

Ashoka Foundation Courses for 2020-21

Monsoon 2020	
Introduction to Critical Thinking (ICT)	<p style="text-align: center;">Aditi Sriram (Academic Writing)</p> <p>Introduction to Critical Thinking (ICT) is a first year requirement for all undergraduates at Ashoka University. Capped at 20 students, it is a seminar where students cultivate the skills and habits to become confident, articulate writers. We study the anatomy of the essay, breaking down articles into their structural and logical components, and then applying those to our own ideas. We learn how to read and analyze a text; how to summarize, accept, and refute it. We make observations, ask questions, and edit passages. By the end of the semester, students understand how to build an argument, support it with research, and format it as an academic article -- a skillset they will continue to refine through the rest of their Ashoka experience.</p>
Great Books	<p style="text-align: center;">Madhavi Menon (English Literature)</p> <p>In this course, we will read several books and fragments of books, all of which have shaped the ways in which we think about sexuality. The books come from different cultures, time periods, languages, and cover different subjects. Nonetheless, they all have something significant to offer us as we think about one of the most universal yet thorny issues in the world today. Texts will include Plato's Symposium, Vatsyayana's Kamasutra, Sufi poetry, Shakespeare's Venus and Adonis, Chughtai's "Lihaaf," and Foucault's History of Sexuality, among others.</p> <p style="text-align: center;">Rudrangshu Mukherjee (History)</p> <p>In this course through certain texts and in some cases parts of texts students are invited to explore a series of complex and variegated themes and issues. Some of these are the relationship between knowledge and ignorance, darkness and truth; the relationship between identity and destiny; narratological techniques; understanding of the historical processes and ideology; and the quest to discover the self to emancipate it from the restrictions that society imposes on the self. The books through which these issues are pursued are</p> <p>Isa Upanishad King Oedipus by Sophocles The Mahabharata (Selected Themes) Babur Nama (Sections) The Communist Manifesto Karl Marx Room Of One's Own by Virginia Woolf Crisis of Civilization by Tagore</p>

	<p style="text-align: center;">Pratap Bhanu Mehta (Political Science)</p> <p>The Civil War of the Soul</p> <p>We experience different kinds of conflict in our lives: conflict between different ends we want to pursue, conflicts between the ends we pursue and the means we deploy, conflict between our reason and our emotions, conflict between virtue and temptation. Sometimes it seems as if we are in a civil war with ourselves. Do these conflicts reflect the inner structure of our Self ; or do they reflect broader social processes? Is happiness even possible?</p> <p>This course will take a deep dive into these questions through a close reading of four extraordinary texts. Plato’s Republic, The Mahabharata, Montaigne, Essais and Simone De Beauvoir, The Second Sex to explore the nature of the human condition. Through reading these texts we will ask, what it means to lead a good life, free of internal conflict and torment, and why it is difficult to achieve it. These texts will also signpost major changes in our conception of what human beings are thought to be like. They will also therefore provide a history of changing conceptions of what it means to be human.</p> <p>Reading: Plato: The Republic (Selections) The Mahabharata (Selections) Michel de La Montaigne, Essays (Selections) Simone De Beauvoir, The Second Sex (Selections)</p> <p>There will be some supplementary material to help with the reading, but the focus will be on texts themselves.</p>
<p>Literature & the World</p>	<p style="text-align: center;">Jonathan Gil Harris (English Literature)</p> <p style="text-align: center;">How does literature imagine the world? And how does the world re-imagine literature?</p> <p>Stories not only provide an important resource for understanding the world in all its human, cultural, and physical complexity. As stories migrate across space, time, and languages, they are in turn re-imagined by the world across a variety of genres and media – poems, plays, novels, essays, films, graphic novels. These re-imaginings might prove that, in literature, there is nothing original under the sun. Yet how stories transform their source materials also tells us a lot about the extraordinarily diverse ways in which different cultures have understood the relations between men and women, the relations between diverse ethnicities and religions, the nature of political and social power, humans’ relations to the animal and plant world, the agonies and ecstasies of love, and the nature of imagination itself.</p> <p>How, for example, is a Roman re-imagining of an old Greek story about an Asian witch re-imagined by an English playwright in an “American” drama that has itself been re-imagined in very different ways by writers and artists</p>

