MIDDLE EAST TECHNICAL UNIVERSITY

50 Years in Graduate Education:
Achievements and Impacts on
Science and Society in Half a Century

6th June 2012

PREFACE

This year is the 50th anniversary of the graduation of our first 15 graduates from METU MS degree programs (1960-1961 academic year) and the 45th anniversary of the graduation of the first two graduates from METU PhD programs (1966-1967 academic year). We feel proud for celebrating half a century of graduate studies, recognizing the importance of such milestones for universities in establishing traditions of higher education.

We prepared this booklet as a stocktaking of what we have done in the last 50 years as well as to recognize and celebrate the success of our graduates through their achievements. We wanted to share all this with you, our alumni and our colleagues at METU.

At the time of the foundation of METU in 1956, successful universities around the world were taken as role models. The core foundations of the university were built during the presidency years of Mr. Kemal Kurdaş. Mr. Kurdaş made a point of valuing freedom and human rights as well as respecting the environment. He created a university atmosphere full with joy and solidarities. He also put an emphasis on the importance of social sciences and social values. Again it was during his tenure that METU built the beautiful campus environment with its reputable architectural style. He was a pioneer and embedded in all **METUnians** values such as hard work, free and critical thinking, innovative behavior, social responsibility, integrity and love for art, music and drama. These values also constitute the basis of all our graduate programs' values.

Between 1960/61 and 2010/11 academic years, **20 267** students graduated from METU Master Degree Programs and **2 771** from the PhD programs. Having English as the language of instruction in all its degree programs has greatly facilitated METU's international connections and collaborations as well as successful accommodation of international students and researchers. Since 1960/61 academic year, **1 760** international students from **75** countries all around the world have graduated from our graduate programs with a ratio of international students to total number of graduates as **~0.08**. In recent years, to increase this ratio METU has made a priority of attracting quality international students to its graduate degree programs.

METU has **97** masters and **62** doctorate programs offered by the Graduate Schools of Natural and Applied Sciences, Social Sciences, Marine Sciences, Informatics, and Applied Mathematics. During the last decade, by giving more emphasis to interdisciplinary graduate programs in newly growing innovative research areas, graduate schools have started more than 10 new interdisciplinary graduate programs. We are very proud of the level that METU has reached over the years in fulfilling its mission in education and research.

METU commonly ranks close to the top among research universities in Turkey and also listed among the leading universities in the world as reflected in many rankings of world universities, including Times Higher Education, QS, URAP, Leiden, HEEACT, and Webometrics. The QS World University Rankings 2010 by Quacquarelli Symonds ranked METU as **185th** worldwide in the field of engineering and technology, and as **285th** in the field of natural sciences. According to the Times Higher Education "World Reputation Rankings 2012" results METU is selected among the top **100** universities by reputation in world university ranking. "World Reputation Rankings 2012" is determined by academics from numerous universities all over the world. No doubt our graduates with their achievements contributed to METU's reputation.

At METU the number of faculty involved in education and research is **841** and the number of faculty who obtained their PhD degree at METU is **257**, which is **30.5%** of the total number. This means that, at METU, which is in the list of top 100 universities by reputation in world ranking, the share of our own PhD graduates is approximately 1/3rd. This is a measure of our success. We are very proud of this outcome.

As of 2011, METU has 19 international joint/dual degree programs and research collaboration agreements with many universities around the globe at the graduate level. The philosophy in protocols signed for these programs is based on equal basis in courses and research. METU is a member of various associations and networks dealing with international education, student and faculty exchange.

For the last six years, the total number of publications of our graduates of MS and PhD programs were **3 043**, while that with METU address were **4 987** in journals that are searched by SCI, SSCI and AHCI. This means that the share of METU-addressed publications produced as a result of our graduate studies is around **61%.** This demonstrates a significant

impact of our graduate studies on science. The number of publications per PhD student varies with departments depending on their traditions. In 2006-2011, the maximum number of publications per PhD student in science departments (BIO, MATH, CHEM, and PHYS) is around **4.38,** while in interdisciplinary programs of GSNAS it is **2.59,** and in engineering departments it is **1.72**.

