# Critical and Creative Thinking (MA, Graduate Certificate)

## FACULTY

**Lawrence Blum** (Philosophy Department), PhD, *Harvard University* • Ethics and Moral Philosophy

**Nina Greenwald**, PhD, *Boston College* • Educational Psychology • Creative Thinking and Problem Solving • Problem-Based Learning • Gifted Education • Multiple Intelligences

**Arthur Millman** (Philosophy Department), PhD, *University of Chicago* • Philosophy of Science • Philosophy of Technology • Environmental Ethics

**Denise Patmon**, EdD, *University of Massachusetts Lowell* • Language Arts and Literacy Instruction • Multicultural Literature • Elementary Education • Teaching Writing, Pre K-12

**Carol Smith** (Psychology Department), PhD, *Harvard University* • Children and Science • Conceptual Change • Cognitive Development

**Peter Taylor**, PhD, *Harvard University* • Science, Technology, and Society • Social Analysis of Environmental and Health Research • Reflective Practice

### Science in a Changing World track, additional faculty

**Arthur Eisenkraft**, PhD, *New York University* (Director, Center for Science and Math in Context [COSMIC]) • Science Education • Physics • Secondary Education

**Fadia Harik** (Teacher Education program and Mathematics Department), PhD, xx • Mathematics Education

**Rachel Skvirsky** (Biology Department), PhD, *Harvard University* • Biology in a social context • Genetics and molecular biology

**Robert Stevenson** (Biology Department), PhD, *University of Washington* • Citizen science • Technological change, values and institutions

**Bala Sundaram** (Physics Department), PhD, *University of Pittsburgh* • Non-linear dynamics • Mathematical biology

**Brian White** (Biology Department), PhD, *Stanford University* • Biology Education • Educational Software and Multimedia

## THE PROGRAM

The Graduate Program in Critical and Creative Thinking (CCT) is a unique interdisciplinary program that provides its students with knowledge, tools, experience, and support to become constructive, reflective agents of change in education, work, social movements, science, and creative arts.

Critical thinking, creative thinking, and reflective practice are valued in all fields. In critical thinking one seeks to scrutinize the assumptions, reasoning, and evidence brought to bear on an issue—by others and by oneself; such scrutiny is enhanced by placing ideas and practices in tension with alternatives. Key functions of creative thinking include generating alternative ideas, practices, and solutions that are unique and effective, and exploring ways to confront complex, messy, ambiguous problems, make new connections, and see how things could be otherwise. In reflective practice one takes risks and experiments with putting ideas into practice, then takes stock of the outcomes and revises one's approaches accordingly.

An explicit and sustained focus on mastering and applying tools of critical thinking, creative thinking, and reflective practice allows students involved in a wide array of professions and endeavors to develop the clarity and confidence to make deep changes in their learning, teaching, work, activism, research, and artistry.

Although each CCT course is self-contained and is open to students from other graduate programs, students matriculated in the program benefit from extended relationships with core CCT faculty and fellow students that support their process-learning. Students learn to experiment and take risks in applying what they are learning, reflecting on the outcomes and revising accordingly, and building up a set of tools, practices, and perspectives that work in their specific professional or personal endeavors.

The foundational knowledge emphasized in the field of critical and creative thinking includes psychological studies of the scope, limits, and techniques of critical and creative thought, information processing, and conceptual learning in children and young adults; philosophical studies of reasoning, argument, logical thinking, valuing, and judging; and work with cognitive structures and metacognitive techniques for stimulating creativity and critical thought. This knowledge base is expanded through elective courses that take students into areas of specialization and through required courses in research, implementation, evaluation, and communication. The program further stresses inter- and intra-personal dimensions of critical and creative thinking and reflective practice (such as empathy, listening, dialogue, and facilitation of group processes) and contribution to constructive social change through anti-racist and multicultural education and involvement of teachers and other citizens in debates about science in its social context.

The CCT Program appeals to students looking for professional and personal development and interested in learning from and with others of

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diverse backgrounds and interests. Many are mid-career educators: teachers and college professors, curriculum specialists, teacher educators, museum educators, or school administrators. Others are policy makers or personnel trainers in government, corporate, or non-profit settings. Some are artists, musicians, or writers. The Science in a Changing World track serves students who want to focus on science in the context of social change or in the context of a people's intellectual development.

