

# UPGRADE

A Manual with Guidelines  
for  
Undergraduate Degree Education in  
Pakistan



**PROMOTION OF EDUCATION IN PAKISTAN, INC.**  
166 Fifth Avenue • 5<sup>th</sup> Floor, New York, N.Y. 10010 • USA  
Phone: 212-255-5399 • Fax: 212-633-2220  
E-mail: [info@pepfoundation.org](mailto:info@pepfoundation.org) • Website: [www.pepfoundation.org](http://www.pepfoundation.org)

## **Foreword**

The Promotion of Education in Pakistan Foundation Inc. has produced a document entitled “Undergraduate Degree Education in Pakistan”. This is a crucially important area since undergraduate education needs to be substantially strengthened. The Provincial Governments are responsible for college level education, while only university level undergraduate education comes under the responsibility of the Higher Education Commission. Concerted effort needs to be made to uplift the quality of education both at college and university level.

I would like to congratulate Dr. Khalid Iqbal, President PEP Foundation, Inc. for the excellent document that PEP Foundation has produced. I hope that it will be published as an electronic document so that there is large access to many users.

Prof. Dr. Atta-ur-Rahman, FRS  
Chairman  
Higher Education Commission

## Preface

Undergraduate degree education, the most critical and pivotal segment of higher education, is the weakest link in Pakistan. The Second International Symposium on Issues in Higher Education in Pakistan “The Undergraduate Degree Education: The Weakest Link” identified three major causes of the substandard education in Pakistan. These three causes are the out of date and annual as opposed to semester-based curricula, the poor methods of teaching and the rote learning as opposed to learning with critical thinking.

The present manual has been designed as a concise document, which every undergraduate degree awarding institution can easily access and follow to overcome the above-stated three major weaknesses.

We hope that the educators, the educationists, and students as well as institutions and policy makers will take full advantage of this gift from PEP Foundation.

Khalid Iqbal, Ph.D.



President  
PEP Foundation, Inc.

Curricula, methods of teaching and methods of learning are three major pillars, which the quality of education rests. The objective of this manual is to provide concisely both guidelines and practical steps to achieve an education, which meets the requirements of the 21<sup>st</sup> century.

## 1. Curricula

### (a) Semester based curricula as opposed to annual based

A semester-based curriculum increases thematic control, better evaluation and effective training, facilitating both a teacher performance and a student needs compared to the current annual based system that allows for faulty and length-wise assessment.

For more information on Fink's Five Principles of good course design visit the teacher's resources website of Honolulu's educators:

<http://honolulu.hawaii.edu/intranet/committees/FacDevCom/guidebk/teachtip/finks5.htm>

### (b) All textbooks should be assessed and revised every three years

Evaluation and proper revision of the core textbooks must be continuous, particularly in science and technology where the latest information should be added accordingly. Updating information is essential not only in science and technology fields, but also identifying errors and improving training methods.

### (c) Core curricula

Core curricula should consist of mathematics, English, Urdu, communication, history of world civilization and world culture, preparing graduates to meet the demands of local community, country and world market needs (see page 10 of this document the proposed PEP's core curricula)

Harvard Core curricula can be found at:

<http://my.harvard.edu/icb/icb.do?keyword=core>

Columbia College curricula can be read at:

<http://www.college.columbia.edu/core/>

For a comparison of American and Canadian college curricula read "Trend in General Education and Core Curricula: a Survey"

<http://www.utm.utoronto.ca/~w3asc/trends.htm>

**(d) Curricula should be challenging**

Curricula that offers challenging subjects assists in developing critical and creative thinking of students, an ability that serves them well on all subjects of learning.

**2. Methods of Teaching**

**(a) Reason-based**

Regardless of the method, instruction has to be based on reason, and geared toward the logic of the subject. Reason-based teaching involves discussion, alternate hypotheses and research.