Since 2001, METU has involved in a project named as Faculty Development Program (**ÖYP**), which was supported by the State Planning Organization (DPT). The main aim of the project has been to educate academics for newly developing universities all around Turkey. METU was the first and the only university in the year 2001 that started the project with four target universities. METU considered it as a social responsibility project and started to implement it despite the initial skepticism of some of its own faculty members. The total number of ÖYP students in this project amounts to 869 with 70 target universities. There are also 35 students enrolled for some international target universities. By the end of April 2012 the number of graduates of this program has reached to **307**. They will start their tenure in **26** newly established universities. Between 2006 and 2011 the total number of papers published by the graduates (268) is **726**. Thus, the number of publications per ÖYP student in this interval is around (726/268) **2.71.**

Due to ÖYP METU has had a significant scientific and social impact. Through this project, METU has increased the number of PhD graduates as well as the number of publications. Consequently, METU has contributed to Turkey's academic capacity, which is a social and scientific impact on the education system. We are very proud of this **social and scientific impact** of our graduate programs.

SAN-TEZ projects were initiated by METU-GSNAS. The structure of these projects is based on producing a product or a method with a graduate thesis study for solving a problem of an industrial company. There are **44** projects of which **27** had ended and some are still continuing with many new proposals from METU. The project is continuing to grow exponentially and today many universities are involved in it. We consider this innovative project as an example of scientific and social impact of METU on Turkey's scientific community and industry by generating an economic development through the value added products and methods.

Our graduate students are very successful in getting different types of scholarships and awards, such as TÜBİTAK (794), ERASMUS (266) and TÜBİTAK and TÜBA awards (32). At the same time most of the award winners of TÜBİTAK and TÜBA are either our faculty members or our BS and MS degree programs' graduates. We have many national and international awards received by graduates of Architecture, City and Regional Planning, Industrial Design Departments, while we have different books published by our Social Science Departments' graduates.

Among **2 771** graduates from different PhD programs we have been partly (75%) successful in finding out their working place**s**. **73%** of the PhD graduates are working as academics, while the number working at international universities is **10%** of this amount. Among them, many also became the presidents, deans of faculties and graduate schools and heads of departments in their respective universities. METU became a research university by the contribution of graduate studies in 50 years. Our graduates are not only successful in scientific publications, university teaching and administrative positions at universities but also very active in sports, arts, music and literature.

We would like to thank those who participated in the organization of "50 Years in Graduation Education: Achievements and Impacts on Science and Society in Half a Century" Celebration Ceremony. There are hidden heroes in the preparation of this manuscript who have taken part in collecting, analyzing and presenting data. Our special thanks are for Ms. Ece Kancı, Ms. Fulya Karahan, Ms. Ceren Bora, Mr. Alper İnce, Ms. Derya Gökçay, Mr. Ali Şahin, Ms. Zeynep Baykal, Mr. Caner Özdemir, Mr. Alper İnkaya, Mr. Recai Rize, Ms. Deniz Tekkaya, Ms. Sibel Gülnar, Ms. Necla Işıklar.

This study outlines the findings and trends in graduate education at METU in 50 years. As such we hope that it contributes to the ongoing discussion on how to further improve graduate studies in our university. METU has invested substantially to improve graduate programs and develop human capital in Turkey with the understanding that capacity for innovation and intellectual progress hinge on a strong system of graduate education. We firmly believe that with this understanding METU will continue its efforts toward improving graduate studies in the future.

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ABBREVIATIONS

ADM	Political Science and Public Administration	**BLR**	Belarus	**CRYP**	Cryptology
AEE	Aerospace Engineering	**BME**	Biomedical Engineering	**DOM**	Dominican Republic
AET	Applied Ethics	**BMED**	Biomedical Engineering (Old program within EE)	**EAS**	Eurasian Studies
AFG	Afghanistan	**BRA**	Brazil	**ECE**	Early Childhood Education
AH	History of Architecture	**BS**	Building Science	**ECON**	Economics
ALB	Albania	**BTEC**	Biotechnology	**EDS**	Educational Sciences
ARCD	Computational Design and Fabrication Technologies in Architecture	**BGR**	Bulgaria	**EE**	Electrical and Electronic Engineering
ARCH	Architecture	**CAN**	Canada	**EGY**	Egypt
ARME	Archaeometry	**CE**	Civil Engineering	**ELE**	Elementary Education
AS	Actuarial Sciences	**CEIT**	Computer Education and Instructional Technologies	**ELIT**	English Literature
ARS	Area Studies	**CEME**	Cement Engineering	**ELT**	English Language Teaching – Foreign Language Teaching
ASN	Asian Studies	**CENG**	Computer Engineering	**EM**	Engineering Management
AUS	Australia	**CHE**	Chemical Engineering	**EMBA**	Executive MBA
AUT	Austria	**CHEM**	Chemistry	**ENVE**	Environmental Engineering
AZE	Azerbaijan	**CHOG**	Chemical Oceanography	**EQS**	Earthquake Studies
BGD	Bangladesh	**CI**	Curriculum and Instruction	**ES**	Engineering Sciences
BCH	Biochemistry	**COGS**	Cognitive Science	**ESME**	Elementary Science and Mathematics Education
BEL	Belgium	**COG**	Congo	**EST**	Estonia
BIH	Bosnia Herzegovina	**COUN**	Psychological Counseling and Guidance	**ESP**	Spain
BIOL	Biology	**CP**	City Planning	**ETH**	Ethiopia
BIN	Bioinformatics	**CRP**	City and Regional Planning		

