by permission of instructor.

T. G. Gutowski

ATL.3244 Science, Technology, and Public Policy

Same subject as 17.302J

Prereq.: Permission of instructor

G (Fall)

3-0-6 H-LEVEL Grad Credit

See description under subject 17.302J

E. S. Shohatoff

TOX**Toxicology**

For degree requirements, see listing in Chapter VII under the Whitaker College.

Undergraduate Subjects**TOX.UR Undergraduate Research Opportunities**

Prereq.: —
U (Fall, Spring)
Units arranged [P/D/F]
Can be repeated for credit

Laboratory research conducted by undergraduates in the field of toxicology. May be extended over multiple terms.

P. C. Dedon, Staff

TOX.101 Special Projects in Undergraduate Research

Prereq.: —
U (Fall)
Units arranged
Can be repeated for credit

TOX.102 Special Projects in Undergraduate Research

Prereq.: —
U (Spring)
Units arranged
Can be repeated for credit

Emphasizes direct and active involvement of undergraduates in laboratory research in toxicology. May be extended over multiple terms. Letter grade credit.

P. C. Dedon, Staff

TOX.104J Chemicals in the Environment: Toxicology

(Same subject as 1.81J, TPP.53J)
Prereq.: 5.11, 7.012/7.013/7.014
U (Spring)
3-0-9

Chemical and biological concepts necessary to relate environmental chemical or radiation exposure to human disease; food-, air-, and water-borne chemicals; exposure, uptake and distribution, metabolism, reactions with cellular macromolecules, enzymatic repair, and cellular or genetic consequences; genotoxicity and hormonal mimicry; development of technology for direct studies in human populations.
W. G. Thilly

TOX.105J Biotechnology and Engineering

(Same subject as 5.22J, 10.02J)
Prereq.: —
U (Spring)
4-0-5

See description under subject 5.22J.
J. M. Essigmann, R. S. Langer

Graduate Subjects**TOX.200 Toxicology Seminar**

Prereq.: Open only to TOX graduate students, or by permission of instructor
G (Fall, Spring)
1-0-2 [P/D/F] H-LEVEL Grad Credit

Weekly one-hour seminars covering graduate student research and presentations by invited speakers.

J. S. Wishnok, P. C. Dedon, D. B. Schauer

TOX.201 Principles of In Vivo Toxicology

Prereq.: Permission of instructor
G (Fall)
4-3-8 H-LEVEL Grad Credit

Selected aspects of anatomy, histology, physiology, and cell biology of mammalian organisms and their pathogens. Subject material integrated with principles of toxicology. A three-hour lab/demonstration period each week involves experiments in anatomy (*in vivo*), physiology, and microscopy to augment the lectures.

J. G. Fox, D. B. Schauer, P. C. Dedon

TOX.209 Biochemistry Laboratory

(Subject meets with 5.071J, HST.410J)
Prereq.: 5.07, and 5.310 or 5.311
G (Spring)
2-8-2 H-LEVEL Grad Credit

See description under subject 5.071J.
J. Williamson, P. Dedon

TOX.211 Metabolism of Toxic Chemicals

Prereq.: 5.07 or 7.05
G (Spring)
3-0-9 H-LEVEL Grad Credit

Analysis of the mechanisms of action of toxic and carcinogenic chemicals from the perspective of uptake, distribution, and metabolism. Key enzymatic and transport processes. Reaction mechanisms, generation of electrophiles, and nucleophilic targets, with stress on DNA and proteins. Human metabolic polymorphisms. Methods of chemical analysis of aducts and metabolites.

S. R. Tannenbaum, P. C. Dedon

TOX.213 Genetic Toxicology

Prereq.: Permission of instructor
G (Spring)
4-0-8 H-LEVEL Grad Credit

The origins and existence of genetic disease examined from the biochemical, genetic, and public health viewpoints. DNA damage by chemicals and radiation. Molecular basis of mutagenesis and mutational spectrometry. DNA repair and consequences of repair defects. Apoptosis and genetic instability. Analysis of dose response relationships and patterns of genetic disease in human populations. Harvard School of Public Health staff involved in teaching of subject.