Graduates leave CCT well equipped for ongoing learning, addressing the needs of their schools, workplaces, and communities, adapting and contributing to social changes, and collaborating with others to these ends.

CCT courses are open to non-degree students and students from other graduate programs seeking to fulfill requirements, particularly in teacher-education programs.

To accommodate the schedules of teachers and other working professionals, courses are offered after 4 pm, as well as in intensive sessions during the summer. While it is possible for a full-time student to complete the master's program in one calendar year, most students combine the program with their ongoing careers and therefore take two or three years.

Several courses are offered in both face-to-face and online sections. Some of the face-to-face courses are designed to bring in a small number of students from a distance by speakerphone (or "voice over the Internet") during regular class meeting times. (Contact the program for details and the program director for approval.) It is possible to complete the entire MA at a distance in the following way: undertake the certificate through online and distance courses; get approval to transfer to the MA program; and complete the remaining regular classes at a distance.

Online sections and the distance option are intended primarily for students outside the Boston area. Matriculated CCT master's students must request permission from the program director before registering for an online CCT section. In no case may students count more than five online courses from UMass Boston toward their CCT MA degree.

## DEGREE REQUIREMENTS

### The Master of Arts Program

MA students complete 33 credits: four foundation courses; four electives; and three final required research and engagement courses, including a capstone synthesis.

*Foundation courses:* A sequence of two core courses, CRCRTH 601 and 602 (Critical Thinking and Creative Thinking), to be taken at the beginning of the program (6 credits).

Two core courses in the philosophy and the psychology of thinking, PHIL 501 and Psych 550L / CRCRTH 651L, to be taken as soon as possible after CRCRTH 601 and 602 (6 credits).

*Electives:* Four electives within a specialty area, chosen from offerings in CCT or, with permission of the CCT Graduate Program Director, from other academic programs and departments (12 credits).

By petition to the CCT Graduate Program Director, up to two upper-level undergraduate courses may be counted toward this requirement.

The elective courses allow students to define specific areas in which they explore their CCT-related interests—for example, "creative thinking at work," "science in a changing world," "gifted and talented education," "critical and creative thinking in literature/arts/music," "dialogue and collaboration in organizational change." Areas of specialization may be constructed through cooperation with other UMass Boston graduate programs, such as Instructional Design, Special Education, Public Policy, and Dispute Resolution.

*Pre-Capstone courses:* Two courses in research and engagement (CRCRTH 692, CRCRTH 693), in which critical and creative thinking interventions are developed, implemented, evaluated, and modified (6 credits).

*Capstone*: Students enroll in CRCRTH 694: Synthesis of Theory and Practice Seminar to undertake a supervised synthesis project and exit self-assessment, through which they review and reflect on the integration into their professional lives of critical and creative thinking skills and strategies and demonstrate competencies appropriate and relevant to their disciplines. The synthesis project has two parts: a written essay and an oral presentation. The synthesis project essay follows the Office of Graduate Studies Guidelines for the Preparation of Theses and Dissertations and is expected to incorporate an appropriate theoretical framework and references to relevant scholarly work in its field. The 30- to 60-minute oral presentation is given before members of the CCT faculty. Both the essay and the oral presentation are evaluated by at least two members of the CCT faculty.

The essay (20–40 pages) may integrate exhibits from the student's work during the program, which may take a variety of forms, such as original curriculum materials, a professional development workshop series, a video case study, a practitioner's portfolio, or a prospectus for future research and engagement. The form and length of the essay depend on the particular nature of the project. For example, an extended essay that reviews and critiques relevant literatures would be expected with the prospectus, but a shorter essay may accompany a video case study.

Before CRCRTH 694 can be undertaken students must have no more than one incomplete left, not be on academic probation, have completed CRCRTH 692, submit a 500–1000-word proposal and have it approved by the capstone advisor and program director.