EUS	European Studies	**IAM**	Institute of Applied Mathematics	**LBY**	Libya
FDE	Food Engineering	**ID**	Industrial Design	**LTU**	Lithuania
FM	Financial Mathematics	**IE**	Industrial Engineering	**LNA**	Latin and North American Studies
FPSY	Family Psychology	**II**	Informatics Institute	**MATH**	Mathematics
FRA	France	**ION**	Informatics Online	**MBA**	Master of Business Administration
GMB	Gambia	**IPSY**	Industrial and Organizational Psychology	**MBF**	Marine Biology and Fisheries
GB	Great Britain	**IR**	International Relations	**MCS**	Media and Cultural Studies
DEU	Germany	**IRN**	Iran	**ME**	Mechanical Engineering
GEOE	Geological Engineering	**ITA**	Italy	**MENA**	Middle East and Northern Africa
GGIT	Geodetic and Geographic Information Technologies	**IS**	Information Systems	**MES**	Middle East Studies
GHA	Ghana	**ISR**	Israel	**METE**	Metallurgical and Materials Engineering
GRC	Greece	**JAP**	Japan	**METU**	Middle East Technical University
GSNAS	Graduate School of Applied and Natural Sciences	**JOR**	Jordan	**MGG**	Marine Geology and Geophysics
GSSS	Graduate School of Social Sciences	**KAZ**	Kazakhstan	**MIN**	Medical Informatics
GT	Game Technologies	**KEN**	Kenya	**MINE**	Mining Engineering
GTSS	German-Turkish Masters Social Sciences	**KOR**	South Korea	**MKD**	Macedonia
GWS	Gender and Women Studies	**KGZ**	Kyrgyzstan	**MNT**	Micro and Nanotechnology
HIST	History	**KWT**	Kuwait	**MODSIM**	Modeling and Simulation
HRDE	Human Resource Development in Education	**LBN**	Lebanon	**MNG**	Mongolia
HUN	Hungary	**LI**	Life Insurance	**MDA**	Moldavia

MAR	Morocco	**PST**	Polymer Science and Technology	**STPS**	Science and Technology Policy Studies
MOZ	Mozambique	**PSY**	Psychology	**SDN**	Sudan
MS/MA	Master of Science / Master of Art	**REST**	Restoration	**SWE**	Sweden
NDLTD	The Networked Digital Library of Theses and Dissertations	**ROU**	Romania	**SYR**	Syria
NLD	Netherlands	**RP**	Regional Planning	**TJK**	Tajikistan
NGA	Nigeria	**RUS**	Russian Federation	**TZA**	Tanzania
NOR	Norway	**SA**	Settlement Archeology	**THA**	Thailand
NZL	New Zealand	**SAN**	Social Anthropology	**TRNC**	Turkish Republic of Northern Cyprus
OAI	Open Archives Initiative	**SAU**	Saudi Arabia	**TUN**	Tunisia
OMN	Oman	**SAF**	South Africa	**TKM**	Turkmenistan
OR	Operational Research	**SC**	Scientific Computing	**UD**	Urban Design
PAK	Pakistan	**Sem. Gra. / Year Gra.**	Seminar Graduated / Year Graduated	**UGA**	Uganda
PES	Petroleum and Natural Gas Engineering	**SRB**	Serbia	**UAE**	United Arab Amirates
PETE	Petroleum and Natural Gas Engineering	**SE**	Software Engineering	**UKR**	Ukraine
PhD	Doctor of Philosophy	**SOC**	Sociology	**USA**	United States of America
PHOG	Physical Oceanography	**SOM**	Somalia	**UPL**	Urban Policy Planning and Local Government
PHL	Philippines	**SUI**	Switzerland	**UZB**	Uzbekistan
PHIL	Philosophy	**SSME**	Secondary Science and Mathematics Education	**VEN**	Venezuela
PHYS	Physics	**SPL**	Social Policy	**YEM**	Yemen
PSE	Palestine	**SLE**	Sierra Leone	**WBLS**	Work Based Learning Studies
POL	Poland	**STAT**	Statistics		

