

**MSN-591 NANOTECHNOLOGY AND ITS IMPACTS ON
SOCIO-ECONOMIC STRUCTURES**

School	: Bilkent University
Course	: Nanotechnology and Its Impacts on Socio-Economic Structures
Year	: Fall 2014
Professor	: Prof. Dr. Orhan Güvenen
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Course Description

This course involves lectures, which are combined with weekly workshops and a research paper that covers the whole semester. The scope of the program will be focused on implications of nanotechnology on socio-economic structures. It concentrates on investigating possible future scenarios, nanotechnology world economic trends, investments of various countries, nanotechnology, industry, business interactions, ethics, legal aspects, patent and intellectual property. National nanotechnology initiatives, world dynamics and decision systems, impacts on human life and society are also presented in the course program with 3 credits.

DETAILS: Nanotechnology Research Center

Textbook

- Foster Lynn E., Nanotechnology, Prentice Hall, Massachusetts, 2006

Supplementary Texts

- Report To The President And Congress On The Third Assessment Of The National Nanotechnology Initiative which was prepared by Executive Office of the President, President's Council of Advisors on Science and Technology, PCAST, March 2010
- Palmberg C., H. Dernis and C. Miguet, Nanotechnology: An Overview Based On Indicators And Statistics, OECD, STI Working Paper 2009/7
- Güvenen O. and M. H. Öztürk, Impact of Nanotechnology on Socio-Economic Structures from an Operational Perspective, Presented at Institute for Operations Research and Management Sciences, INFORMS, Seattle, 2007
- Güvenen O. "World Dynamics, Ethics, Security, and Society" in AM Herzberg Editor, Statistics, Science and Public Policy, Queen's University, 2011
- Wissema J.G., Towards the Third Generation University, Edward Elgar, Massachusetts, 2009

Grading

Research Paper	30%
Workshops (weekly, 30 minutes)	10%
Midterm	25%
Final	35%

Weekly Calendar

Week #	Subject
Week 1	Strategical Importance of Nanoscience, Nanotechnology and Mathematical Chaos Nanotechnology Initiatives and Their Key Role in Nanotechnology Development and Impacts on Society.
Week 2	Nanotechnology Applications and Products Percent Distribution of Nanotechnology Products by Sectors in the World
Week 3	Nanotechnology, World Dynamics and Decision Systems World Power Driven Structure, Nanotechnology, Society and Decision Making
Week 4	Nanotechnology and World Economic Trends Economic Growth and Multi-Sectorial, Multi-Factorial Productivity Growth through Nanotechnology
Week 5	Nanoscience, Nanotechnology, Education Systems and Transdisciplinarity Third Generation Universities, Leading Research Universities, National Nanotechnology Research Centers, Transdisciplinary Science Methodology
Week 6	Nanotechnology, Nanobiotechnology, Materials, Healthcare System, Defense System, Engineering, ICT Interactions, Strategies and Applications Information Systems, Information Security, Data Bases in Various Sectors
Week 7	Nanotechnology, Industry, Business Interactions. Investments in Nanotechnology Collaborative, Contract and Consulting Approach for University / Industry Relations, Innovation, Startup Companies, Technology development, Entrepreneurship
Week 8	Midterm Exam
Week 9	Nanotechnology Legal Aspects: Policies and Regulations Regulatory Agencies, Rulemaking, Health and Safety Regulations
Week 10	Patent and Intellectual Property in the context of Nanotechnology and World Applications History of Patent and Patents in Nanotechnology, USPTO and EPO, Turkish Patent Institute, Worldwide Patent Applications in Nanotechnology
Week 11	Ethics and Nanotechnology Ethics and Leadership as a Necessary Condition of System Optimal in Society

Week 12	<p>Nanotechnology, Social Implications and Its Possible Future Scenarios. Nanotechnology Specific Responsiveness and Its Positive and Negative Impacts on Environment, Health, Safety, Society and Culture</p> <p>Social Implications on Health, Family, Environment, Education, Culture, Society and International Sphere Dynamics</p>
Week 13	<p>Impact of Technologies, which have Exponentially Increasing Evolution and Changing speed, on Human Life and Society</p> <p>Sustainability and Adjustment in Societal Structures</p>
Week 14	<p>Nanotechnology and Macroeconomic Growth. Actual State and 2023 Nanotechnology Strategies in Turkey</p> <p>An Anticipatory Analysis for the Next 10 Years in the World</p>
Week 15	Final

Supporting Letter

Nanotechnology is considered as an “industrial revolution” by U.S. National Science Foundation (NSF) and other authorized organizations. It is considered to have strong future impacts on technologies, economies, and society. Education, research, industry and business are interactively endogenous in “Third Generation Universities”.

Leading universities like Harvard, Arizona State University, University of California, e.g.; leading countries like US, Germany, UK, e.g. are offering courses, organizations, web pages; establishing journals, and writing books about the social and economic impacts of nanotechnology due to their awareness of its importance. This program by its specificity is analyzing nanotechnology and its impacts on socio-economic structures. It aims to provide a value added in teaching and research in our University. Under the scope of the program, weekly workshops will be performed for the interactive participation of students; hence a platform will be formed for them to share their questions and thoughts.

Nanotechnology, social impacts and its possible future scenarios, nanotechnology specific responsiveness and its positive and negative impacts on environment, health, safety, society, and culture are analyzed in this context.

Nanotechnology and macroeconomic growth, actual state and 2023 nanotechnology strategies in Turkey and an anticipatory analysis for the next 10 years in the world are equally presented in the program.

Prof. Dr. Orhan Güvenen