Mid-program Check-in: At the end of the semester in which students take their fifth course towards the CCT M.A. they must submit: i) evidence of Research and Study Competencies (www.cct.umb.edu/ competencies.html) that they have been acquiring; and ii) a Reflective Practice Portfolio, consisting of a) a self-customized toolbox and set of reminders that students intend to use in their on-going learning and practice embedded in b) a narrative, which is updated each semester after reflecting on themes and connections across courses (cctrpp.wikispaces.umb.edu). The CCT faculty reviews these submissions and meets with the students to make <u>non-binding</u> recommendations (which may include taking a break from courses in order to finish incompletes, improving writing skills, and acquiring more Research and Study Competencies). Although the recommendations from the check-in are non-binding, an advising hold is put on registration until this mid-program check-in is scheduled and completed.

### The Graduate Certificate

The objective of the fifteen-credit graduate certificate program is to provide a coherent and substantial course of study resulting in an understanding of the skills needed in teaching, training, or designing curriculum for critical and creative thinking and an enhanced ability to use and communicate these skills in professional practice.

Students seeking the certificate take a total of five courses: a sequence of two foundation courses, Critical Thinking (CRCRTH 601) and Creative Thinking (CRCRTH 602); and three other CCT courses. Customarily, these include either Foundations of Philosophical Thought (PHIL 501) or Cognitive Psychology (CRCRTH 651L/PSYCH 550L), or an elective course, Processes of Research and Engagement (CRCRTH 692). Alternatively, students may, after consultation with their faculty advisor and with the approval of the Program Director, take up to three electives in one specialty area. Each certificate student also gives an exit performance, usually as part of CRCRTH 692, which demonstrates competence in implementing critical and creative thinking. This exit performance is reviewed and evaluated by a faculty committee.

Online sections, available for several courses, make it possible for the certificate to be undertaken by non-resident students.

Certificate students may count CCT courses that they have taken toward completion of their MEd or another UMass Boston Master's degree toward the certificate.

CCT certificate students who subsequently apply and are approved to transfer to the MA program may apply the credits from their certificate studies, including up to five online courses.

### CCT Certificate with a Special Focus

For each of the following foci, CCT graduate certificate students take CRCRTH 601, CRCRTH 602, and three other courses from a recommended list of electives and complete an exit performance as part of one of the courses taken. Online sections are available for several courses. For more information, please contact the Program Office; email: cct@umb.edu.

- Creative Thinking at Work
- Science in a Changing World
- Gifted and Talented Education

### Science in a Changing World (SICW) Track

This track serves CCT Masters and Graduate Certificate students who want to focus on science in the context of social change and/or in the context of a people's intellectual development.

The SICW track is identical to the regular CCT program except that it permits an alternative set of foundation courses:

1. either CrCrTh 640 Environment, Science and Society: Critical Thinking or CrCrTh 645L Biology in Society: Critical Thinking
2. CrCrTh 650 Mathematical Thinking
3. CrCrTh 649L Scientific and Political Change
4. CrCrTh 652 Children and Science

M.A. students take all four Foundation courses; SICW Certificate students choose two of the four. (Note: Some of these courses are crosslisted in other programs as indicated in the course descriptions. The crosslisted sections are also permitted.)

Students taking the SICW track as a Professional Science Master's degree must:

1. Inform the Program Coordinator in writing so appropriate advising can be arranged.

2. Take 6 Science courses. (All courses offered by departments in the College of Science and Mathematics, with the exception of policy-oriented courses, count for this requirement, as do CrCrTh 645L, 650, 651L, 652, EDCG 661, and PPol 753L. Appropriate courses from other programs may be designated as Science courses by the Program Director in consultation with the Program faculty.)

3. Undertake an internship or equivalent supervised activities in schools, workplaces, communities, businesses, or the policy arena before completion of the capstone requirement. This requirement may be completed as part of the work for CrCrTh 688, 692, 693, or 694. (Internship details and application forms are available from the Program.)

Requirements for the SICW track, including the final three research and engagement courses, allow students to develop valuable professional skills in two areas: a. Research, Writing, and Evaluation for Civic Engagement; and b. Collaborative Processes and Problem-Based Teaching around current controversies involving science and technology.

## ADMISSION REQUIREMENTS

Please see the general statement of admission requirements for all graduate programs in the "Admissions" section of this publication.