CHAPTER 1

1.1 OPENING ADDRESS

Professor Ahmet Acar
President of Middle East Technical University

Distinguished Guests, Dear Colleagues, METU Alumni, and Students,

Welcome to the symposium organized by our graduate schools to celebrate the Fifty Years of Graduate Education at Middle East Technical University. I greatly appreciate the creativity and resourcefulness of our graduate schools to put together this impressive program and to involve so many prominent people in this event. We have very eminent speakers with us today, and I am also delighted to see that our distinguished emeritus faculty members and alumni of our graduate programs have joined us for the occasion. So before I say anything else, I would like to congratulate our graduate schools for their initiative, and thank all people – administrators, academics, and administrative staff – who have worked very hard to make this event possible.

Our university started in 1956 as a novel approach to meeting the pronounced demand for well-trained "technical" experts in Turkey and neighboring countries, hence its name and the choice of English as the medium of instruction. In a very short time, METU established itself as an innovative university with effective undergraduate programs in the "technical fields", and attracted qualified and competitive students not only from Turkey but from a wide geography.

Two parallel developments shortly followed. First, METU expanded the range of its undergraduate programs to cover a much wider spectrum in engineering, natural and social sciences. Secondly, graduate programs started in the technical fields.

METU had distinguished itself on the strength of "research-based learning" in its undergraduate teaching, well before it proved itself as a graduate institution or established itself as a research-intensive university. METU undergraduates benefited from a learning environment that promoted deep learning, independent inquiry, and hands-on training. As such, METU undergraduates were *"inoculated with the research virus"* that caused so many of them to pursue further research at the graduate level. I believe the rapid development of graduate education at METU was greatly bolstered by this strong research foundation at the

undergraduate level, as our graduate programs could count on a steady stream of qualified students who were already pre-programmed to do research. The success of METU graduate programs was validated by the high numbers of international students who preferred METU, and upon graduation became leading academics and researchers in their home countries. To this day, the strong research and inquiry component of METU education, at both the undergraduate and graduate levels, continues in all fields of study, and is responsible for the high success of METU graduates in the academic and professional fields, in Turkey and abroad.

By 1990s, METU's commitment to research and graduate education was became more pronounced, and it was in line with the increasing need for faculty members and industry researchers in the country. One can see a clear correlation between the creation of new research centers and centers of excellence, increasing participation in EU research programs, and growth of the graduate programs in the 1990s and 2000s. In more than a decade, the expansion of METU's education programs has been almost exclusively at the graduate level, and more so in the interdisciplinary fields.

Today, the 169 graduate programs we offer across our three campuses far outnumber our 54 undergraduate programs. Our graduate programs have also taken the lead in the joint-degree programs we offer in collaboration with universities abroad; their share is 18 out of the total of the 22 programs in this group.

Today, based on the number of our PhD programs and diplomas we confer each year, as well as our annual research budget, METU is considered a research-intensive university by any definition of the term. METU's success in graduate education and research performance plays a major role in our well-deserved reputation and ranking in Turkey and abroad.

In this Symposium, we will listen to experiences and episodes from people who have witnessed the first years of graduate education at METU as students or academics. We will hear their accounts of how gradually, but firm-footedly, METU established itself as a "first-address" in graduate education in Turkey. Their accounts and the book entitled "METU: Fifty Years of Graduate Education" will trace the process through which METU has come to set the standards and serve as the model for other universities also in graduate education. So I will not talk in any detail about how our MS and PhD programs have grown and evolved in time.

However, I will mention a METU initiative which has made a remarkable contribution to the Turkish higher education system in the field of graduate education: the Faculty Development

Program (FDP), or ÖYP as we call it in Turkish. METU launched the ÖYP in 2001 with the financial support of the then State Planning Office (DPT), in order to train the future faculty members of the 4 collaborating Turkish universities. The network grew rapidly in time, and until today, METU accepted research assistants of 64 Turkish universities and 7 universities abroad to its PhD programs. More than 300 PhD degrees have already been granted to ÖYP participants, and currently more than 550 ÖYP candidates continue their graduate studies at METU. The exceptional success of the ÖYP has recently prompted the Higher Education Council of Turkey (YÖK) to take over from DPT as the sponsoring institution, and now the ÖYP model covers a much broader network of universities throughout Turkey.

