

# HOUSING AND EARTHQUAKE: AN EXAMPLE OF A GRADUATE PROGRAMME

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## THE NECESSITY OF THE PROGRAMME

Earthquakes, by their recurrence and intensity, are very powerful natural phenomenon affecting the societies deeply. An important section of the habitable areas in the world are under earthquake risk. In Turkey, 43% of the areas in the country are under earthquake risk and about 51% of the population live in the 1st and 2nd degree earthquake zones (Fig.1). The 17th of August 1999 Kocaeli earthquake has proved how unprepared our nation and its institutions are in facing the earthquakes one more time.

The 17th of August 1999 Kocaeli earthquake has become the starting point for the generation of the Housing and Earthquake Graduate Programme. Until the Kocaeli Earthquake, the policies, the solutions alternatives and projects to reduce the effects of earthquake risk, have not been considered as seriously, in the agenda of the central and the local authorities, universities and the community organizations and the media as they should have been. The fact that the 17th of August 1999 Kocaeli earthquake, which has harmed the national economy seriously, has taken place in a region, which has the most important industrial potential and intense population in the nation, has attracted more attention than the previous earthquakes in Erzincan in 1992, in Dinar in 1995 and in Adana in 1998 (Fig.2). The warnings and the forecasts of the earthquake specialists about a very strong earthquake in the vicinity of Istanbul has made the earthquake a daily aspect of the human lives in the nation.

The Housing and Earthquake Graduate Programme, which is proposed by Istanbul Technical University, Social Sciences Institute is for architects, urban planners and other related disciplines. Housing and Earthquake Programme will be carried out by the staff at I.T.U. Faculty of Architecture, Department of Architecture and the Department of Urban and Regional Planning, with the contribution of TUBITAK-

INTAG (Turkish Scientific and Technical Research Institute) ITU Housing Research Unit.

### **THE GOAL AND CONTENT OF THE PROGRAMME**

The goal of the Housing and Earthquake Programme is to accumulate the information on earthquake and housing, taking into consideration the lack of knowledge and inadequacy of the studies on housing and earthquake during a disaster, and to train architects and urban planners to become specialists in the relevant fields.

The content of the programme thus is to evaluate the physical, social, economical, legal and administrative impact of the significant earthquakes on the housing settlements; to examine the experiences and the solution alternatives geared towards the earthquake risk reduction and reinforcement; to scrutinize the earthquake risk reduction policies and the earthquake scenarios in the world and Turkey, through a variety of examples and case studies; and to identify the social and spatial planning principles and the criteria.

### **THE STRUCTURE OF THE PROGRAMME**

The Housing and Earthquake Graduate Programme, to be conducted by ITU Social Sciences Institute, has an interdisciplinary character. It will be carried out by the staff at the departments of Architecture, and Urban and Regional Planning of ITU Faculty of Architecture and TÜBİTAK-INTAG-İTU Housing Research Unit; furthermore, the participation of the specialist-academics from other faculties of ITU, other universities in Turkey and outside the country will be provided. Professionals of official as well as private institutions will be invited to give lectures at the courses and the seminars within the framework of the programme.

Within the programme, there are both "core" courses for 3 credits (24 credits in total) and "elective" courses for 2 credits (12 credits in total) each (Table 1). The requirement to complete the programme is to take courses totaling up to 36 credit-units plus a term-project with no credit. The project without credit needs to be taken during the third term of the programme under the guidance of an academic advisor. In the courses within the programme, taking measures against the severe earthquake effects in the housing settlements under the earthquake risk before the earthquake happens; the problems to be confronted during an earthquake; and short- medium- and long-term studies to be realized after an earthquake; and new construction, renewal and reinforcement implementations changing from the scale of the city down to the scale of building and its components will be examined according to the fields of occupation and the specialization of the participants in the light of the earthquakes that are experienced. In the Project at the end of the Programme, an integrative approach for lowering this risk, in settlements under the earthquake risk; with physical, social, economic, legal and administrative factors in mind, and with the participation of the relevant specialists will be adopted towards



identifying the principles of planning and designing the new and existing housing areas, so that they will be affected the least in case of an earthquake (Table 2).

The students to be accepted into the programme are selected among those who have graduated from an institution of at least 4 years of higher education (architecture, urban and regional planning, and other related disciplines), who have taken LES Exam and have got a minimum grade of 45 and who have succeeded in the Graduate programme foreign language (or an accredited) exam by a commission from the Social Sciences Institute.