W. G. Thilly, J. M. Essigmann, Staff

TOX.214 Human Pathophysiology

Prereq.: 5.07 and TOX.201 or permission of instructor
G (Spring)
3-0-9 H-LEVEL Grad Credit

Mechanisms underlying selected diseases are examined, with particular emphasis on molecular and biochemical basis of pathogenesis. The role of inflammation, the immune system, hormones, growth factors, drugs, toxins, and infectious agents are considered. Subject integrates aspects of pathology, physiology, biochemistry, pharmacology, and toxicology.

D. B. Schauer

TOX.215 Epidemiology and Molecular Models of Disease

Prereq.: Permission of instructor
Acad Year 1996-97: G (Fall)
Acad Year 1997-98: Not offered
4-0-11 H-LEVEL Grad Credit

The lifetime incidence and morbidity of diseases such as cancer, atherosclerosis, and other degenerative diseases are analyzed. A combination of these data with molecular cascade models, especially those involving genetic change, is attempted. The general approaches of epidemiology — case control, prospective and retrospective studies — are discussed in terms of new enabling analytical technology for human occupational and environmental studies.

W. G. Thilly, G. N. Wogan, S. R. Tannenbaum
Other courses in areas of disease analysis, identity and transmission, Student Research Society, the Medical Research Center, and a Research Project in Toxicology. Please see student in the Management of Toxicology Program.

TOX.219 Selected Topics in Toxicology

Prereq.: —

G (Fall, IAP, Spring)

Units arranged H-LEVEL Grad Credit

Can be repeated for credit

Detailed discussion of selected topics of current interest. Classwork in various areas not covered by regular subjects.

Staff

TOX.301 Research Problems in Toxicology

Prereq.: —

G (Fall, Summer)

Units arranged H-LEVEL Grad Credit

Can be repeated for credit

TOX.302 Research Problems in Toxicology

Prereq.: —

G (Spring)

Units arranged H-LEVEL Grad Credit

Can be repeated for credit

Directed research in the field of toxicology. Open only to Toxicology graduate students.

P. C. Dedon, Staff

TOX.303 Thesis Proposal

Prereq.: —

G (Fall, Spring, Summer)

0-24-0 [P/D/F] H-LEVEL Grad Credit

Can be repeated for credit

Thesis proposal research and presentation to the Thesis Committee.

P. C. Dedon, Staff

TOX.304 Teaching Experience in Toxicology

Prereq.: Permission of instructor

G (Fall, Spring)

Units arranged H-LEVEL Grad Credit

Can be repeated for credit

For qualified graduate students interested in teaching. Tutorial, laboratory, or classroom teaching under the supervision of a faculty member. Total enrollment limited by availability of suitable teaching assignments.

P. C. Dedon, Staff

TOX.Th Graduate Thesis

Prereq.: —

G (Fall, Spring, Summer)

Units arranged H-LEVEL Grad Credit

Can be repeated for credit

Program of graduate research leading to the writing of an S.M. or Ph.D. thesis; to be arranged by the student and the MIT faculty advisor.

P. C. Dedon, Staff

Engineering School TOX**Electives**

TOX.219 Selected Topics in Toxicology
TOX.301 Research Problems in Toxicology
TOX.302 Research Problems in Toxicology
TOX.303 Thesis Proposal

For further information, see listing in Chapter VII later in the School of Engineering.

TPP**Technology and Policy**

For further information, see listing in Chapter VI.

TPP.03J Industrial Competition in the US and Asia

(Same subject as 3.08J, 21H.541J)

Prereq.: —

Acad Year 1996-97: U (Spring)

Acad Year 1997-98: Not offered

2-0-7 HASS

See description under subject 3.08J.