Another METU initiative that requires mention in this context is the Industry Thesis Program, called SAN-TEZ in Turkish, which has proven to be an innovative model to bring together university, industry, and the Ministry in support of graduate education. The SAN-TEZ program has contributed, in a significant manner, to the "relevance" of MS thesis work, to the solution of real-life problems of the participating companies, and the financing of graduate theses work through cost sharing by the Ministry of Industry and participating companies. While METU still leads the nation in the number of SAN-TEZ projects, the Program has expanded in the last 5 years to provide support for graduate education in all Turkish universities.

In the more recent years as well, METU has introduced new models to support and integrate graduate education and research again, in collaboration with industry. The Researcher Development Program for Industry (RDPI), Sanayi İçin Araştırmacı Yetiştirme Programı or SAYP for short in Turkish, was initiated by METU in 2010 to form industry-wide partnerships that will train researchers in line with the needs of specific industries. The first industry-wide agreement that was signed in 2011 involved 4 large defense industry companies and 10 projects, partly sponsored the Undersecretariat for the Defense Industries. The process is underway to expand the RDPI model to energy, biomedical, and other strategic industries for METU.

Another recent METU initiative to integrate graduate education with university and industry research is the Collaboration Development Program for Research and Development Centers (CDP), Merkezler İçin İşbirliği Geliştirme Programı (MİGEP) in Turkish. MİGEP is an effective model that provides incentives for industry to collaborate with METU R&D centers and graduate programs, promotes mobility of researchers/graduate students between companies and METU R&D centers, and further integrates the related graduate programs and

R&D centers in METU. The pilot MİGEP agreement is signed in 2012 involves METU Center for Solar Energy Research and Applications (GÜNAM), and is supported by the Ministry of Development.

Our recent initiatives to support and integrate graduate education, university and industry research continue with the new TechnoThesis (TeknoTez) Program which targets deeper collaboration with the R&D companies located in the METU Technopolis. The TeknoTez Program participants – graduate students, academics, and company researchers – develop proposals for thesis work or larger projects to be financed by the Technopolis companies and outside institutions. The METU Office of Sponsored Projects (PDO) and the METU Technopolis Project Office (TPO) provide technical support in proposal preparation and management of the research projects. The TechnoThesis Program, designed in 2011, has already attracted 25 Technopolis companies, and pilots with 3 company-department partnerships will start in 2012.

I am confident that the continuing growth in graduate education at METU will turn out higher numbers of well-qualified researchers for the academia and industry, deeper collaboration with industry, and richer and more influential research setup in our University.

Today, when we look back at the past 50 years, we feel very proud of the contributions of our graduate programs, and the impact that our graduates have made in their fields. We follow the success stories of our alumni in academe and industry. So many of them have become key figures in academic institutions, and still others have assumed leadership positions in industry throughout the world.

We owe the success of graduate education at METU to so many people throughout these 50 years. Our faculty members, academic leaders, administrative and technical staff, students, and alumni have worked hard and contributed to our graduate programs and graduate schools. I know that only some of these notable people will be recognized in this Symposium. I wish to express our deepest gratitude to all who have contributed to METU's successful 50-year journey in graduate programs.

Once again, I congratulate the Graduate Schools of Natural and Applied Sciences, Social Sciences, Marine Sciences, Informatics and Applied Mathematics for organizing this Symposium, and thank you all for participating in this remarkable event.

1.2 PLENARY LECTURE-1

Political Science and Social Sciences: Evolution, Influences, Debates, Innovation

Professor Leonardo Morlino
President
International Political Science Association

If we go back to the period from the end of World War Two to the date we can identify the changes taking place in political science, the influences of the other disciplines, the contemporary debates, and also discussing an important question such as how is innovation possible in social science. Here we will deal with these topics in sequence.

Evolution of Political Science

When looking at the period after World War II, the basic difference in the traditions of different countries and areas of the world is between a plural form (political sciences) that is more common in Europe and encompasses the singular (political science). Conversely, in the tradition of United States the singular form (political science) includes the plural (political sciences). In the singular, there is a pluralist political science where empirical analysis is dominant, but also other perspectives (law, history, philosophy) are present. However, be it plural or singular, during the last decades empirical political science has increasingly differentiates itself from sociology, and above all from political sociology, public law, political philosophy and contemporary history. Actually, in these developments we can see differences among disciplines or, more precisely, among specific groups of scholars in specific countries, but also overlapping and mutual influences with ever stronger interactions among scholars who are able to cross borders from Europe to North and South America, and to Africa and Asia, with a strong British tradition still present in Australia.