For a great comparison of Direct and Indirect Instructional Methods Information please visit:

<http://www.adprima.com/teachmeth.htm>

For a guide on teaching techniques and methods, please visit:

[http://library.thinkquest.org/C005704/content\\_teaching\\_it\\_techniques.php](http://library.thinkquest.org/C005704/content_teaching_it_techniques.php)  
3

**(b) Open discussion and allow criticism**

There is a great need in Pakistan's education system to encourage open discussion of student's ideas and allow sound criticism of presented views.

For a guide on generating classroom discussion please read the New York University's site <http://www.nyu.edu/cte/discussionhtm.html>

For more on innovative ways on how to design instructions to encourage critical and creative thinking please consult the Critical Community Organization's website at: <http://www.criticalthinking.org/>

**(c) Interactive teaching with active participation of students**

Teaching should not be only through lectures. Exchange of ideas, active participation and discussion of students' inquiries make the process of learning long lasting and effective.

For a detailed guide on teacher training topics, curricular areas, and special thematic pages for school managers, teacher trainers and education researchers, please visit:

<http://www.edsnnet.na/Resources/ResourceContent.html>

**(d) Based both on textbooks as well as empirical research**

Empirical research should be a crucial part of teaching. Teachers should emphasize the importance of independent research while implementing methods that will bring creative and critical thinking of students.

For an excellent guide on Program Design please visit Faculty Development Associates Online Resources website at:

<http://www.developfaculty.com/online/index.html>

**(e) Presentation encouraged and competitive presentation on a larger scale promoted**

Students should be encouraged to develop presentation and leadership skills both by presenting their projects in front of the class as well as by cooperating with one another in larger-scale projects.

For a detailed guide on how to create multimedia presentations using PowerPoint please visit: <http://www.actden.com/pp/>

**(f) An emphasis on literature**

Students should be encouraged to select books from extensive and available classroom collections suggested to them. Teachers should be updated on literature and conduct relevant author studies.

The University of Hawaii website offers great tips for teaching and motivating students' learning:

<http://honolulu.hawaii.edu/intranet/committees/FacDevCom/guidebk/teachtip/teachtip.htm>

**Seven Principles of Good Practice in Undergraduate Education**

**AAHE Bulletin, 1989, p. 11; Aurthur W. Chickering, Zelda F. Gamson, Louis M. Barsi**

**(i) Encourages Contact Between Students and Faculty**

Frequent student-faculty contact in and out of classes is the most important factor in student motivation and involvement. Faculty concern helps students get through rough times and keep on working. Knowing a few faculty members well enhances students' intellectual commitment and encourages them to think about their own values and future plans.

**(ii) Develops Reciprocity and Cooperation Among Students**

Learning is enhanced when it is more like a team effort than a solo race. Good learning, like good work, is collaborative and social, not competitive and isolated. Working with others often increases involvement in learning. Sharing one's own ideas and responding to others' reactions sharpens thinking and deepens understanding.

**(iii) Encourages Active Learning**

Learning is not a spectator sport. Students do not learn much just by sitting in classes listening to teachers, memorizing pre-packaged assignments, and spitting out answers. They must talk about what they are learning, write about it, relate it to past experiences and apply it to their daily lives. They must make what they learn part of themselves.

**(iv) Gives Prompt Feedback**

Knowing what you know and don't know focuses learning. Students need appropriate feedback on performance to benefit from courses. When getting started, students need help in assessing existing knowledge and competence. In classes, students need frequent opportunities to perform and receive suggestions for improvement. At various points during college, and at the end, students need chances to reflect on what they have learned, what they still need to know, and how to assess themselves.

**(v) Emphasizes Time on Task**

Time plus energy equals learning. There is no substitute for time on task. Learning to use one's time well is critical for students and professionals alike. Students need help in learning effective time management. Allocating realistic amounts of time means effective learning for students and effective teaching for faculty. How an institution defines time expectations for students, faculty, administrators, and other professional staff can establish the basis of high performance for all.