J. P. Clark, P. C. Perdue

TPP.09J Real-World Ethics

(Same subject as 2.95J)

Prereq.: Permission of instructor

U (Spring)

3-0-6 HASS

Open to juniors, seniors, and graduate students. See description under subject 2.95J.

C. Whitbeck, N. Kiang, I. Paul

TPP.101 Introduction to Leadership

Prereq.: —

G (Fall)

0-2-1

Presents basic concepts of individual and collective leadership in groups. A structured set of outdoor experiences complements classroom activities. Restricted to entering students in the Technology and Policy Program. Taught first half of semester.

Information: R. D. Tabors.

TPP.11 Proseminar in Technology and Policy

Prereq.: Permission of instructor

G (Fall)

4-0-8 H-LEVEL Grad Credit

Core subject for TPP students first considers the diversity of values that complicate the selection of policy: personal morals; values inherent in various professions; and cultural differences. Shows how formal models of technology can be used to build consensus, identify points of contention, and form a basis for negotiation. Case projects of increasing complexity explore these issues. Emphasis on developing the participants' skills in making verbal and written presentations.

R. D. Tabors, J. Ehrenfeld, L. McKnight

TPP.121J Strategic Analysis for Environmental Policy Planning, Design, and Implementation

(Same subject as 1.141J, 3.563J, 6.688J, 11.385J, 22.822J)

Prereq.: 1.146 or 2.192 or 3.56 or 13.62 or 16.861 or TPP.21 or 11.200 or 11.205

G (Spring)

3-0-6 H-LEVEL Grad Credit

See description under subject 1.141J.

D. H. Marks, R. de Neufville, J. Clark, R. Gakenheimer, M. W. Golay, D. Sadoway, R. D. Tabors

TPP.123J Industrial Ecology

(Same subject as 1.814J, 3.560J)

Prereq.: TPP.11 or 3.56

G (Spring)

3-0-6 H-LEVEL Grad Credit

Quantitative techniques for life cycle analysis of the impacts of materials extraction, processing use, and recycling; and economic analysis of materials processing, products, and markets. Student teams undertake a major case study of automobile manufacturing using the latest methods of analysis and computer-based models of materials process.

J. Clark, F. Field, R. de Neufville

TPP.126 Energy Systems and Economic Development

Prereq.: TPP.11, TPP.130

G (Spring)

3-0-6 H-LEVEL Grad Credit

A team-based policy research subject focused on evaluation of energy technologies and their implementation within developing countries. Focuses on one or more specific nations, carries out a resource assessment, and develops an energy strategy that is congruent with technical potential, cultural requirements, and environmental constraints.

R. D. Tabors, Staff

TPP.130 Professional Practice

Prereq.: TPP.11

G (Spring)

1-0-2 [P/D/F] H-LEVEL Grad Credit

Focuses on concepts of effective, intelligent professional practice in preparation for careers in technology, management, and policy.

J. Ehrenfeld

TPP.14J Thesis Proposal Seminar

(Same subject as 1.980J)

Prereq.: Thesis Registration

G (Fall, IAP)

1-0-2 H-LEVEL Grad Credit

Can be repeated for credit

Orientation to thesis in Technology and Policy, with emphasis on integrating the two into a professional effort showing leadership in the field. Students work closely with advisors to prepare an acceptable thesis proposal. Restricted to advanced students in the Technology and Policy Program in the semester preceding their intended graduation.

R. de Neufville, J. Ehrenfeld, R. Tabors

TPP.15 Technology Policy Internship

Prereq.: TPP.11 and TPP.121 or equivalent

G (Fall)

Units arranged H-LEVEL Grad Credit

Seminar examines what technology policy is in practice. Considers the question of "Who achieves what, when, how, and why?" regarding technical issues. Program faculty and visitors present and dissect their own experience with special reference to specific cases in which they are participating. Students who have completed summer internships participate.