### **THE CONDITIONS OF THE PROGRAMME**

The Housing and Earthquake Programme lasts for 3 terms; and it requires no thesis. Each term consists of 14 weeks. A student completes the coursework in three terms, identified by the academic calendar. In the third term, the student carries out a term project under the supervision of an advisor and submits it. In case the student fails to compile the programme within a period of 6 terms, his relations with the University will be broken off. Student attendance to the courses during the period of the programme is obligatory and the active participation of the student in the courses through research, implementation and seminars is crucial. The courses are designed to encompass case studies and implementation works. 30% of the Courses in the programme will be in English. In evaluating the courses and the projects, the principles of the ITU Senate will be in effect. The student must be successful in 3 courses at least during the first two terms; and the weighted average of at least 6 courses must be at least 3.0 out of 4.0 during the first four terms. For graduation, the weighted average of the all courses taken throughout the programme must be 3.0 (BB) out of 4.0. A student, who successfully completes the courses and the project, is given an ITU Graduate Diploma based on the student's undergraduate background. On this Diploma "Programme" and the "Title" earned will be indicated.

### **CONCLUSION**

One of the most important missions of the universities about earthquake and other disasters, are to define roles and responsibilities of architects and urban planners again, and to give comprehensive knowledge to them on these topics. The quality of the post-earthquake works, temporary and permanent housing examples show the importance of the education about earthquake and housing (Fig.3). It is known that there are many universities, centres and institutions which give education about earthquake and housing problems. The programmes of various universities and centres have been examined (Table 3.1., Table 3.2.), and the courses have been analysed and grouped in order to shed light on the preparation phase of the programme (Table 4.). The Housing and Earthquake Graduate Programme, with the core and elective courses and the other studies which support the programme, will play an important role for education of the architects, urban planners and other related disciplines.

Table 1: Housing and earthquake graduate programme

	CORE COURSES (3+0)	ELECTIVE COURSES (2+0)
1st TERM	<ul style="list-style-type: none"> <li>* HOUSING AND EARTHQUAKE: CONCEPTUAL FRAMEWORK</li> <li>* HOUSING POLICY</li> <li>* SOCIOLOGICAL APPROACH TO EARTHQUAKE</li> </ul>	<ul style="list-style-type: none"> <li>* PRINCIPLES OF EARTHQUAKE RESISTANT BUILDING DESIGN</li> <li>* CONSTRUCTION TECHNOLOGIES FOR HOUSING AND EARTHQUAKE</li> <li>* EARTHQUAKE AND ENVIRONMENTAL PROBLEMS</li> <li>* EARTHQUAKE AND EARTH SCIENCES</li> </ul>
2nd TERM	<ul style="list-style-type: none"> <li>* URBAN PLANNING PRINCIPLES IN SEISMIC ZONES AND DISASTER AREAS</li> <li>* HOUSING DESIGN PRINCIPLES IN SEISMIC ZONES AND DISASTER AREAS</li> <li>* SEISMIC RISK ASSESSMENT AND HAZARD MITIGATION OF EXISTING SETTLEMENTS</li> </ul>	<ul style="list-style-type: none"> <li>* DISASTER MANAGEMENT</li> <li>* EARTHQUAKE AND LIMITED ECONOMIC RESOURCES</li> <li>* EMERGENCY TRANSPORTATION PLANNING</li> <li>* EARTHQUAKES IN THE TWENTIETH CENTURY</li> </ul>
3rd TERM	<ul style="list-style-type: none"> <li>* POST-EARTHQUAKE HOUSING EXPERIENCES: COMPARATIVE ANALYSES</li> <li>* LAWS AND REGULATIONS FOR EARTHQUAKE</li> <li>* TERM PROJECT (NON-CREDIT)</li> </ul>	<ul style="list-style-type: none"> <li>* PROTECTION OF CULTURAL HERITAGE AGAINST EARTHQUAKE</li> <li>* GEOGRAPHICAL INFORMATION SYSTEMS IN DISASTER MANAGEMENT AND PLANNING</li> <li>* COMPARATIVE CASE STUDIES FOR HAZARD MITIGATION</li> </ul>

Table 2: Housing and earthquake graduate programme - course contents

	CORE COURSES (3+0)	ELECTIVE COURSES (2+0)
1st TERM	<p>HOUSING AND EARTHQUAKE: CONCEPTUAL FRAMEWORK</p> <p>Concept of housing. Housing as an intersection of society, family and individual. Theoretical approaches to housing. Housing as a system. Roles in the housing system. Various approaches to the interrelationships among user, designer, constructor and developer. Model examples for pre- and post-disaster periods.</p>	<p>PRINCIPLES OF EARTHQUAKE RESISTANT BUILDING DESIGN</p> <p>Earthquake terminology, seismicity of Turkey, evaluation of the 1998 Turkish Earthquake code-specification for structures to be built in disaster areas, principles of earthquake resistant building design, irregular buildings-irregularities in plan and evaluation, earthquake resistant design of reinforced concrete (RC), masonry, steel and timber buildings, structural detailing, determination of earthquake safety level of existing buildings, damage assessment, repair and strengthening methods.</p>