The Critical and Creative Thinking Program will recommend for admission those applicants who present evidence of their ability to do graduate work with distinction. Such evidence will normally include:

1. A distinguished undergraduate transcript with a grade point average of at least 3.0.

2. For MA applicants, at least three positive and informed letters of recommendation submitted by persons with whom the applicant has worked closely and who have direct knowledge of their abilities. Recommenders should be able to comment in detail about an applicant's academic strengths, work, and/or life experience. For Graduate Certificate applicants, at least two such letters.

Optionally, applicants may submit results of the Graduate Record Examination (GRE) or the Miller Analogies Test (MAT) and/or evidence of teaching or other examples of workplace competence, such as curriculum projects and lessons or business plans, to strengthen their application.

## SPECIAL OPPORTUNITIES AND RESOURCES

The CCT Program and the CCT Forum, a club run by graduate students, organize regular presentations by students, faculty, and graduates which are open to the wider University community. In these settings students can receive support from their peers and from graduates who provide mentoring, information on employment opportunities, and access to new directions in putting CCT into practice. The CCT Network and CCT Community Directory also facilitate exchange among current and past CCT students. Outside the regular academic year, CCT hosts workshops and other activities designed to promote outreach beyond the University. Information is available from the CCT website at http://www.cct.umb.edu, the CCT wiki at http://cct.wikispaces.umb.edu, and through regular email news bulletins.

The CCT Handbook provides additional information about joining and moving through the CCT program, about Program and Graduate School guidelines, and about the wider CCT community. This handbook can be viewed on the CCT website at http://www.cct.umb.edu/handbook.html, or downloaded as a PDF file.

## DEPARTMENTAL COURSE (REQUIRED)

PHIL 501

Foundations of Philosophical Thought

By discussing four or five traditional substantive problems in philosophy, such as morality, the nature of knowledge, freedom of the will, the nature of mind, and social organization, the course attempts to derive a common approach that philosophers bring to these problems when developing their own solutions and criticizing the solutions of other philosophers. It also considers some of the ways that substantive issues and debates in philosophy relate to contemporary non-philosophical issues in our society and can be introduced into a broad range of educational environments outside standard philosophy courses.

3 Lect Hrs, 3 Credits

CCT Courses

CRCRTH 601

Critical Thinking

This course explores issues about the nature and techniques of critical thought, viewed as a way to establish a reliable basis for our claims, beliefs, and attitudes about the world. It explores multiple perspectives, placing established facts, theories, and practices in tension with alternatives to see how things could be otherwise. Views about observation and interpretation, reasoning and inference, valuing and judging, and the production of knowledge in its social context are considered. Special attention is given to translating what is learned into strategies, materials, and interventions for use in students' own educational and professional settings.

3 Lect Hrs, 3 Credits

CRCRTH 602

Creative Thinking

This course seeks to increase the participants' understanding of creativity, to improve their creative problem-solving skills, and to enhance their ability to promote these skills in others, in a variety of educational settings. Students participate in activities designed to help develop their own creativity and discuss the creative process from various theoretical perspectives. Readings are on such topics as creative individuals, environments that tend to enhance creative functioning, and related educational issues. Discussions with artists, scientists, and others particularly involved in the creative process focus on their techniques and on ways in which creativity can be nurtured.

3 Lect Hrs, 3 Credits

CRCRTH 611

Seminar in Critical Thinking

This course involves research on and discussion of important issues of current concern about critical thinking. Issues include critical thinking; logic and knowledge; critical thinking about facts and about values; knowledge in its social context; teaching to be critical; and evaluating critical thinking skills. The course addresses these issues through cases of topical interest. (Note: The thematic emphasis for each semester is described on the program website: www.cct.umb.edu.) Course may be repeated once (6 credits total) for credit.

3 Lect Hrs, 3 Credits

CRCRTH 612

Seminar in Creativity

This course delves deeply into the theory and practice of promoting creativity, using a specific theme, such as invention and innovation, humor, realizing creative aspirations, building creative communities, as a focus for the readings, discussion, class activities, and semester-long student projects. The course materials, which are drawn from a variety of sources to match the instructor's specialty, student interests, and evolving trends in the literature, include biographies, intellectual histories, psychological studies, educational research, the popular media, guest speakers, and outside mentors. (Note: The thematic emphasis for each semester is described on the program website: www.cct.umb.edu.)