When we trace the original development of empirical political science, we can see that in a large number of European and American countries, political science is the result of empirical developments in public law. Consequently, the first difference concerns the difference between the perspective of law, which deals with “what ought to be”—with norms and the institutions that seek to embody them, and that of political science as transformed by

behavioralism into an empirical social science, which is focused on "what is"—on the reality and on the explanations of it.

In Europe as well as in North and South America, there are other strong traditions that make contemporary history a parent of the new, post-World War II empirical political science. Here, despite all its ambiguities, the criterion of differentiation is between historical idiographic research, focused on the analysis of specific unique events, and a political science characterized by epistemological and methodological assumptions of other social sciences such as economics, sociology, and psychology, at least in terms of expectations of empirical findings (nomothetic) with a more general scope (regularities, patterns, laws). Social history and historical sociology as in the works of Reinhard Bendix, Barrington Moore, Stein Rokkan, Charles Tilly and others have also greatly contributed to our understanding of long-term political processes at the macro-level. In this respect historical studies and political analysis can nicely supplement each other, as in the adage "Political science without history has no root, history without political science bears no fruit."

Within the European and North American traditions, sociology is the third parent of the new empirical science. Here, in addition to the common epistemology and possibly methodology of research, the overlapping of the contents, when political sociology is considered, makes the differentiation more difficult. Such a criterion was set up by two famous sociologists of the 1950s, Bendix and Seymour Lipset, when they stated that political science starts from the state and analyzes how it influences society, whereas political sociology starts from the society and analyzes how it influences the state (Bendix&Lipset, 1957, p. 87). In other words, the independent variables of a sociologist are the dependent variables of a political scientist: The arrows of explanation are going in opposite directions. Such a distinction sounds artificial and unrealistic when the inner logic of research is taken into account—if we decide in advance what is/are the independent variable/s, how can we stop when no salient results come out and declare that from now on one becomes a sociologist or economist or else? Nevertheless, for years such a distinction was the rule of thumb used to stress the difference between political sociology and political science. However, such a rule was responding more to the necessities of differentiation between academic communities than to the needs of developments in empirical research. It must also be noted that political sociology can be understood in both a broad and a narrow sense. In the former, it covers the broad social-structural and political-cultural bases of politics and their long-term developments over time at the macro level. In the latter, the intermediate and input structures of politics like interest

groups, parties, social movements and other aspects of civil society are dealt with. These, undoubtedly, belong more to the realm of political science proper and have continued to flourish. In the former sense, closer to historical sociology, a certain slackening can be observed. This is due to the fact that the consideration of long-term social-structural developments had rigidified to some extent in the 1970s and 1980s in variants of orthodox Marxism, or the political element had largely disappeared in the analysis of finer social distinctions in Pierre Bourdieu's sense.

Last but not least, the development of differences between political philosophy and political science should be recalled. Again, there is much overlapping of contents, but epistemology and methods are different and easy to distinguish. As recalled by Giovanni Sartori (1984) with regard to the "language watershed," first of all, the language is different: The words and the related empirical concepts of political science are operationalized, that is, translated into indicators and, when possible, in measures, whereas the language of political philosophy is not necessarily so; it usually adopts meta-observed concepts, that is, concepts that are not empirically translated.

As discussed in the next section, this apparently simple differentiation covers possible commonalities, but leaves unsolved how the two different disciplinary perspectives deal with normative issues. Norberto Bobbio (1971, pp. 367, 370) made a relevant contribution in this direction when he emphasized that political philosophy focuses mainly on the search for the best government; the search for the foundations of the state or the justification of political obligations; the search for the 'nature' of politics or of 'politicness'; and the analysis of political language. All four topics have an ethical, normative content, which is a characterizing feature of each political philosophical activity. At the same time, Bobbio recalls that an empirical analysis of political phenomena that are the objects of political science should satisfy three conditions: the principle of empirical control as the main criterion of validity; explanation as the main goal; and *Wertfreiheit*, or freedom from values, as the main virtue of a political scientist. As noted in the discussion of epistemology above, the key element is in differentiating the speculative, ethically bound activity of a philosopher from the empirical analysis, even of phenomena that are influenced by the values of the actors.