R. de Neufville, Staff

TPP.21 Engineering Systems Analysis

Prereq.: Permission of instructor

G (Fall)

3-0-6 H-LEVEL Grad Credit

Engineering School-Wide Elective Subject. Description given at end of this chapter in SWE section on page 562.

R. de Neufville, J. P. Clark, F. Field

TPP.23J Dynamic Strategic Planning

(Same subject as 15.378J)

Prereq.: Permission of instructor

G (Summer)

3-0-3 H-LEVEL Grad Credit

Dynamic strategic planning as the logical way to approach long-term, risky projects. Integrated presentation of the real-world risks, the asymmetric valuation of gains and losses, the production function as the means to display alternatives, and of decision analysis to identify optimal strategies. Students learn to apply the method by carrying out a realistic project in teams. Restricted to students in the Management of Technology Program.

R. de Neufville, J. P. Clark, F. Field

TPP.32J Law, Technology, and Public Policy

(Same subject as 15.655J)

Prereq.: —

G (Spring)

3-0-6 H-LEVEL Grad Credit

Examination of the relationship between law and technological change, and the ways in which law, economics, and technological change shape public policy. Areas addressed include: 1) responses of the legal system to problems created by new or existing technology; 2) the influence of law on technological change; 3) the actors and institutions which do/should limit or encourage the direction and extent of technological change; and 4) how technological innovation affects the distribution of wealth and social justice. Topics covered include genetic engineering; telecommunications; health, safety, and environmental regulation; cost/benefit analysis as a decision tool; and public participation in governmental decisions affecting science and technology.

N. A. Ashford, C. C. Caldart

TPP.33J Environmental Law: Pollution Control

(Same subject as 1.811J)

Prereq.: Permission of instructor

G (Fall)

3-0-9 H-LEVEL Grad Credit

See description under subject 1.811J.

*N. A. Ashford, C. C. Caldart***TPP.34J Regulation of Chemicals, Radiation, and Biotechnology**

(Same subject as 1.812J)

Prereq.: Permission of instructor

G (Spring)

3-0-9 H-LEVEL Grad Credit

See description under subject 1.812J.

*N. A. Ashford, C. C. Caldart***TPP.35J Technology, Law, and the Working Environment**

(Same subject as 10.805J, 15.656J)

Prereq.: —

Acad Year 1996-97: Not offered

Acad Year 1997-98: G (Fall)

3-0-6 H-LEVEL Grad Credit

See description under subject 10.805J.

*N. A. Ashford, C. C. Caldart***TPP.37J Sustainability, Trade, and the Environment (New)**

(Same subject as 15.657J)

Prereq.: —

G (Fall)

3-0-6

With the recent passing of the North American Free Trade Agreement and the establishment of the World Trade Organization, serious questions have been raised concerning the effects of global trade on sustainability, which includes not only a healthy economic base, but also a sound environment, stable employment, adequate purchasing power, distributional equity, national self-reliance, and maintenance of cultural integrity. Subject explores the many dimensions of sustainability and the use of political and legal mechanisms to further sustainable development.

N. A. Ashford

TPP.41J Research Ethics

(Same subject as 2.953J, 16.954J)

Prereq.: —

G (Spring)

3-0-3

See description under subject 2.953J.
C. Whitbeck

TPP.42J Ethical Problems in Advanced Engineering and Science

(Same subject as 2.954J)

Prereq.: 2.953J, 16.954J, TPP.41J, permission of instructor

G (Spring)

3-0-3

See description under subject 2.954J.
C. Whitbeck, N. Kiang

TPP.51J Chemicals in the Environment: Fate and Transport

(Same subject as 1.725J)

Prereq.: Permission of instructor

G (Fall)

3-0-9

See description under subject 1.725J.
H. F. Hemond

TPP.52J Chemicals in the Environment: Sources and Control

(Subject meets with 1.10J, 10.470J, 10.570J)

Prereq.: Permission of instructor

G (Fall)

3-0-6 H-LEVEL Grad Credit

Meets with subjects 1.10J, 10.470J, and 10.570J; but assignments differ. See description under subject 1.10J.