3 Lect Hrs, 3 Credits

CRCRTH 616

Dialogue Processes

Genuine dialogue provides a creative social space in which entirely new ways of thinking, learning, and relating to others may emerge. Dialogue involves a shared process of collective inquiry where people work together to understand the assumptions underlying their individual and collective views that limit their thinking and responses to the world. Course participants learn and experience approaches to dialogue inspired by Bohm, Isaacs, Scharmer, Weissglass, and others in the interest of bringing about significant educational, organizational, social, and personal change.

3 Lect Hrs, 3 Credits

CRCRTH 618

Creative Thinking, Collaboration, and Organizational Change

Through interactive, experiential sessions and structured assignments, students learn critical and creative approaches to working in organizations. Skills addressed include: communication and team-building; facilitation of participation and collaboration in groups; promotion of learning from a diversity of perspectives; problem-finding and solving; and reflective practice. Students apply these skills to situations that arise in business, schools, social change groups, and other organizations with a view to taking initiative and generating constructive change.

3 Lect Hrs, 3 Credits

CRCRTH 619L (PPOL 719L)

Biomedical Ethics

This course develops students' critical thinking about dilemmas in medicine and health care policy, such as those that arise around allocation of scarce resources, criteria for organ transplants, informed consent, experimentation on human subjects, AIDS research, embryo research and selective termination of pregnancy, euthanasia, and physician-assisted suicide. Through such cases the course introduces methods in moral reasoning, including principle-based reasoning, rights-based reasoning, decision-making under uncertainty, and utilitarianism in classic and contemporary normative reasoning.

3 Lect Hrs, 3 Credits

CRCRTH 627

Issues and Controversies in Antiracist and Multicultural Education

This course explores two related forms of education—antiracist education and multicultural education—approaching them as issues in moral and value education and exploring controversies in the theories and practices of antiracist and multicultural education. The course deals with both practical and theoretical issues but concentrates more on theory. Specific topics include racism, race, and school achievement; ethnic identity and self-esteem; Afrocentrism; religious pluralism; multiculturalism as a unifying or divisive force.

3 Lect Hrs, 3 Credits

CRCRTH 630

Criticism and Creativity in Literature and the Arts

Expression and evaluation, freedom and discipline, creative production and its critique—how do these dualities relate to visual and verbal imagination as they are demonstrated in literature and the arts? Specific strategies for eliciting imaginative work in these areas are demonstrated, as are specific strategies for evaluating imaginative works. Finally, this course focuses on ways of helping others (including children) to develop these skills and utilize these strategies effectively.

3 Lect Hrs, 3 Credits

CRCRTH 640

Environment, Science, and Society: Critical Thinking

Through current and historical cases, this course explores the diverse influences that shape environmental science and politics and their pedagogical, professional, social, and moral implications for educators, environmental professionals, and concerned citizens.

3 Lect Hrs, 3 Credits

CRCRTH 645L (BIOL 545L)

Biology in Society: Critical Thinking

Current and historical cases are used to examine the political, ethical, and other social dimensions of the life sciences. Close examination of developments in the life sciences can lead to questions about the social influences shaping scientists' work or its application, and, in turn, to new questions and alternative approaches for educators, biologists, health professionals, and concerned citizens.

3 Lect Hrs, 3 Credits

CRCRTH 646L (SPE G 646L)

The Gifted and Talented Student

This course provides students with an overview of the gifted and talented student. Topics include definitions of "gifted," identification of the gifted and talented, and methods and programs geared to these students. Special areas to be addressed are the gifted and talented minority student, as well as the gifted and talented underachiever.

3 Credits

CRCRTH 649L (PPOL 749L)

Scientific and Political Change

Although relatively few Americans have backgrounds in science or engineering, they are increasingly confronted with issues that are technically complex. This course explores the resulting tensions and asks how the needs for scientific expertise and democratic control of science and technology are reconciled. The first half of the course traces the historical development of American science policy and situates this development comparatively. The second half focuses on contemporary controversies, including those over the nature of university/industry relations, patent policy, and cases of expert/lay disagreements over risk.