**(vi) Communicates High Expectations**

Expect more and you will get more. High expectations are important for everyone -- for the poorly prepared, for those unwilling to exert themselves, and for the bright and well motivated. Expecting students to perform well becomes a self-fulfilling prophecy when teachers and institutions hold high expectations for themselves and make extra efforts.

**(vii) Respects Diverse Talents and Ways of Learning**

There are many roads to learning. People bring different talents and styles of learning to college. Brilliant students in the seminar room may be all thumbs in the lab or art studio. Students rich in hands-on experience may not do so well with theory. Students need the opportunity to show their talents and learn in ways that work for them. Then they can be pushed to learn in new ways that do not come so easily.

For more teaching strategies and techniques in the classroom, lectures and presentations, facilitating discussion, effective communication, methods and critical thinking development please visit the website of Wisconsin Madison University: <http://www.provost.wisc.edu/tle/teaching-strategies-and-techniques.html>

Inside Teaching: practice tools for teachers from Carnegie Foundation for the Advancement of Teaching:

[http://gallery.carnegiefoundation.org/insideteaching/quest/about\\_us.html](http://gallery.carnegiefoundation.org/insideteaching/quest/about_us.html)

Resources for Better Teaching can be read at Teaching Handbook from Harvard School of Public Health: <http://www.cfkeep.org/static/index.html>

More teaching resources from Harvard University at:

<http://www.hsph.harvard.edu/academicaffairs/Teaching/resources.htm>

More on lesson planning and professional development read:

<http://www.education-world.com/>

### 3. Methods of Learning

Learning well requires skills and knowledge of the process of learning. In order to study well and learn any given subject, student should first learn how to think within the discipline, identify and grasp its logic. There are several ways to achieve this goal\*:

- raise vital questions and problems within it, formulating them clearly and precisely,
- gather and assess information, using ideas to interpret that information insightfully,
- come to well-reasoned conclusions and solutions, testing them against relevant criteria and standards;
- adopt the point of view of the discipline, recognizing and assessing, as need be, its assumptions, implications, and practical consequences;
- communicate effectively with others using the language of the discipline and that of educated public discourse; &
- relate what one is learning in the subject to other subjects and to what is significant in human life.

---

\* 1[1]Richard Paul & Linda Elder (2001) “*Critical Thinking & Teaching Students How to Study and Learn*”, [Electronic version]. Retrieved January 9, 2007, from <http://www.criticalthinking.org/resources/tgs/how-to-study-and-learn.cfm>

**(a) Active participation and research**

Learning is a continuous process that should not rely only on lectures given by teachers. Extensive research on the topic, questions and alternative answers, lead to inquiries that develop active participation and adequate long time learning. Both active participation of students and out-of-classroom research are tools to redirect rote learning.

More on how to conduct research, please visit: WebGURU, a Web Guide to Research for Undergraduates, an interactive web-based tool intended to assist undergraduates navigate the hurdles of an undergraduate research experience: [www.webguru.neu.edu](http://www.webguru.neu.edu)

**(b) Student clubs**

Learning more with like-minded people that share the same interest and thirst for knowledge in the subject of your choice is encouraged and more effective through student clubs. It offers innovative learning through in peer socialization while giving the opportunity for leadership, organizing special events, planning programs that represent their interest, class, or school in a variety of arenas locally, nationally and internationally.

**(c) Elective courses should make a broad based education**

In addition to the required courses of the selected major, counselors and teachers should advise their students to broaden their horizons by taking up a variety of courses. Undergraduate education should prepare students that become active citizens of society and thus knowledgeable and prepared to life's challenges.

**(d) Follow talent and aptitude**

Identifying one's talent is the first step on the road to success. Traditional preferences on student's major should be appropriate and according to their aptitude. Encouragement of talents to achieve success in the field of choice should be practiced more often.

**(e) Community projects involvement**

Involving students in community projects gives them a first hand experience and the necessary link between theory and practice. By including community projects in the learning process, students learn how their actions reflect and impact society, how they can make changes and how to go for them.

**(f) Apprenticeship seeking, internship for future employment**

Research and 1-2 semesters of internship programs should be included in the undergraduate degree curriculum in order to give students an opportunity for future employment.