*A. F. Sarofim, J. R. Ehrenfeld, P. Gschwend***TPP.53J Chemicals in the Environment: Toxicology**

(Same subject as TOX.104J, 1.81J)

Prereq.: 5.11, 7.012/7.013/7.014

U (Spring)

3-0-9

See description under subject TOX.104J.
W. G. Thilly

TPP.54J Chemicals in the Environment: Policy and Management

(Same subject as 11.363J)

Prereq.: —

G (Spring)

3-0-6 H-LEVEL Grad Credit

See description under subject 11.363J.
V. Norberg-Bohm

TPP.61J Operation and Planning of Electric Power

(Same subject as 6.683J)

Prereq.: 6.061 or 6.013; 15.011

Acad Year 1996-97: Not offered

Acad Year 1997-98: G (Fall)

3-0-9 H-LEVEL Grad Credit

See description under subject 6.683J.
M. D. Ilic, R. D. Tabors

TPP.64J Energy in Perspective

(Same subject as 22.928J)

Prereq.: Permission of instructor

G (IAP)

2-0-4 H-LEVEL Grad Credit

See description under subject 22.928J.
M. Miller, M. J. Driscoll

TPP.71J Information and Communications: Technology and Policy

(Same subject as 15.582J)

Prereq.: Permission of instructor

G (Spring)

3-0-9 H-LEVEL Grad Credit

Provides students with an understanding of the complex technology, market, and policy processes affecting development of information networks, communications infrastructure, and economic development. Case studies of specific technology policy processes serve to illustrate the global, national, and local; public and private; social and economic factors that will shape use of information and communication technology in the next century.

L. McKnight

TPP.91 Special Subjects in Technology and Policy

Prereq.: Permission of instructor

G (Fall, Spring)

Units arranged H-LEVEL Grad Credit

Can be repeated for credit

Opportunity for group study of advanced topics in Technology Policy not otherwise included in the curriculum at MIT. Offerings are initiated by faculty on an ad hoc basis subject to Program approval.

*R. de Neufville, R. D. Tabors***TPP.92-TPP.95 Special Subjects in Technology and Policy**

Prereq.: Permission of instructor

G (Fall, IAP, Spring, Summer)

Units arranged H-LEVEL Grad Credit

Can be repeated for credit

Opportunity for group study of advanced topics in Technology Policy not otherwise included in the curriculum at MIT. Offerings are initiated by faculty on an ad hoc basis subject to Program approval.

R. de Neufville, R. D. Tabors

ROTC**ROTC Programs**

Aerospace Studies, Military Science, and Naval Science subjects are not for MIT credit.

With the recent passing of the North American Free Trade Agreement and the establishment of the World Trade Organization, serious issues have come up related to the effects of these changes on our economy and society.

Aerospace Studies**AS.11 The Air Force Today**

Prereq.: —
U (Fall)
1-0-1

Survey subject focusing on background, mission, and organization of the Air Force, and the functions of its forces. Promotes an understanding of the concepts of professionalism and officerhood as they apply to the military. Emphasis is on beginning the development of oral and written communications skills.

B. Tagg

AS.111 Leadership Laboratory

Prereq.: —
U (Fall)
0-2-2 [P/D/F]

Introduction to the customs, traditions, and courtesies of the Air Force through seminars, guest speakers, and appropriate group exercises. Taken simultaneously with AS.11.

D. Gerrig

AS.12 The Air Force Today

Prereq.: AS.11
U (Spring)
1-0-1

Continues the study of the US Air Force and its role in the contemporary world. Includes Air Reserve Forces, Air National Guard, and other US Armed Forces. Discusses the US defense policy and strategy. Cadets learn about terrorism and geographical awareness.