1st TERM	<p><b>HOUSING POLICY</b> Goals of housing policy and definitions of components. Housing Policies in developed and developing countries. Theories of supply and demand. Housing policy, Standards and housing quality. Housing policy and income level of user group. Improving strategies of housing policy and applications. Housing policy and earthquake.</p>	<p><b>CONSTRUCTION TECHNOLOGIES FOR HOUSING AND EARTHQUAKE</b> Importance of technology in house building; historical evaluation of house building technologies; transition from individual house building process to mass housing production process; house building technologies in industrialization process; examination of house building technologies for their vulnerability to earthquake movement; examination of case studies of building technologies in urban earthquake areas.</p>
	<p><b>SOCIOLOGICAL APPROACH TO EARTHQUAKE</b> Earthquake, human being and society; people and organizations; sociology of organizations; characteristics of community development, determination of community profile; community planning and community visioning; community response to natural disaster; implementation of community participation in earthquakes; social impact of earthquake.</p>	<p><b>EARTHQUAKE AND ENVIRONMENTAL PROBLEMS</b> Environmental problems as a result of earthquake, Principles of water pollution, Water sources, Water and waste water infrastructure, Water threatment systems, Waste water threatment systems, Hazardous materials, Control techniques for soil and air pollution, nuclear pollution, Scenarios related to environmental impacts of earthquake.</p>
		<p><b>EARTHQUAKE AND EARTH SCIENCES</b> Structure of earth, Turkey and earthquakes, the characteristics of soil groups, geological parameters of locational choice, geotechnical engineering, building, foundation and soil interactions.</p>
2 nd TERM	<p><b>URBAN PLANNING PRINCIPLES IN SEISMIC ZONES AND DISASTER AREAS</b> General principles of planning for new and existing settlements in disaster areas. Assessment of physical and social affect of earthquakes on housing areas. Earthquake and housing policies. Planning process and planning stages. Goals and objectives for earthquake sensitive urban planning. Assessment of data for natural and built environment. Site selection and location. Population, density and settlement patterns. Land use and transportation relationships. Distribution of urban facilities. Public participation for planning. Examination of urban planning experiences developed to reduce earthquake risk. Principles and criteria for social and spatial planning in settlements and housing areas.</p>	<p><b>DISASTER MANAGEMENT</b> Principles of emergency management; emergency planning; rescue operations, life supports. Clearance in disaster areas. Studies for estimation / determination of damage. Classification of damaged buildings. Post-earthquake activities, short, medium and long term studies; restructuring of social, economic and physical life. Pre-earthquake activities, risk analysis and hazard mitigation, disaster scenarios. Disaster preparedness of community.</p>

2 nd TERM	<p><b>HOUSING DESIGN PRINCIPLES IN SEISMIC ZONES AND DISASTER AREAS</b>                  General principles of housing design in disaster areas; social, economic and cultural profile of user; needs and requirements; importance of qualities related with space use, flexibility, accessibility safety, privacy, personalization, etc. for housing design; relationships between construction system and house form, environmental quality and quality of outdoor space, examination of the participatory approaches to design and construction processes, analyses and evaluations of the case studies.</p>	<p><b>EARTHQUAKE AND LIMITED ECONOMIC RESOURCES</b>                  Structure and development process of urban economics within the economical principles. Its reflections to the spatial structure. Economic restructuring process in post- earthquake period. Economic problems emerging after earthquake. Examples of solutions. Land values and speculation. Resources and construction process of housing, strategic alternatives. Economic aids to inhabitants, and insurance systems. Creation and use of economic resources.</p>
	<p><b>SEISMIC RISK ASSESSMENT AND HAZARD MITIGATION OF EXISTING SETTLEMENTS</b>                  Precautions to be taken to reduce the affects of earthquake on settlements in seismic zones. Planning and design problems for damage risk. Short, medium and long tem studies in post-earthquake period. Examination the experiences and solution alternatives towards the earthquake risk reduction and strengthening. Policies of hazard mitigation and earthquake scenarios.</p>	<p><b>EMERGENCY TRANSPORTATION PLANNING</b>                  Definitions of pre- and post-earthquake studies in the process of transportation planning. Before earthquake, preparation of equipments and services for emergency. After earthquake, data collection and determination of demands. Planning of the priorities of transportation channels (land, sea, air). Setting up units for transportation management, inter- relationships of units.</p>
		<p><b>EARTHQUAKES IN THE TWENTIETH CENTURY</b>                  Earthquakes that occurred in the World and in Turkey in the 20th Century. Evaluation of the social, physical and economic consequences and effects of earthquakes on settlements.</p>
3 rd TERM	<p><b>POST-EARTHQUAKE HOUSING EXPERIENCES: COMPARATIVE ANALYSES</b>                  Examples of resettlement in the World and in Turkey. Various settlement patterns. Temporary and permanent</p>	<p><b>PROTECTION OF CULTURAL HERITAGE AGAINST EARTHQUAKE</b>                  Conservation problematic for historic environment in seismic zones. Cultural and philosophical framework of conservation. Behavior of traditional buildings during earthquake. Precautions for</p>