Influences of Other Disciplines

The obvious conclusion of the previous subsection is that there are different ways of analyzing political phenomena that correspond to different traditions and come from different cultural influences. Moreover, the discussion of those differences may help in developing a

negative identity of political science. This is the very first meaning of the actual pluralism we have in this domain of knowledge: pluralism only means that politics can be legitimately studied in different ways and with different goals that belong, at least, also to law, history, sociology, and economics. Pluralism in this sense challenges the autonomy of political science and even, in a radical version, has led to a denial that it constitutes a specific science. This view, however, no longer corresponds to the internal differentiation of the discipline, its specific achievements, and its more general institutionalization as an academic field. In addition, a second sort of pluralism inside political science proper reveals the overlapping and the influences of other disciplines in empirical political science. In this vein, when again considering the period starting after World War II, a main hypothesis can be proposed: political science is influenced by the discipline or the other social science that in the immediately previous years has developed new salient knowledge. This is so for sociology, as can be seen in the analysis of Lipset and Bendix and other important authors since the end of World War II, who developed the work of classic sociologists, from Weber and Durkheim to Parsons and others. This is so for the influence of general systems theory, coming from cybernetics, and translated meaningfully into the analysis of political systems **so** that since the mid-1950s, it has become a major approach in political science. The same applies to the influence of functionalism, born with the developments of anthropology, and to rational choice or more specifically game theory, coming from economics and becoming more and more influential with several adaptations since the end of the 1950s. This is so, finally, for cognitive psychology that became very important in economics and at the same time in political science with the development of new ways of studying electoral behavior.

Moreover, when we consider more closely some of the sub-sectors of political science we can see more specific influences. For example, in the field of international relations, we can see the influence of international law. The public policies sector of political science has been influenced by sociology, economics and constitutional and administrative law. Sociology has shaped the development of research on political communication. The influence of history can be seen in the selection of specific topics in comparative politics. Thus, we see that political science not only embodies a highly developed pluralism of the two kinds mentioned above, but also requires the integration of knowledge from other disciplines. Political scientists therefore also need an educational background that enables them to draw on these interdisciplinary sources of the field.

Current Debates and Innovation

With respect to the ways that pluralism and inter-disciplinary developments have taken place in political science, the North American influence has been paramount. The so-called Americanization affected all of Europe as well as other areas of the world where native scholars, educated in North American universities, went back to conduct research and to teach, bringing a new empirical conception of the discipline that significantly contributed to create new communities of political scientists (Favre, 1985, pp. 4–7). Moreover, American foundations and research centers gave support for research in Europe, Latin America, Asia and Africa. While there are differences in political science as it exists today on different continents in this domain of knowledge—and actually also in most other scientific research domains—the North American universities, as well as the American research centers and the scholars associated with them, had a great influence that can be compared only to the intellectual German influence during the fifty years between the end of the 19th century and the first three decades of the 20th century. Thus, at the end of the 1960s, Mackenzie (1969, p. 59) suggested that in this period 90% of political scientists worked in North America, and Klaus von Beyme noted that the Department of Political Science at the University of California at Berkeley had more professors in this field than all German universities combined. Moreover, in those years and earlier in the 1950s in all European countries and in Japan, the American influence had been very strong in all social sciences, with some exceptions such as anthropology, which had a specific French presence. Forty years later, 70% of all political scientists are almost equally present in North America and Western Europe and the other 30% are spread throughout the rest of world, again with a relatively strong presence in Japan.

To better understand the development of the discipline all over the world with its specific contents, approaches, and methods, we should note that the American influence has been supplemented by the great increase of faculty members in all universities of the world since the 1960s. During this period, especially in Europe, there was the so-called transition from elite universities to mass universities; that is, there was a significant growth in the number of university students, which required the recruitment of a large number of new faculty members in all disciplines, political science included. This growth of the discipline allowed the creation of academic groups who absorbed and translated the American influence in different ways. Without that internal growth, there would not have been even the possibility of such a widespread influence.

This penetrating influence had a different impact in the various countries also in connection with their respective traditions. More precisely, on the one hand, the influence of the way empirical research is developed through quantitative statistical analysis and qualitative research is general and fairly homogeneously widespread; but, on the other hand, some approaches that have a stronger correspondence or congruence in the European and Japanese traditions, such as the different neo-institutionalist approaches, have had more success than other approaches, such as the rational choice approach. That latter has become very strong in North American political science, where it has its roots in economics, but it has remained much weaker among political scientists in other areas of the world. By its very nature, political science in other regions of the world also has been more specifically historical and comparative rather than just focusing (mostly) on a single case, the United States. Moreover, the legal traditions of several European countries especially influenced research in the subfield of public policies. At the same time, traditions in political philosophy and contemporary history maintained some influence on research that was predominantly qualitative rather than quantitative. Finally, and more specifically in Europe, research funding from the European Union led to the development of a number of works focused on topics related to the Union.