B. Tagg

AS.121 Leadership Laboratory

Prereq.: AS.111
U (Spring)
0-2-2 [P/D/F]

Continuation of AS.111. Emphasis on role and responsibilities of an Air Force junior officer. Taken simultaneously with AS.12.

D. Gerrig

AS.21 The Air Force Way

Prereq.: —
U (Fall)
1-0-1

History of the development of air power, from its beginnings through modern applications. Emphasis on the events, leaders, and technical developments surrounding air power and its ascension as a primary element of national security. Communication skills are also emphasized.

D. Gerrig

AS.211 Leadership Laboratory

Prereq.: AS 121
U (Fall)
0-2-2 [P/D/F]

Emphasizes development of techniques used to direct and inform. Students are assigned leadership and management positions in the AS.111 programs described above. Taken simultaneously with AS.21.

D. Gerrig

AS.22 The Air Force Way

Prereq.: AS.21
U (Spring)
1-0-1

Concentrates on the environment of the Air Force officer. Includes the study of leadership fundamentals and the concepts of ethical behavior. Leadership concepts are reinforced through interactive exercises. Communication skills are emphasized including a discussion of presentation techniques and a student application.

D. Gerrig

AS.221 Leadership Laboratory

Prereq.: AS.211
U (Spring)
0-2-2 [P/D/F]

Continuation of AS.211. Adds a special program in preparation for Field Training. Taken simultaneously with AS.22.

D. Gerrig

AS.31 Air Force Leadership and Management

Prereq.: —
U (Fall)
3-0-3

Study of management fundamentals, professional knowledge, and communicative skills required of an Air Force junior officer. Case studies are used to examine Air Force leadership situations. Special emphasis is placed on the concept of quality in AF management situations and communications.

D. Eherenman

AS.311 Leadership Laboratory

Prereq.: AS 221
U (Fall)
0-2-4 [P/D/F]

Supervisory practice and exercise of leadership functions in controlling and directing activities of the cadet corps. Development of leadership potential in a practical, supervised training laboratory. Taken simultaneously with AS.31.

D. Gerrig

AS.32 Air Force Leadership and Management

Prereq.: AS.31
U (Spring)
3-0-3

Continuation of AS.31 with emphasis now on leadership. Leadership concepts and professional ethics explored through the use of case studies and interactive class exercises. Communication skills are also emphasized.

D. Eherenman

AS.321 Leadership Laboratory

Prereq.: AS.311
U (Spring)
0-2-4 [P/D/F]

Continues AS.311 emphasis on supervisory and leadership skills. Emphasis on advantages of an Air Force career. Taken simultaneously with AS.32.

D. Gerrig

AS.411 Leadership Laboratory

Prereq.: AS.321
U (Fall)
0-2-4 [P/D/F]

Exercise of management functions in planning, supervising, and directing cadet corps activities. Acquire proficiency in military leadership skills.

D. Gerrig

AS.42 Issues for Today's Military

Prereq.: AS.41
U (Spring)
3-0-3

Study of selected issues that affect the military today. Topics include the laws of armed conflict, the military legal system, aerospace doctrine, the military as a profession, officership, and the transition from civilian to military life. Communication skills are emphasized.

S. Borah

AS.421 Leadership Laboratory

Prereq.: AS.411
U (Spring)
0-2-4 [P/D/F]

Continues AS.411. Includes preparation for professional duties.

D. Gerrig

Military Science**MS.101 Introduction to the Army**

Prereq.: —
U (Fall)
1-2-1

Investigates the generalized structure and employment of the US Army. Provides a framework of leadership, management, and communication skills to enable the first-year ROTC cadet to understand the responsibility and authority vested in Army officers, and to critically evaluate a leader's effectiveness. Emphasizes ethical considerations for leaders, group dynamics, and the importance of verbal and non-verbal communication skills.