For extensive reading on tools for teaching and good teaching please consult the extended Berkeley Compendium of Suggestions for Teaching with Excellence compiled by Barbara Gross Davis, Lynn Wood, and Robert C. Wilson at:

<http://teaching.berkeley.edu/bgd/teaching.html> and  
<http://teaching.berkeley.edu/compendium/>

A Great article on the role of undergraduate education: “From Teaching to Learning -A New Paradigm for Undergraduate Education” by Robert B. Barr and John Tagg can be read at:

<http://critical.tamucc.edu/%7Eblalock/readings/tch2learn.htm>

More information on issues of learning and teaching for the international higher education community website “*Deliberations on teaching and learning in higher education*”

<http://www.londonmet.ac.uk/deliberations/>

For a comprehensive collection of information resources in the field of higher education throughout the world, visit Higher Education Resource Hub: <http://www.higher-ed.org/>

## **Undergraduate Education: Curriculum Samples**

For a detailed broadly based curriculum on any specific subject of interest, consult Yale University Website at:

[http://www.yale.edu/yalecollege/publications/ycps/chapter\\_iv/index.html](http://www.yale.edu/yalecollege/publications/ycps/chapter_iv/index.html)

For a description of academic requirement, majors and minors at Massachusetts Institute of Technology, read: <http://web.mit.edu/catalogue/overv.chap3.shtml>

## **PEP Foundation proposed Core Curriculum**

The PEP Foundation's Core Curriculum of 48 credit hours is an alternative curriculum for undergraduate degree programs. The core curriculum covers areas such as the history of world civilization, Islamic history and the history of Pakistan, human rights, global economics and politics, visual and performing arts, human development/quality of life, basic economics, the stock market, creative writing, the principles and art of communication, basic mathematics, the ecosystem and environment, basic astronomy, basic computer science and the internet, principles of genetics and genetic engineering, and the functioning of the brain.

The undergraduate core curriculum of 48 credit hours consists of 13 credit hours from Area I (Communication Core); 12 credit hours from Area II (Analytical Skills); 6 credit hours from Area III (Natural Science) for non-science students only; 6 credit hours from Area IV (History); 3/6 credit hours from Area V (Arts and Humanities) for Arts/Science students; 6/9 credit hours from Area VI (Modern Issues) for Arts/Science students; and 2 credit hours from Area VII (Physical Education).

Students are required to complete the core curriculum during their first four semesters of college.

## **Core Courses for B.C.S., B.B.A., B.A. Hons. And B.S. Hons. Degree Programs**

### **Area I - Communication Core**

- The College Experience (1 credit)
- English Composition (6)
- Urdu Literature (3)
- Urdu for Foreigners (3)
- Speech and Writing (3)

### **Area V - Arts and Humanities**

- Fine Art I (3)
- Acting, Film and Theater (3)
- Modern Cultures (3)
- Chinese History and Culture (3)
- Japanese History and Culture (3)
- Arabian History and Culture (3)
- European History and Culture (3)
- American History and Culture (3)

### **Area II - Analytical Skills**

- Mathematics I (3)
- Statistics I (3)
- Economics I (3)
- Geography I (3)
- Psychology I (3)
- Sociology I (3)
- Introduction to Computers (3)
- Philosophy I (3)
- Political Science I (3)

### **Area VI - Modern Issues**

- Human Rights (3)
- The Stock Market (3)
- Global Economy and Politics (3)
- Human Development/Quality of Life (3)
- Environment and Ecosystem (3)
- How the Brain Functions (3)
- Molecular Genetics and Genetic Engineering (3)
- The Internet (3)

### **Area III - Natural Science**

- Anthropology I (3)
- Astronomy I (3)
- Biology I (3)
- Chemistry I (3)
- Geology I (3)
- Physics I (3)

### **Area VII - Physical Education**

- Cricket (1)
- Hockey (1)
- Soccer (1)
- Tennis (1)
- Volleyball (1)
- Physical Exercises (1)
- Jogging (1)
- Table Tennis (1)
- Badminton (1)

### **Area IV - History**

- History of World Civilization (3)
- Islamic and Pakistan History (3)

The Core Curriculum is designed as the cornerstone of PEP Foundation's undergraduate education. The intellectual mission of the Core Curriculum is to provide all undergraduate students, regardless of their major or concentration, with wide ranging perspectives on significant ideas and achievements in Urdu and English literature, philosophy, history, art and science, teach them modern issues, and train them to be able to use the electronic medium to communicate and to acquire and process information.