3 rd TERM	<p>settlements. Alternative systems for design and construction of housing. Experiences of different cultures. Comparative analyses.</p>	<p>environmental and building scale to reduce affects before earthquake. Principles of conservation, restoration and retrofit for the scales of urban, building and building component, and practical problems. Policies and applications of risk reduction for historic environment and buildings. Examination of experiences and solutions developed to reduce earthquake risk for historic environment and traditional buildings.</p>
	<p><b>LAWS AND REGULATIONS FOR EARTHQUAKE</b>                  Laws and regulations related with the planning and location of settlements. Necessities of earthquake resistance for housing. Earthquake laws and regulations for design and construction of housing. Interdisciplinary studies about protection from earthquake damage, and building control, especially in terms of seismic regulations principles.</p>	<p><b>GEOGRAPHICAL INFORMATION SYSTEMS IN DISASTER MANAGEMENT AND PLANNING</b>                  Introduction to Geographical Information Systems, Data types and input, Data Analysis, Remote Sensing and GIS, GIS applications for preparedness, mitigation, response and recovery.</p>
	<p><b>TERM PROJECT (non-credit)</b></p>	<p><b>COMPARATIVE CASE STUDIES FOR HAZARD MITIGATION</b>                  Hazard mitigation of disaster. Examination of the case studies about hazard mitigation from physical, social, economic and administrative perspectives. Comparative analyses.</p>

Table 3.1. Examined programmes of foreign universities (Disaster / Earthquake)

**1. Disaster / Earthquake Programmes of Universities and Colleges:**

- 1.1. Texas A&M University:** Ph.D. in Regional and Urban Science, Masters in Urban Planning
- 1.2. University of British Columbia:** Masters and Ph.D. in Regional and Urban Science
- 1.3. Arkansas Tech University (AKU):** Emergency Administration and Management BA degree
- 1.4. George Washington University:** Emergency Medical Services Program leading to a four-year BS with a major in Emergency Management in School of Medicine and Health Science
- 1.5. Thomas Edison State College:** Associate (two-year) and Baccalaureate (4-year) levels
- 1.6. University of Maryland:** Environmental and Hazardous Materials Management
- 1.7. University of North Texas:** Bachelor of Science in Emergency Administration and Planning Degree in the Institute of Emergency Administration and Planning
- 1.8. University of Richmond:** Associate in Applied Studies Degree, School of Continuing Studies

- 1.9. West Virginia University:** Masters program in Safety Management in the Department of Safety and Environmental Management
- 1.10. Delaware Technical & Community College:** Associate Degree called the Specialized Occupations Program in Emergency Management Services
- 1.11. Front Range Community College**
- 1.12. Garland County Community College (GCCC):** Associate of Applied Sciences in Emergency Services Management Degree program modeled on FEMA's Emergency Management Institute courses
- 1.13. Quincy College:** Certificate Program and an Associate Degree in Emergency Management within its Fire Science Technology Program
- 1.14. Red Rocks Community College:** Certificate and Associate Degree in Emergency Management and Planning
- 1.15. Scott Community College:** Hazardous Materials Technology Certificate and a 2-year Associate of Applied Science Degree in Hazardous Materials Technology
- 1.16. St. Petersburg Junior College:** Associates Degree in Emergency Administration, The Institute of Emergency Administration and Fire Science Fundamentals of Emergency Management Introduction to Hazards
- 1.17. California State University, Long Beach:** a non-credit Disaster Recovery Certificate Program in the Extension Program
- 1.18. California State University, Los Angeles:** Certificate Program in, Emergency Management, The Office of Continuing Education
- 1.19. Eastern Michigan University (EMU):** Bachelors and Masters levels in Emergency Management
- 1.20. Frontier Community College:** Emergency Disaster Services Technology (EDST) Certificate in Public, Personal & Social Service Vocational Program
- 1.21. Florida International University (FIU):** Certificate in Emergency Management and Hazard Mitigation
- 1.22. Millersville University of Pennsylvania:** multidisciplinary minor in emergency management
- 1.23. Rochester Institute of Technology (RIT):** Accredited under-graduate Emergency Management Certificate in College of Continuing Education distance learning Bachelor's of Science degree program in Applied Arts and Science)
- 1.24. University of Akron:** Bachelor of Science in Geography and Planning with a Concentration in Emergency Management Degree Program
- 1.25. University of California at Berkeley:** Emergency Preparedness Planning and Management Certificate program
- 1.26. University of Utah:** Earthquake Hazards Reduction emergency management certificates in The Center for Natural and Technological Hazards in the Geography Department
- 1.27. University of Wisconsin:** International emergency management program in the Disaster Management Center
- 1.28. California Specialized Training Institute (CSTI)**
- 1.29. California State University - Chico:** The Center for Hazards Research in the Geography and Planning Department
- 1.30. California State University - Fullerton:** The Masters of Public Administration program in the Division of Political Science and Criminal Justice