3 Lect Hrs, 3 Credits

CRCRTH 650

Mathematical Thinking

This course explores several types of mathematical thinking in the context of number theory, algebra, geometry, and introductory calculus, and relates them to critical and creative thinking skills. Developmental and experiential factors in learning and teaching mathematics are considered, as well as techniques for determining a learner's mathematical abilities and learning styles. Readings, discussion, research, and problem-solving are used to provide a historical context and to suggest connections with other disciplines. Individual and small-group projects are adapted to student interests. No formal mathematical background beyond high school algebra and geometry is required.

3 Lect Hrs, 3 Credits

CRCRTH 651L (PSYCH 550L)

Cognitive Psychology

This course gives a survey of the field of cognitive psychology from an information-processing viewpoint. The course considers how people encode, organize, transform, and output information. Emphasis is given to such topics as concept formation, problem-solving, and creative thinking.

3 Lect Hrs, 3 Credits

CRCRTH 652L (PSYCH 552L)

Children and Science

This course explores the ways children think about their natural and social world and how this thinking affects their learning of science. It is particularly concerned with identifying and describing the organized conceptual frameworks children have prior to instruction (which typically are different from the scientists' conceptualizations) and with understanding the general processes by which conceptual frameworks can be changed. One important question concerns the ways in which children are fundamentally different learners and thinkers from adults and the ways in which they are fundamentally similar.

3 Lect Hrs, 3 Credits

CRCRTH 655

Metacognition

This course considers various aspects of metacognition and how they influence behavior in children and adults. Topics include the individual's knowledge of his or her own cognition, self-awareness, the monitoring of conscious thought processes, inferences about unconscious thought processes, metacognition as a decision process, metacognitive strategies, the development of metacognition, and metacognition as a source of individual differences in children.

3 Lect Hrs, 3 Credits

CRCRTH 688

Reflective Practice

Reflective practitioners in any profession pilot new practices, take stock of outcomes and reflect on possible directions, and make plans to revise their practice accordingly. They also make connections with colleagues who model new practices and support the experimenting and practice of others. Students in this course gain experiences and up-to-date tools for reflective practice through presentations, interactive and experiential sessions, and, optionally, supervised pilot activities in schools, workplaces, and communities.

1-3 Lect Hrs, 1-3 Credits

CRCRTH 692

Processes of Research and Engagement

In this course, students identify issues in educational or other professional settings on which to focus their critical and creative thinking skills. Each student works through the different stages of research and action – from defining a manageable project to communicating findings and plans for further work. The classes run as workshops in which students are introduced to and then practice using tools for research, writing, communicating, and supporting the work of others.

3 Lect Hrs, 3 Credits

CRCRTH 693

Action Research for Educational, Professional, and Personal Change

This course covers techniques for and critical thinking about the evaluation of changes in educational practices and policies in schools, organizations, and informal contexts. Topics include quantitative and qualitative methods for design and analysis; participatory design of practices and policies in a framework of action research; institutional learning; the wider reception or discounting of evaluations; and selected case studies, including those arising from semester-long student projects.

3 Lect Hrs, 3 Credits

CRCRTH 694

Synthesis of Theory and Practice Seminar

This seminar provides participants with an opportunity to review and reflect on their work in the program and its impact on their current and future professional and personal lives, through a final project that demonstrates knowledge and integration of critical and creative thinking skills, processes, and strategies. To facilitate the synthesis of ideas and the identification of a final project option, the seminar begins with group experiences. Students choosing the same final project option meet in small groups weekly to present their plans and progress notes for support and critique. A three-page final project description is presented early in the course, and all projects are presented during the last four weeks.

Prerequisite: Permission of program director.

3 Lect Hrs, 3 Credits

CRCRTH 696

Independent Study

This course involves the comprehensive study of a particular topic or area of literature determined by the student's need; the study is pursued under the guidance, and subject to the examination, of the instructor. An application or outline of study should be submitted to the instructor by the end of the semester previous to that in which this course is to be taken.

Prerequisite: Permission of instructor.

1-6 Credits

CRCRTH 697

Special Topics in Critical and Creative Thinking

This advanced course offers intensive study of selected topics in the field of critical and creative thinking. Course content and credit vary according to the topic and will be announced during the advance registration period.

3 Lect Hrs, 1-6 Credits