from the Caribbean, Sierra Leone, Mauritius, and Samoa? How is a Roman re-imagining of a Babylonian (ie Iraqi) love story reworked by the same English playwright in a Greek mythic tale with an Asian subtext that gets in turn re-imagined by a firang director in Tamil, Malayalam, Hindi, Marathi, Bengali, and Sinhalese as well as by an English graphic novelist in a reworking of an American comic-book hero's saga? And how is an antique Persian story about an African migrant re-imagined in an Arab novel and then re-imagined by the same English playwright, whose play is then diversely re-imagined by a Sudanese novelist and an Indian film-maker? We will read, among others, Ovid's *Metamorphoses*, Hanan Al-Shaykh's *The Thousand and One Nights*, Shakespeare's *A Midsummer Night's Dream*, *Othello*, and *The Tempest*, Neil Gaiman's *Sandman: Dream Country*, Tayeb Salih's *Season of Migration to the North*, and Aimé Césaire's *A Tempest*, as well as see films such as *Omkara* and *Forbidden Planet*.

Johannes Burgers (English Literature)

Literary Odysseys

Homer's *Odyssey* is one of the central texts of the western canon, and has been a continuous touchstone for literary creation since its earliest telling. With each retelling, authors have used the adventures of Odysseus to reflect on Homer's time as well as their own. In this course, you will study the *Odyssey* and the long history of its influence on other works. Like the travels of Odysseus, you will sail to the horizons of the known world, and encounter many different cultures along the way. Your ship will launch from the Baghdad caliphate as you explore the medieval world of Sinbad the Sailor, from there you will travel into the depths of Dante's *Inferno*, and sit next to the seat of empire in Alfred Lord Tennyson's Victorian England, go on to grab a pint in a pub in James Joyce's modernist Dublin, walk with Primo Levi through the unimaginable darkness of the Auschwitz death camp, journey across Derek Walcott's Caribbean isle of St. Lucian, relive the *Odyssey* through Margaret Atwood's feminist retelling of Penelope's life, and, finally, return to the Mediterranean via Nigeria with Chigozie Obioma's Igbo-inspired odyssey in *An Orchestra of Minorities*.

Saikat Majumdar (English Literature & Creative Writing)

This course considers literature written in the former colonial languages of English and French and includes materials drawn from film, advertisements, the press, and historical documents. French texts will be read in English translation (originals may be used by those fluent in French). How does the view of the world change when those who were dominated take up the very languages that once represented colonial power? How does culture, taken broadly, from regions with varying relationships with their respective colonial powers—in Africa, the Indian subcontinent, the Caribbean, the Indian Ocean, New Zealand, Ireland, and Australia—reshape Europe's modernity? And how do immigration and the presence of formerly colonized peoples within Europe interact with this contested notion of modernity? In considering these questions, this course will focus on the theoretical ideas of postcolonialism and decoloniality as they are expressed at the level of nation

	<p>or group as well as at the micro-level, in the lives of individuals. The course will be structured around the themes of childhood, growth, and education in the shadow of (post)colonial history.</p> <p>The course will be taught jointly by me and Anjali Prabhu, Professor of French and Comparative Literature, Wellesley College, who will be delivering her lectures on Zoom</p>
<p>Indian Civilizations</p>	<p style="text-align: center;">Nayanjot Lahiri (History)</p> <p>This is a small course about a large and fascinating subject, that of Indian Civilizations. It has been structured in a way that it can be immersed in, I hope, with enjoyment. The course will draw out civilizational elements from prehistory till the present – through travels and lives, through ideas and art forms – in which small phenomena will be linked to the larger world of the Indian subcontinent and beyond. In the process, the course will explore a varied and rich tapestry that includes rock art, the Harappan Civilization, the iconic emperor Ashoka, the poetry of Bhakti saints, the travels of Indians beyond India and Mughal art along with its influence on European painters like Rembrandt. Indian civilization, as the course will emphasize, is not to be seen merely as part of the dead past but as an element that continued to be invoked in present times, by literary giants like Rabindranath Tagore and statesmen like Jawaharlal Nehru, and by more ordinary people in India’s villages and towns. The course will involve scholarly readings and literature, as also film appreciation and analysis, and a creative project to be ‘performed’ in class.</p> <p style="text-align: center;">Rudrangshu Mukherjee (History) & Gopal Gandhi (History)</p> <p>This course aims to provide students with an outline of the various influences that fashioned the civilizations that are integral to the history of India. The emphasis is on the plurality of Indian culture and tradition. The course is divided into two separate but interrelated parts. In the first part Rudrangshu Mukherjee presents the very broad themes of the civilizations from ancient times to the modern age. The themes are</p> <ol style="list-style-type: none"> 1. Harrapan Culture 2. Vedic Civilization. 3. Coming of The Buddha 4. Ashoka 5. Gupta Empire --- Political Structure, Culture, Religious Ideas 6. Coming of Islam -- Bhakti And Mughal Pluralism 8. British Rule -- Indian Responses -- Rammohun, Gandhi, Tagore <p>In the second part Gopalkrishna Gandhi looks at some specific features of these civilizations. These features are</p>