- 1.31. **Cincinnati State Technical and Community College**
- 1.32. **Clark University:** M.A. and Ph.D levels (including concentrations in three subfields: environmental affairs, risk analysis, and technology assessment) insubfields: environmental affairs, risk analysis, a graduate-level Environment, Technology and Society Program
- 1.33. **Cogswell Polytechnical College:** Fire Service Program
- 1.34. **Empire State College:** three emergency management courses at the Associate's Degree level in Empire's Center for Distance Learning (Part of the State University of New York)
- 1.35. **Florida State University:** Within the Department of Geography
- 1.36. **George Washington University:** established Institute for Crisis and Disaster Management, Research, and Education
- 1.37. **Georgia State University:** Within The School of Public Administration and Urban Studies
- 1.38. **Hampton University:** A Bachelor's Degree in Emergency Medical Systems Management, Hampton's College of Continuing Education
- 1.39. **Harvard School of Public Health, Office of Continuing Education:** Planning for Nuclear Emergencies Workshop
- 1.40. **Lewis and Clark Community College**
- 1.41. **University of Hawaii:** A series of twelve emergency management modules within the Office of the Chancellor for Community Colleges
- 1.42. **Indiana Public Safety Training Institute**
- 1.43. **John Jay College of Criminal Justice:** Within Master of Science in Protection Management
- 1.44. **Lewis and Clark Community College**
- 1.45. **New Mexico State University:** Within The Sociology and Anthropology Department
- 1.46. **Northern Illinois University:** Within The Department of Technology
- 1.47. **Penn State - Harrisburg:** Within The School of Public Affairs
- 1.48. **Pennsylvania State University:** Within The College of Earth and Mineral Sciences
- 1.49. **Rutgers University:** Within The Geography Department
- 1.50. **University of California at Los Angeles:** Within The Graduate School of Public Health
- 1.51. **Rutgers University:** Within A Master of Science in Public Safety
- 1.52. **Tennessee Technological University**
- 1.53. **University of Central Florida:** Within The Department of Public Administration
- 1.54. **University of Colorado at Boulder:** Within The Geology Department
- 1.55. **University of Delaware:** Within The Department of Political Science
- 1.56. **University of Denver:** Within The Department of Sociology
- 1.57. **University of Houston:** Within The College of Social Sciences
- 1.58. **University of Kansas:** Within The Department of Geology
- 1.59. **University of Massachusetts:** Within The Department of Geology and Geography
- 1.60. **University of Miami:** Professional Development for Information System's Institute

- 1.61. **University of Michigan-Flint:** Within The Department of Earth and Resource Science
- 1.62. **University of North Carolina at Charlotte:** Within The Department of Sociology
- 1.63. **University of South Carolina:** Within The Department of Geography
- 1.64. **University of Southern California:** Within the Graduate School of Business Administration, (The Center for Crisis Management)
- 1.65. **University of Tennessee, Knoxville:** Within The Department of Health, Leisure and Safety Science
- 1.70. **University of Toledo:** Within the Department of Geography and Planning
- 1.71. **University of Wisconsin, Oshko:** Within The Geography Department
- 1.72. **Villanova University:** Within The Department of Geography
- 1.73. **Washington University:** Within The George Warren Brown School of Social Work
- 1.74. **West Virginia University:** Masters program in Safety Management in the Department of Safety Environmental Management

Table 3.2. Examined programmes (Housing)

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**2.Housing Programmes of Universities and Colleges:**

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- 2.1. **West Virginia University:** Post-graduate program in Development planning, Urban and Regional Planning Department, University of Michigan Concentration in Community Development and Housing
- 2.2. **Cleveland State University:** Masters of Urban Planning in Design and Development, Levin College of Urban Studies, Department of Urban Studies
- 2.3. **Heriot-Watt University:** Master program diploma in Housing, Faculty of Environmental Studies
- 2.4. **Institute for Housing and Urban Development Studies:** Master Degree Programme in Urban Housing Management in co-operation with Lund University, Sweden
- 2.5. **Oxford Brookes University:** Master Program degree in Housing Studies, School of Planning
- 2.6. **Oxford Brookes University:** Master Program degree in Housing, Postgraduate Taught Course
- 2.7. **University College London:** Master Program degree in Urban Housing, the Development Planning Unit, The Bartlett Faculty of the Built Environment
- 2.8. **Cardiff University:** Postgraduate Diploma / master degree program in Housing, Department of Urban and Regional Planning
- 2.9. **Heriot-Watt University:** Master degree program / Diploma in Housing, School of Planning & Housing, Edinburgh College of Art
- 2.10. **The State University of New Jersey, RUTGERS:** Master Program in Edward J. Bloustein School of Planning and Policy Concentration, Housing, community Development and Urban Redevelopment
- 2.11. **Harvard University:** 2000 Brown Bag Housing Seminar Series in Joint Center for Housing Studies