**CC-SC-011 The College Experience (1 cr.) Introduction to the history of college, various degree programs offered, the college work programs, the community service program and the on-campus entrepreneurship opportunities.**

**CC-LA-012 English Composition and Literature (6 cr.)** This two-semester course is intended to foster the ability to read critically and imaginatively, to appreciate the power of language to shape thought and represent the world, to be sensitive to the ways in which literature is created and achieves its effects. Various styles of English composition will be illustrated through the work of several modern British and American writers. This course will also teach students the discipline of purposeful intellectual argumentation by discussing texts by Homer, Aeschylus, Sophocles, Euripides, Herodotus, Thucydides, Aristophanes, Plato, Dante and Shakespeare and their significance to contemporary literature.

**CC-LA-013 Urdu Literature (3 cr.)** Both the composition and the literary value of Urdu literature will be taught through the work of Urdu writers and poets of the 20th and 21st centuries.

**CC-LA-013F Urdu for Foreigners (3 cr.)** Urdu grammar, everyday use vocabulary, listening comprehension and conversation practice will be covered. Students will also be taught the Urdu alphabet and ability to read and write Urdu.

**CC-LA-014 Speech and Writing (3 cr.)** Students will be introduced to various modes of oral and written communication and will gain experience in effective oral and written presentations. They will also develop skills in assessing and evaluating public discourse. They will be exposed to differences among factual business correspondence, study reports, scientific writing, fiction, poetry, drama and nonfiction within the context of a liberal education.

**CC-NA-015 Mathematics I (3 cr.)** This course will cover real numbers, linear equations and inequalities, systems of equations, polynomials, exponents, logarithmic functions, geometric relationships, properties of geometric figures, one-, two- and three-dimensional measurement and problem solving, differentiation, applications of differentiation, integration, the fundamental theorem of calculus, and applications of integration.

**CC-NA-016 Statistics I (3 cr.)** A basic introductory statistic course with applications shown to various fields and emphasis placed on assumptions, applicability, and interpretations of various statistical techniques. Subject matter includes frequency distribution, descriptive statistics, elementary probability, normal distribution, applications, sampling distribution, estimation, hypothesis testing, one-way analysis of variance, correlation and regression.

**CC-LA-017 Economics I (3 cr.)** Basic economic principles applied to current social issues and problems. Topics covered will typically include inflation, unemployment, wage and price controls, welfare, national debt, health programs, food prices, pollution, crime, corruption, mass transit, revenue sharing, multinationals, population and energy.

**CC-LA-018 Geography I (3 cr.)** An introduction to the principles, concepts and methods of analysis used in the study of human geographic systems. Examines geographic perspectives on contemporary world problems such as population growth, globalization of the economy, and human environmental relations.

**CC-LA-019 Psychology I (3 cr.)** Introduction to the science of human behavior. Topics include history of psychology, sleep and dreams, sensation and perception, learning and memory, theories of development, language and cognition, research methods and statistics, intelligence, social behavior, emotion, mental illness and psychotherapy.

**CC-LA-020 Sociology I (3 cr.)** Introduction to basic sociological concepts, including some of the substantive concerns and findings of sociology, sources of data, and the nature of the sociological perspective. Classical and contemporary approaches with key social issues that include power and authority, culture and communication, poverty and discrimination, and social change.