Digging for the Future

1. 'Dancer', 'Priest-King' and Bull - Life's Rhythms in the Indus Valley (Discussing the possible reasons for their decline and the trajectories of their continuance)

Great Words

2. The Past, Present and Future of Sanskrit (A Post-Modern reflection on the Buddha, Mahavira and Sankara)

Great Works

3. The Tirukkural (Its ethical and romantic as opposed to didactic voltage)

4. Kalidasa (His romantic and aesthetic as opposed to moral preoccupations)

'Rock of Ages Cleft For Me'

5. Asoka's Stones (The Imperatives of an Ethical Sovereignty)

The Peacock Throne

6. Shah Jehan's Progeny and Abanindranath Tagore's paintings (with a tangential sighting of Sarmad and the Sufis)

Company - Colony - Country

7. Dalhousie - as a Maker and Breaker of India

8. Wavell – as a Soldier-Statesman who lost without knowing what he had lost

Arindam Chakrabarti (Philosophy)

Indian Civilization: A Debating Society

The Sanskrit/ Bengali/ Hindi word for civilization “sabhyatā” derives from the concept of a sabhā, or assembly for civil debate and deliberation. To be sabhya/ civilized is to be worthy of an assembly. The Telugu, Tamil, Kanada, Malayalam words for the same concept have to do with “nāgarikatā” invoking the idea of citizenship in a polis. The central focus of this class will be the genealogy and philosophy of conflict-management through rule-guided public debate from the time of emperor Ashoka to modern India. The reading-plan will be divided into five modules: A. Philosophical Debates, B. Aesthetic Debates, C. Negotiations of Collective Violence, D. Colonization, Swaraj, Violence, and Annihilation of Caste, and E. the Crisis of Civilisation.

Beginning with Rabindranath Tagore’s mid-twentieth century classic “Crisis of Civilisation” the class will rewind back to ancient Indian pitch for inter-faith accommodation. In the first and longest module, we shall read the texts of and on Ashokan Edicts, and a translation of the early 9th century Kashmiri Sanskrit play “Tumult of Traditions” (Agama Dambara) by Jayanta Bhatta. By way of explaining the philosophical debates between Buddhists and Vedists, Jainas and Brahmins, Materialist Hedonists and ritualist Mimamsakas, we shall cover some of the central philosophical debates that

	<p>have exercised the “argumentative Indians”: Self versus No-Self, God versus No God, morality based on the Authorless Imperatives of the Vedas versus morality based on alleviating the suffering of all living beings and so on. Religious conflict resolution during the Mughal period will be studied by a close reading of sections of Dara Shikoh’s Majma-ul-Bahrain.</p> <p>Side by side with religious and metaphysical debates, debates on Aesthetics among conflicting accounts of what makes a work of art relishable will also be discussed on the basis of contemporary work on “Rasa”-theory and Indian theories of literary imagination.</p> <p>The course will end with Indian Civilization’s cultural and political struggle with simultaneous valorization and denouncement of violence and war (through the lens of Mahatma Gandhi on the Bhagvadgītā) and Babasaheb Ambdedkar’s sustained argument for “annihilation” of dehumanizing caste-divisions.</p>
<p>Environmental Studies</p>	<p style="text-align: center;">Mahesh Rangarajan (History & Environmental Studies)</p> <p>The environment as major issue emerged in public consciousness just around half a century ago and remains at the centre of public concern. But to think about it in a meaningful way requires an engagement across divides, as between nature and society, classes or nations and species or ecosystems. One way to do so is to also ask how and why the environment means different things to different people. Also, to see how and why the control of resources and spaces has deep implications not only for those in the human present but for other species and future generations.</p> <p>The course will engage with key thinker such as Rachel Carson and Barry Commoner, practitioners Fritz Schumacher and Wangari and Matthai. Issues of the environment are often also about population, energy and technology as much about making peace with nature. This engagement will link changes within India and Asia to the wider global challenges. Climate change and species extinction or Himalayan and ocean futures may seem daunting issues. Yet any beginning towards a a better future is by asking how we got here in the first place. And by thinking in new ways across disciplines the course helps gain insight into the questions of questions, how a peace among people can be underpinned with a peace with nature.</p> <p style="text-align: center;">Mukul Sharma (Environmental Studies) Environment, Development, Climate Change</p> <p>This course offers an overview of the interrelationship between environment, development and climate change. It examines various concepts and components of ecosystem and biosphere, and diverse ways in which human-non human lives exist, cooperate and compete with each other. It traces the history of development through different phases of human-nature correlation and explains how theories, practices and questions of globalisation, sustainability, transition, inter-generational equity, gender, health, disasters and green growth have important bearings on our understanding of ecology in present times. In this course, environment and development are also inferred in the context of climate change. It analyses</p>