**2.12. Katholieke Universiteit Leuven:** Department of Architecture, Urban and Regional Planning, Post Graduate Center Human Settlements, Master Programme in Human Settlements

**2.13. Istanbul Technical University:** Faculty of Architecture, Graduate Program for Architectural Design-Housing (1974-82 terms)

Table 4. Main course groups of the programmes

COURSE GROUPS OF THE "DISASTER/ EARTHQUAKE" PROGRAMMES	COURSE GROUPS OF THE "HOUSING" PROGRAMMES
INTRODUCTION: Introduction to Hazards, Natural Catastrophe, Earthquakes, Earthquakes and Other Natural Disasters, Natural Disasters, Natural Hazards, Environmental Hazards, Introduction to Emergency Management, Introduction to Emergency Management and Disasters, Our Communities and Hazards	INTRODUCTION: Introduction to Housing
SOCIOLOGY: Sociology of Disasters, Social Dimensions of Disaster, Social Problems of Disaster, Social Aspects of Earthquake Hazards, The Sociology of Disasters, Environmental Sociology, People and Organization, Public Policy in Emergency Management, Human Dimensions of Global Environmental Change, Human Elements in Preparedness Planning	SOCIOLOGY: Urban Sociology, Urban Change & Community Development, Social and Cultural Anthropology, Introduction to European Culture, Human Behaviour and Applied Psychology
COMMUNITY PLANNING, LAWS AND REGULATIONS: Community Crisis, Management Skills, Community Planning and Response, Community Response to Natural Disaster, Managing Public Emergencies, Disaster and Politics, Laws and Regulations in Disasters, Environmental Planning Administration	LAW: Legal Studies, Housing Law, Rights and Advice, Governance, Legal Developments in Housing
DISASTER PLANNING: Disaster Response Plan, Aspects of Disaster Response, Emergency Planning, Emergency Planning and Methodology, Mitigation and Planning for Emergencies, Planning and Strategy for Emergency Response, Disaster Planning and Management and Risk Analysis, Natural Hazards and Disaster Planning, Environmental Disaster Planning, Hazard Reduction Planning	URBAN PLANNING: Urban History and Theory, Urban Development Planning, Environment and Sustainable Development, Urban and Regional Planning for Sustainable Development, Planning for Housing, Traffic Planning in Growing Cities, Neighborhood Development, Planning for New Communities, Housing and Development Planning

<p>MITIGATION, RISK ASSESSMENT: Principles of Hazard Mitigation, Practice of Hazard Mitigation, Environmental Hazard Assessment and Mitigation, Environmental Hazard, Hazardous Materials Management, Disaster Mitigation, Natural Hazard Mitigation and Recovery, Disaster Preparedness and Hazard Mitigation, Earthquake Hazard Reduction, Risk Assessment and Hazard Management, Risk Assessment and Management, Disasters: Natural Hazards and Risk Assessment, Disaster Preparedness and Response, Disaster Preparedness and Hazard Mitigation</p>	<p>ARCHITECTURE-URBAN DESIGN-URBAN PLANNING, HOUSING: Architecture, Housing, Urban Development, Building and Urban Design in Development, Neighborhood Planning, Urban Design Seminar, Workshop in Urban Design, Housing in Developing Countries, Housing Standards, Housing and Human Settlements Policies and Realities, Housing Development, Housing Strategies and Choices.</p>
<p>EMERGENCY MANAGEMENT: Principles of Management, Emergency Management, Emergency Operations, Comprehensive Emergency Management, Principles of Emergency Management, Fundamentals of Emergency Management, Emergency Management: Organization and Structure, Emergency Preparedness Planning Aim and Scope of Disaster Management, Current Issues in Emergency Services Management, Emergency Preparedness and Response, Disaster Preparedness and Emergency Systems, Strategic Planning and Implementation in Emergency Management</p>	<p>MANAGEMENT: Housing Management, Housing Programme and Project Design and Management, Professional and Practice Skills Management in the Public Sphere, Municipal Implementation of Planning Program</p>
<p>COMPUTERS, GIS: Computers in Emergency Management, Computers in Emergency Services, Information Systems for Emergency Management, Emergency Operations Simulation Training, Digital Techniques of Remote Sensing, Using Geographic Information Systems in Disaster Management, Seminars in Geographic Information Systems, Geographic Research and Natural Disaster, Training Geography</p>	<p>COMPUTER: Computer Programming</p>
<p>TECHNOLOGY: Environment, Technology and Change, Technology in Emergency Management and Hazard Mitigation</p>	<p>CONSTRUCTION: Building Construction and Maintenance</p>
<p>FINANCIAL ASPECTS: Financial Preparedness Planning</p>	<p>FINANCE/ECONOMICS: Housing Finance, Rationalization of Construction under Limited Resources, Building Economy and Cost Control, Economics of Development, Real Estate Finance, Real Estate Opportunities, Economic Issues for Local Governments: An Overview,</p>