**CC-CS-021 Introduction to Computer (3 cr.)** General introduction to computer science, including the design of algorithms and computer hardware, as well as hands-on experience with applications such as word processing, spreadsheets, databases and the World Wide Web. Introductory programming in Java.

**CC-LA-022 Philosophy I (3 cr.)** A critical introduction to philosophical conceptions and distinctions that have applications in a variety of philosophic disciplines. An introductory study of such philosophical concerns as existence, knowledge, meaning and mortality.

**CC-LA-023 Political Science I (3 cr.)** The objective of this course is to enhance students' understanding of the political world in which we live. The course explains some

fundamental political concepts such as power, conflict, authority, and governments. It may also include an overview of the major subfields of political science: comparative politics, international relations, political theory and public policy.

**CC-LA-024 Anthropology I (3 cr.)** A survey of human biological and cultural evolution from early pre-Pleistocene hominids through the development of urbanized state societies, with the goal of better understanding our human heritage with special reference to the Egyptian, Indus River Valley and Chinese civilizations.

**CC-NA-025 Astronomy I (3 cr.)** An introduction to astronomy includes the history of astronomy, the apparent motions of the moon, sun, stars, and planets, gravitation and planetary orbits, the physics of the earth and its atmosphere, and the exploration of the solar system.

**CC-NA-026 Biology I (3 cr.)** For students with non-science background. Introduction to principles of cellular biology, molecular biology, genetics, plant anatomy, diversity, development and physiology, animal development, diversity and behavior, evolution and ecology of plants and animals.

**CC-NA-027 Chemistry I (3 cr.)** For students with non-science background. Essential principles of chemistry, atomic and molecular structure, bonding, properties and reactions of elements and compounds, stoichiometry, solutions, acids and bases, introduction to organic and biological chemistry.

**CC-NA-028 Geology I (3 cr.)** Basic principles of earth history, geologic time, basic rock types, reconstructing past environments. Physical development of the earth, its interior mountains formation, plate tectonics. Origin and development of life, evolution and the fossil record.

**CC-NA-029 Physics I (3 cr.)** For students with non-science background. Introduction to the study of mechanics, fluids, thermodynamics, conservation laws, gravitation, electricity, magnetism, optics, special relativity, quantum mechanics, atomic physics and nuclear physics.

**CC-NA-030 History of World Civilization (3 cr.)** From the earliest forms of human culture in the prehistoric past to the rise of major civilization in prehistory and proto-history throughout the world, from the initial appearance of sedentism, agriculture and social stratification through the emergence of empires. Description of analysis of civilizations that originated from Mesopotamia, Egypt, the Indus River Valley, China, North America, Mesoamerica, and Andean South America.

**CC-LA-031 Islamic and Pakistan History (3 cr.)** This Course covers the birth of Islam with reference to Judaism and Christianity, the early system of government, i.e. the Caliph system of government, the spread of Islam to Far East, Europe and to India, the Muslim rulers in India, the British rule and the birth of Pakistan. The Two Nations

Theory of Jinnah and the role of Mohammad Ali Jinnah and other Muslim leaders in the independence of Pakistan.

**CC-LA-032 Fine Art I (3 cr.)** Introduction to drawing and painting, exploring a wide range of techniques. Aspects of pictorial composition, wide range of media, sketching and painting from still life and live model.

**CC-LA-033 Acting, Film and Theatre (3 cr.)** Introduction to the history and theories of theater and film, acting, directing, design and playwriting. Analysis of significant plays and films.

**CC-LA-034 Modern Cultures (3 cr.)** Introduction to modern Asian, Middle Eastern, European, North American, Latin American and African cultures through literature, family values, racial and ethnic influences, architecture, global economic and international relations.

**CC-LA-035 Chinese History and Culture (3 cr.)** Introduction to Chinese civilization from ancient times to the 20th century, with emphasis on characteristic institutions and traditions.

**CC-LA-036 Japanese History and Culture (3 cr.)** Introduction to the development of Japanese society and culture, with special attention to national self-image and values as revealed in thought, institutions, literature, and the arts.