	<p>not only how development has led to climate change, but also how climate change is defining our development, which incorporates socio-economic distribution of impacts and burden, energy and carbon emissions, politics of climate change and justice, and alternatives of renewable energy and sustainable transition.</p> <p style="text-align: center;">Amita Baviskar (Environmental Studies) Nature, Culture, Power</p> <p>Any environmental issue is invariably about society and politics. From global warming to garbage on city streets, nature and culture lie at the centre of competing claims about what should be done. To understand these processes of ‘socio-nature’, we need to focus on social inequality as well as biological complexity. This course looks at how biophysical processes in natural landscapes are changed by the cultural geography of capitalism, colonialism, caste and nationalism. We will analyse environmental crises and explore how collective action can lead to ecological justice.</p>
<p style="text-align: center;">Mind & Behaviour</p>	<p style="text-align: center;">Kranti Saran (Philosophy) Human Nature</p> <p>What kind of creature are you? A human being, no doubt. But what kind of creature is that? How should such a creature live? We will critically explore influential models of human nature in the Indic and Western philosophical traditions and their profound implications both for how we ought to live and our place in the social world. Readings include selections from the Upanishads, Vasistha’s Yoga, Plato, Aristotle, Hume, Freud, Mill, Railton, Śāntideva, Korsgaard, Foot, O’Neill, Frye, Kahneman, Haidt, Milgram, Hobbes, Rawls, Bilgrami and others.</p> <p style="text-align: center;">Scott Dixon (Philosophy)</p> <p>What is a mind? Is it something separate from the brain? Can we know whether someone or something else has a mind? If so, how? If any species have minds, humans do. But do any other organisms? If not, could any other organisms have minds? Do computers have minds? If not, could they if they were constructed in the right way? These are the central questions that we will be asking in this course. We will look at these questions from both philosophical and scientific perspectives, reading literature and viewing other media from both lines of inquiry. We will also spend time thinking about how to think and write clearly, and how to write an argumentative paper. This will help you not only with the course work, but it will also highlight some potential criteria that might be relevant in distinguishing between intelligent and non-intelligent conscious beings, which might itself be relevant to the question of which beings do or could have minds. By the end of this course, you will have gained familiarity with two of the most important traditions which investigate matters related to the mind, and you will have further developed your skills in thinking and writing critically.</p>

	<p style="text-align: center;">Aditi Chaturvedi (Philosophy) Debates about Human Nature</p> <p>In this course we will study a range of contemporary philosophical debates around the idea of human nature. We will look at debates in a range of fields including political science, anthropology, biology, psychology, medicine, and computer science. We will critically examine the continuum between non-human and human rationality, genetic determinism, the extent to which the human evolutionary lineage can explain human nature, the existence of a single human essence, the role of ‘normality’ in discussions of human nature, and the political significance of the concept of human nature. We will supplement philosophical texts with films and literary texts.</p>
<p>Economy, Politics & Society</p>	<p style="text-align: center;">Pulapre Balakrishnan (Economics) Economic Ideas from Smith to Sen</p> <p>This course is intended as an introduction to the main currents of economic thought. It commences with the ideas of Adam Smith, moves on to those of the other members of the Classical School such as Malthus and Ricardo and ends this section with the writings of Marx, who was unique among the political economists of his time in aiming to change the world rather than merely understanding it. We next journey on to the works of the economics of the early twentieth century including Marshall, Hayek and Keynes, arguably the most influential economist of all time, whose work continues to find a place in policymaking today. Finally, we study the rise after 1945 of Development Economics, focussed on the problems of the economies of Africa, Asia and Latin America, which it was believed required a treatment on its own. In this section we encounter the ideas of Amartya Sen who opened up a whole new view of 'development' and applied it to an understanding of Indian economic history since 1947. As the course progresses it will reveal the various modes of reasoning that have been deployed in economics and also serve as a brief economic history of the world in the past two centuries.</p> <p>The course intends to develop the thinking, writing and communication abilities of the students. Two books will be followed: ‘The Worldly Philosophers’ by Robert Heilbroner and ‘Great Economic Thinkers’ by Jonathan Conlin (ed.). In addition, students read passages from the original work of Smith, Marx, Keynes and Sen among other thinkers.</p> <p style="text-align: center;">Arvind Subramanian (Economics) The Global Economy, Pre-Columbus to Post-Covid: An Analytical Tour</p> <p>The aim of this course will be to familiarize students with the important facts/events that have shaped economic development around the world, including India, China, Europe, America, and Africa. These include: the slave trade and the Columbian exchange; the opium wars, colonization, US and Chinese civil wars, the Bretton Woods conference, the fall of the Berlin Wall, the Global Financial Crisis, and the COVID-19 pandemic. This historical tour will be grounded in a framework for understanding development: how have</p>