	Housing Economics and Markets, Fundamentals of Real Estate, Real Estate Investment
PRACTICES, CASE STUDIES: Disasters in the Twentieth Century, Practice of Hazard Mitigation, Special Topics in Hazard Planning and Research, Selected Topics in Disaster Relief and Humanitarian Assistance, Practical Applications, Case Studies, Special Problems, Practicum, Seminar in Emergency Management	DESIGN/PRACTICE: Design Studio/Project Work+Study Tour, Housing Project, Housing Practice, Land Development Practice
ENVIRONMENT AND HEALTH: Environmental Health and Safety, Environmental Health Management, Health Services Organizations	CONSERVATION/RENEWAL: Methods and Practice of the Conservation of the Architectural Heritage and Historical Towns and Sites, Housing and Urban Renewal, Theory and Policy for Urban Redevelopment
	HOUSING THEORY: Housing Theory, Architectural Design Theory and Methods +CAAD
	HOUSING POLICY: Housing and Human Settlements Policies and Realities, Developing and Implementing Housing Policy, Housing and Social Policy, Determinants of Housing Policy, Seminar in Housing Policy, National Housing Policy, Comparative Housing Problems and Policies, Urban Housing Policy, Principles of Housing and Community Development Policy, Housing Policies in Comparative Perspectives
	RESEARCH METHODOLOGY: Housing Research and Survey Methods, Housing Analysis, Housing Scenarios, Statistics, Research Methods, Social Research Methods