A. Lewis

MS.102 The Fundamentals of Military Science

Prereq.: MS.101 or permission of instructor
U (Spring)
1-2-1

Discusses interface between Active Army, National Guard, Reserves, and civilian work force; interservice and intra-alliance support. Examines organization and role of company-sized units; small-unit tactics and combined arms concepts. Specialties of soldiers are related to operational unit missions. Introduces principles of war and relates them to actual historical events.

A. Lewis

MS.201 Intermediate Military Skills I

Prereq.: MS.102 or permission of instructor
U (Fall)
1-2-1

Develops and refines cadet technical and tactical skills. Stresses oral and written communications techniques. Cadets serve in a variety of positions to develop their leadership, managerial, and communication skills. Tactical and technical skills presented during classroom instruction are applied and evaluated during leadership laboratories and in field training exercises.

A. Lewis

MS.202 Intermediate Military Skills II

Prereq.: MS.201 or permission of instructor
U (Spring)
1-2-1

Stresses and continues the process of cadet development. Emphasizes individual soldier skills, including first aid, map reading, and radio communications procedures. Integrates individual skills into collective tasks at the squad and platoon level. Prepares cadets for the rigors of leading others in a tactical environment. Technical and tactical skills presented during classroom instruction are applied and evaluated during leadership laboratories and in a field training exercise.

A. Lewis

MS.301 Leadership and Military Science

Prereq.: MS.202
U (Fall)
3-2-1

Focuses on development of cadet skills in the areas of map reading, land navigation, preparation of combat orders, conducting physical training, and other general military subjects.

S. Acton

MS.302 Small-Unit Tactics

Prereq.: MS.301
U (Spring)
2-0-1

Addresses the leadership of small units conducting conventional combat operations. Elements of terrain analysis and application to offensive, defensive, and retrograde operations discussed, along with weather considerations and their impact on combat operations. Current organizations and hardware associated with small tactical combined-arms formations reviewed.

S. Acton

MS.311 Advanced Military Science

Prereq.: MS.202 or permission of instructor
Acad Year 1996-97: U (Fall)
Acad Year 1997-98: Not offered
1-2-1

Continues development of cadet competencies and confidence through intermediate leadership and technical/tactical instruction. Training focuses on leadership, written and oral communication, operations and tactics, land navigation, physical fitness, and general military subjects.

J. Long

MS.312 Advanced Camp Preparation

Prereq.: MS.311
U (Spring)
1-2-1

Prepares the Army ROTC Cadet for Summer Advanced Camp by focusing on the specific subjects and events that need to be mastered to successfully complete camp. Among the topics covered are Patrolling, Squad Tactics, Practical Land Navigation, and Tactical Radio Communications. Cadets also participate in a field training exercise which emphasizes rifle marksmanship, land navigation, and performing on a Leadership Reaction Course.

J. Long

MS.401 Leadership and Management I

Prereq.: MS.302
U (Fall)
3-2-1

Designed to develop the cadets' technical, tactical, and leadership skills while continually assessing their officership potential. Intended to prepare the cadets for a smooth transition into the officers' corps. Provides information on a series of topics ranging from the United States military justice system; oral and written communications; the army's training philosophy; and command and staff functions at the small-unit level, battalion and below.

B. Creel

MS.402 Leadership and Management II

Prereq.: MS.401
U (Spring)
3-2-1

A continuation of the orientation initiated in MS.401. Provides a basic background in the army's logistic, supply, and personnel management systems; post/installation support; military ethics and professionalism; as well as advanced tactical considerations dealing with threat analysis, intell/electronic warfare systems, battle focus planning process, security measures, and the army's program to combat terrorism.

B. Creel

MS.411 Leadership Laboratory

Prereq.: MS.312
U (Fall)
1-2-1

Practical exercise in the application of military leadership and managerial techniques in planning, organizing, directing, and controlling the activities of the corps of cadets. Students are assigned leadership positions, serving in both command and staff capacities in a standard battalion configuration. The primary objective is further leadership development.