	<p>geography, history and institutions influenced the trajectory of nations? What has been the role of states and markets? How have ideas, interests, institutions, inheritances and individuals interacted in the course of economic history? Over the last few decades, and especially after the COVID-19 pandemic, should we think about development as compartmentalized between distinct geographies? The work of Jared Diamond, Ian Morris, Kenneth Pomeranz, Thomas Piketty, Acemoglu and Robinson, Karl Polanyi among others will be covered in the course.</p> <p style="text-align: center;">Deepak Mehta (Sociology) Work and Labour</p> <p>Work and labour are activities that are essential to the survival and continuity of human societies. Indeed, through work and labour the human species is distinguished from other life forms. But the analytic and categoric difference between work and labour as types of activities is not a settled issue and yet this difference is important because on its basis we are able to plot trajectories of employment, occupation and technological innovation. This course will explore the multiple ways of thinking through these two terms. Is activity in the household work or is it labour? How may we understand the effort of creating art - as music, painting or production by skilled crafts persons? Can we argue that everything that deals with production is labour, while all other physical activity is work? In designing this course as a primer, we will navigate a complex field or representations divided along six sub-sections. These are:</p> <ol style="list-style-type: none"> i) From craft to industry ii) Work and the body iii) Labour, technology and the machine at work iv) Alienation, innovation and the pain of labour v) Commodities and the exchange of social value vi) Digital work and the modern artisan
<p>Mathematical Thinking</p>	<p style="text-align: center;">M. Krishna (Mathematics) Mathematics For Liberal Arts</p> <p>The course starts with a discussion on the mathematical abilities that biological organisms, in particular humans are capable of. The number systems explores various ways of writing numbers starting from early civilizations leading upto the present. The topic on estimation is about estimating almost anything, number of grocery shops in a city, number of bricks in Ashoka buildings and so on. Sets, Logic, Functions are tools that Mathematicians and many others use formalising questions and answering them.</p> <p>Fair division, the two chapters on voting are discussions on how to choose among several possibilities that humans developed and their inherent limitations.</p> <p>Geometry, Graph theory, Probability and Statistics are specific ideas that apply to our surroundings and a large collections of events from which we can predict possibilities, quite useful for our life.</p>

	<p style="text-align: center;">Maya Saran (Mathematics) Introduction to Mathematical Thinking</p> <p>Some of humankind’s most powerful and beautiful ideas live in Mathematics. This ancient and most human of disciplines also happens to be the ideal arena in which to gain experience in both analytical thinking as well as creative problem solving -- these twin aspects of mathematics are what will drive this course. The topics we will choose to work with will not require any technical background – you will be given all the tools you need. During this course, you will develop a set of broadly useful problem solving strategies and gain experience in making rigorous arguments while encountering landmark ideas. We will look at the existence of non-rational lengths, the foundation of calculus, and Cantor’s set theory -- ideas that we take for granted today but which represent some of the "great works" of our collective intellectual history.</p> <p style="text-align: center;">Debayan Gupta (Computer Science) Foundations of Computer Programming</p> <p>This is an introductory course intended for students who want to learn the basics of programming. No prior programming experience is expected, though it helps to be “computer literate”.</p> <p>We will delve into computational thought and the principles which underlie modern programming, including rudimentary complexity theory. There will also be some discussion of the history and evolution of current computation and the internet. Students will learn how to write simple code in and express algorithms in the form of pseudocode. In terms of algorithms, we will cover some sorting and searching, as well as a number of useful computational tools and techniques, with special attention to recursive methods.</p> <p>Note: If you already possess some coding ability, and want to improve, or to start coding more seriously in a principled manner, please take the “Introduction to Computer Programming” (CS 101) course offered in the spring. This course is not a replacement for 101. This is an FC, intended for general audiences; 101 is more intensive, and meant for people who are considering a CS major. You can expect to leave this FC with basic coding ability as well as an understanding of modern computation, along with high-level views of topics such as artificial intelligence, blockchains, and cybersecurity.</p>
<p>Principles of Science</p>	<p style="text-align: center;">Gautam Menon (Physics)</p> <p>My Principles of Science course will provide a survey of the evolution of scientific thought, from the point of view of examples that I'll use to illustrate general principles. Examples I'll use will include: (i) The Hyderabad fish cure and the British doctors cohort (illustrating evidence in epidemiology and the importance of randomized control trials), (ii) the evolution of the atomic theory (how can we reason about things we can't see) (iii) the periodic table (why is the whole world made up of a limited set of building blocks) (iv) nuclear energy and atomic bombs (experiments that point the way to a deeper</p>