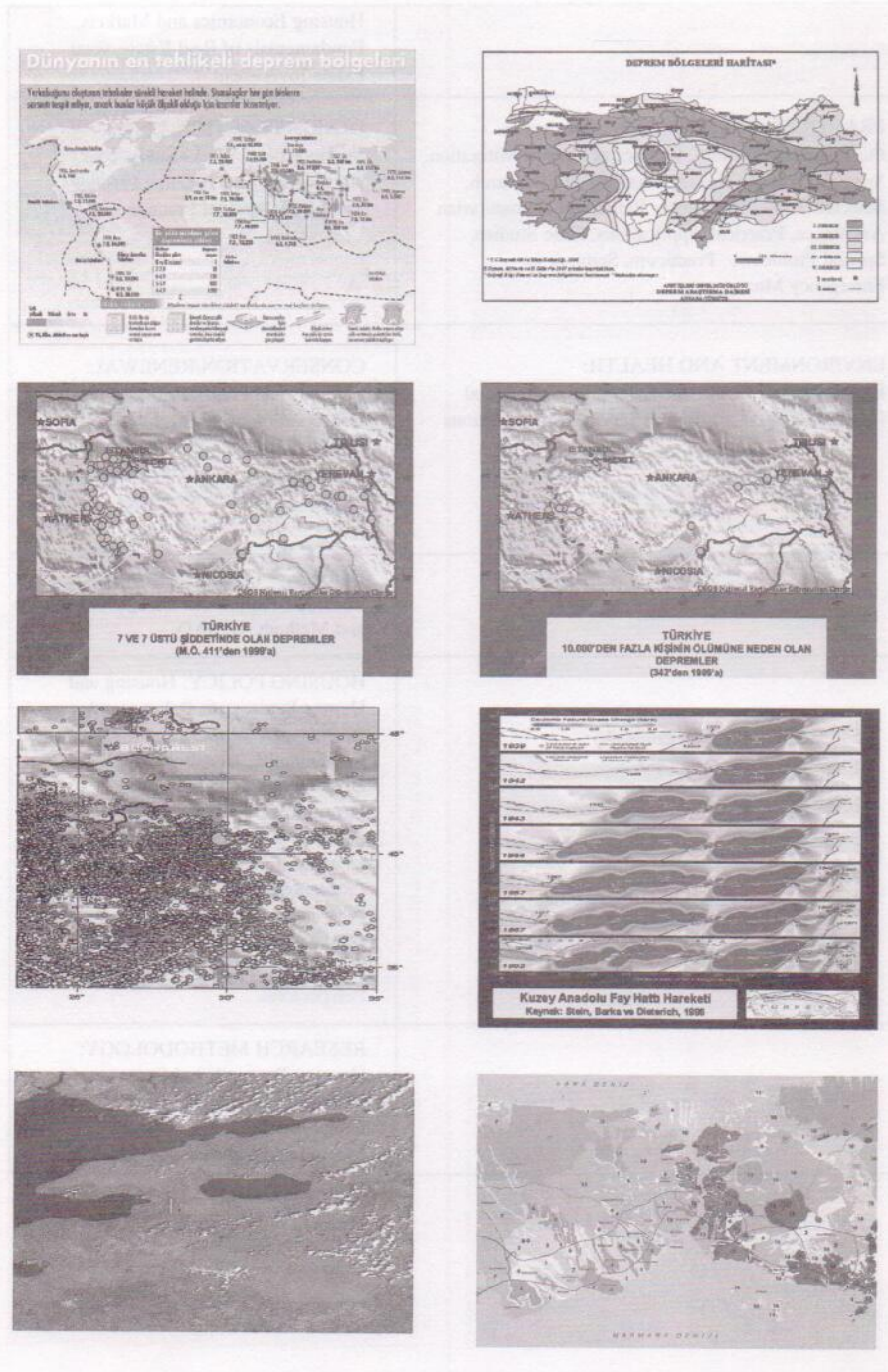


Figure 1. Earthquake characteristics for the world, Turkey and Marmara Region





Figure 2. Views after the Kocaeli earthquake

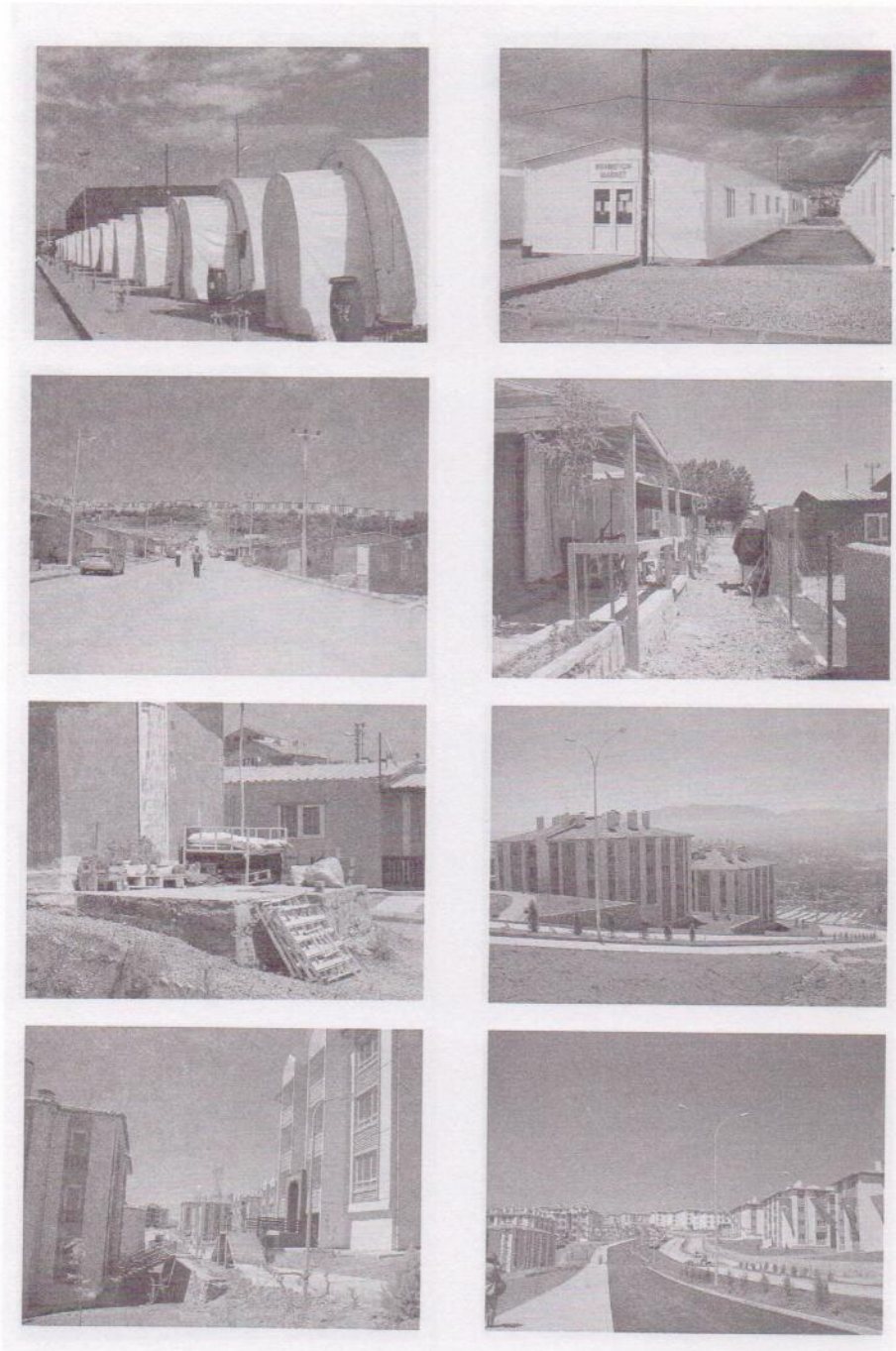


Figure 3. Examples from temporary and permanent housing