B. Creel

MS.412 Leadership Laboratory

Prereq.: MS.411
U (Spring)
3-2-1

Continues MS.411. Includes preparation for the transition from cadet/student to lieutenant.

B. Creel

Naval Science

NS.101 Introduction to Naval Science

Prereq.: —
U (Fall)
2-0-1

General introduction to seapower and the naval service. An overview of the organization and historical development of the US Navy and its personnel and equipment. Covers the basic tenets of naval courtesy and customs, discipline, and leadership, as well as the major challenges facing today's Naval officer.

Staff

NS.102 Naval Ships Systems¹

Prereq.: —
U (Spring)
3-0-3

Lecture series on technological fundamentals of applied and planned Naval Ships Systems from an engineering viewpoint. Topics: stability, propulsion, ship control and systems.

T. D. Sperry

NS.201 Naval Weapons Systems¹

Prereq.: 8.01, 18.02 recommended
U (Fall)
3-0-3

Overview of the properties and behavior of electromagnetic radiation pertaining to maritime applications. Topics: communications, radar detection, electrooptics, tracking and guidance systems. Sonar and computer-controlled systems also discussed. Examples taken from systems found on naval ships and aircraft. Selected readings on naval weapons and fire control systems.

T. D. Sperry

NS.202 Seapower and Maritime Affairs

Prereq.: —
U (Spring)
2-0-2

Discussion of the history of seapower, the role of various warfare components of the Navy in supporting the Navy's mission, and implementation of seapower as an instrument of national policy.

Staff

NS.301 Coastal Piloting and Celestial Navigation¹

Prereq.: Recommended second class cruise
U (Fall)
2-2-4

Comprehensive study of the theory, principles, and procedures of piloting and celestial navigation, including mathematics of navigation, practical work involving navigational instruments, sight reduction by *pro forma* and computerized methods, charts, publications, and voyage planning.

M. Kosnar

NS.302 Navigation and Naval Operations

Prereq.: Recommended second class cruise and NS.301
U (Spring)
3-0-3

Comprehensive study of tactical and strategic considerations to the employment of naval forces, including communications, tactical formations and dispositions, relative motion, maneuvering board, and nautical rules of the road.

M. Kosnar

NS.401 Leadership and Management I

Prereq.: NS.101
U (Fall)
3-0-3

A comprehensive study of organizational behavior and management in the context of the naval organization. Topics include a survey of management functions and skills including planning, communications, team building, and decision making. Explores ethics and total quality leadership methods. An overview of naval administration is included. Behavioral theories and their practical applications are explored by use of experimental exercises, case studies, and discussion.

L. Fisher

NS.402 Leadership and Management II

Prereq.: First class cruise/NS.401
U (Spring)
2-0-2

A seminar which analyzes ethical decision making and leadership principles. Provides a basic background in the duties and responsibilities of a junior division and watch officer; strong emphasis on the junior officer's responsibilities in training, counseling, and career development. Student familiarization with equal opportunity and drug/alcohol rehabilitation programs. Principles of leadership reinforced through leadership case studies.

M. L. McHugh

NS.410 Evolution of Amphibious Warfare

Prereq.: —
Acad Year 1996-97: U (Fall)
Acad Year 1997-98: Not offered
2-0-4

Historical and tactical analysis of amphibious warfare. Seeks to define the concept, explore its doctrinal origins, and trace its evolution as an element of naval policy during the twentieth century. Case study approach used to provide the prospective Marine Corps officer with the fundamentals of amphibious tactics.

D. S. Rogers

¹This subject is normally conducted in conjunction with an MIT credit-bearing seminar. Tufts ROTC students can only register under this ROTC subject number; MIT students must register under the associated MIT seminar number; Harvard and Wellesley students can register under either number. Any technical aspects of the subject matter of interest only to midshipmen are covered in separate NROTC sessions and field trips.