understanding of fundamental constituents of nature and the ethical and moral consequences of such knowledge) (v) evolution (are there "laws" in biology and what determines the diversity we see around us) (vi) DNA and genetic engineering (Watson, Crick and Franklin and the Nobel prize, ethical issues around cloning) and (vii) the greenhouse effect and climate change (how to reason about the world from a scientific viewpoint, dealing with the unknown). The course will introduce some mathematical concepts along the way that relate to these examples, among them: combinatorics, probability, random walks, functions and simple statistics, so that the role of mathematics in helping us think is illustrated.

Alok Bhattacharya & LS Shashidhara (Biology)

Principles and Practice of Science: From subatomic particles to complex biological organisms

Science entails systematic pursuit of knowledge, which essentially involves unbiased observations and multiple methods of validation and falsification. Science gives us the ability to understand how our world works and how we interact with our physical surroundings. It not only incorporates basic ideas and theories about how our universe behaves but it also provides a framework for learning more and tackling new questions and concerns that come our way. Science also provides an unparalleled view of the order and symmetry of the universe and its workings—subatomic particles to the never-ending space. Science enables you to integrate with your surroundings, both living and non-living. It has also given us the tools to alter living and non-living things. It has the potential to have both positive impacts such as coping with natural disasters, curing diseases, and discovering new sources of energy, as well as negative impacts in the form of climate change and weapons of mass destruction.

The course narrates some of the key theoretical and technical developments in the evolution of the sciences and offer a synoptic view of the development of concepts that drive modern science.

Somendra M. Bhattacharjee (Physics)

G3: Growth, Gravity, & Geometry

The aim of the course is to develop the scientific temper to look at problems from different points of view, thereby pursuing parallel lines of enquiry. The focus shifts gradually to more complex systems to find their underlying simplicities and their descriptions. The course will help in appreciating how logic and reasoning lead to cross-breeding of ideas from disparate topics, with mathematics as the unifying link.

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- **Introduction:** (This course is not on any historical survey.)
 - **Geometry and physics:** gravitational law and geometry
 - **Dimensional analysis:** Connecting Kepler's and Newton's laws; Concept of scales
 - **Geometry I: Euclid--** points, lines and curves; axioms and logic;

- **Geometry and algebra:** Do parallel lines meet? Point at infinity;
- **Calculus I:** functions, limits and derivatives
- **Straightlines:** Eclipse, velocity of light
- **Measuring length and time:** Does a curve necessarily have a length?
- **Geometry II:** line, circle, knot; sphere, cup, torus
- **Functions:** trigonometric, exponential, logarithm; graphs
- **Logarithms:** musical scale, earthquakes, avalanches, pH (chemistry)
- **Rabbits and population:** Fibonacci sequence, Golden mean, rationals and irrationals
- **Probability I:** randomness, probability, Bayesian approach, “false positive” cases
- **Probability II:** Genetics, heat and temperature, income distribution, rare events
- **Mechanics:** laws of motion, frame of reference, speed of light, relativity
- **Atoms:** planetary motion vs Hydrogen atom, periodic table, nuclear energy
- **Geometry III:** Beyond Euclid: soap bubbles, saddles; shape of a virus; earth as a sphere---maps and atlas
- **Geometry and gravity:** Uniform vs accelerated motion, space-time; gravity: Einstein's view
- **More is different:** single vs crowd; order vs disorder; similarities like forest-fire and infection, coin-toss and magnetism
- **Conclusion**