**CC-LA-037 Arabian History and Culture (3 cr.)** The birth of biblical religions and their role in the development of Arabian civilization and culture, political, social, and religious institutions and intellectual traditions.

**CC-LA-038 European History and Culture (3 cr.)** Europe in the middle ages to the 20th century. Political, economic, social, religious and intellectual history of modern Europe, including the renaissance, reformation and counter-reformation, world wars, and scientific revolution.

**CC-LA-039 American History and Culture (3 cr.)** Colonial period, revolution, confederation and constitution, political, social, cultural and intellectual history, and industrial and scientific revolution.

**CC-LA-040 Human Rights (3 cr.)** This course assesses the meaning and impact of human rights in principle and practice by tracing the evolution of its theory and content, the ideology and impact of human rights movements, national and international laws and institutions and their application with attention to universality and the relevance of human rights in Pakistan.

**CC-BE-041 The Stock Market (3 cr.)** History and working of the stock market, major stock exchanges and their role in global economy, various instruments of investments and risks involved.

**CC-BE-042 Global Economy and Politics (3 cr.)** Introduction to global economy, the interaction between economics and politics, political economy of stabilization policies in developing countries, the economic powers and the use of economic sanctions as a political tool.

**CC-LA-043 Human Development/Quality of Life (3 cr.)** Responsibility and role of government and society in providing basic living conditions (shelter, water, power), health care, education, training in different skills, work and religious, cultural freedom and freedom of expression to its citizens. How various nations have and are working to improve the quality of life of their citizens. Various programs and needs in Pakistan to improve the status of its human development.

**CC-NA-044 Environment and Ecosystems (3 cr.)** Introduction to different aspects of the interaction of environment on human, animal and plant life, the ozone layer, the green house effect, the effect of industrialization and modern lifestyles on the environment, the problems of population, pollution and natural resources and their implications for society. Role of citizens and governments and means to controlling and reducing pollution. The importance of maintaining ecosystems, and how ecosystems and biodiversity affect the health of human population.

**CC-NA-45 How Brain Functions (3 cr.)** Introduction to brain as a supercomputer, its functioning, programming and dysfunctioning, effect on cognition, behavior and objectivity. A neurobiological basis of human behavior.

**CC-NA-046 Molecular Genetics and Genetic Engineering (3 cr.)** Introduction to molecular biology, the genetic code, the human genome project, the Mendelian genetics, principles of genetic screening and engineering, identification of genetic diseases and disease carrying genes by molecular genetics, principles of gene therapies, cloning and generation of new genes and species, ethical issues and impact on society.

**CC-CS-047 The Internet (3 cr.)** History and working of the Internet, information available on the Internet and the impact of internet on economic, social, cultural and political sectors of the society. This course will also involve hands-on experience on how and what information to access from the Internet.

**CC-SC-048 Cricket (1 cr.)** Students will be coached to play cricket. Selection will also be made for college Cricket A, B, or C teams.

**CS-SC-049 Hockey (1 cr.)** Students will be coached to play games of hockey. Selection will also be made for college Hockey A, B, or C teams.

**CC-SC-050 Soccer (1 cr.)** Students will be coached to play soccer, and selection of college Soccer A, B, or C teams will be made.

**CC-SC-051 Tennis (1 cr.)** Students will be coached to play tennis and will be selected for the college Tennis A, B, or C teams.

**CC-SC-052 Volleyball (1 cr.)** Students will be coached to play volleyball and selection for college Volleyball A, B, or C teams will be made.

**CC-SC-053 Physical Exercises (1 cr.)** Students will be coached in performing various physical and relaxation exercises.

**CC-SC-054 Jogging (1 cr.)** Students will be coached in jogging and relaxation exercises.

**CC-SC-055 Table Tennis (1 cr.)** Students will be coached in table tennis, and selected for forming college Table Tennis A, B or C teams.

**CC-SC-056 Badminton (1 cr.)** Students will be coached in badminton, and then selected for the college Badminton A, B, or C teams.