In the most recent developments, the impact of a more continuous and effective communication among scholars through different modalities, such as domestic and international collective associations, research networks, and initiatives of private and public institutions, affected the discipline as a whole mainly in three directions. The first one is a growing trend toward blurring national differences and a consequent convergence between North America, or between North and South America, and Europe. The second is an increased blurring of sub-disciplinary divides. This is so especially between comparative politics and international relations, traditionally two separate fields in the past. Such a trend is particularly evident in the European studies. Third, research in political science more and more focuses on relevant, contemporary realities rather than confining itself to an ivory tower, which made it distant and largely irrelevant and, consequently, created that ‘tragedy of political science’ Ricci singled out years ago (1987).

Contemporary political science thus has developed into a multi-faceted, well-established discipline that is concerned with the pressing problems of our times and provides sound empirical analyses and meaningful orientation in the ever more integrated and complex world of the 21st century. In this field as well as in other fields the scientific innovation is mainly

either the result of research on new events and phenomena as it can be seen when analyzing in closer way the sub-field of comparative politics or the result of looking in a different perspective old phenomena, as happened in economics with the influence of cognitive psychology.

1.3 PLENARY LECTURE-2

Trends and Approaches in Graduate Education in the 21st Century – USA Perspective

Professor Yaman Yener
Northeastern University, USA

Introduction

This talk illustrates the current trends in the graduate education system in the United States, including many of the factors that determine its magnitude and directions, especially in sciences and engineering (S&E). The information presented, however, is only illustrative, for the graduate-education enterprise in the United States is exceedingly complex. It is diverse, decentralized, no two institutions are exactly alike, and the scene is continually and rapidly changing in detail.

Undergraduate education is important to the creation of a stable economy, providing students with foundational knowledge and work skills and offering graduates a wide range of employment options. Graduate education, on the other hand, goes beyond just providing students with advanced knowledge and skills - it also further develops critical thinking skills and produces innovators. These individuals are and will be in the forefront of addressing current grand challenges faced in the areas of healthcare, energy independence, climate change, cyber security, human/social systems, and the financial sector, as well as new challenges that cannot even be imagined today.

In the United States, policymakers, institutions of higher education, and business leaders all have a stake in the process of producing well-prepared graduate degree holders. Because of the diversity of missions and agencies participating in higher education, any important changes require cooperative efforts based on a shared understanding. In S&E, for example, there are many independent participants, including more than 600 public and private universities and colleges which offer master's or doctoral degrees, scientific and engineering societies which help to define what scientists and engineers should know and do, the federal government which supports research and education, state governments, accreditation bodies, philanthropic organizations, the Council of Graduate Schools, the Association of American Universities, and the National Association of State Universities and Land Grant Colleges.

History

Graduate education in the U.S., as a formal education beyond the baccalaureate, has a long history. Its roots predate by more than a century the formation of the Nation. There are four significant phases in its development.

- In 1642 Harvard awarded the first baccalaureate degree and established the requirements for the master's or 2nd degree. This degree continued the medieval traditions of Europe, and especially those of England. By the middle of the 18th century, however, this degree began to lose its scholarly significance, and for the next hundred years or so the award of the degree became largely a formality and frequently honorary.

- As early as 1786, there were many efforts to establish a university, as distinct from a college. These included proposals (*a*) to develop state systems of public education, including both universities and colleges, and (*b*) by many individuals to stimulate reforms in existing colleges by the establishment of graduate divisions. These movements ultimately succeeded. In 1816, the Virginia legislature passed a resolution for the establishment of the University Virginia.

- During the 19th century about 10 000 students went to Europe, especially to Germany, for graduate education. Partly in response to growing demand for graduate education, many colleges finally started graduate programs. The characteristic structure became a German type of university formed as a super structure on an English type of undergraduate college. The Doctor of Philosophy (PhD) degree, first awarded in the U.S. in 1861 by Yale, represented the formal adoption of the German degree. Parallel to the growth of doctoral programs, the master's degree again began to represent the successful completion of formal programs of graduate education.

- The most recent phase of graduate education began with the expansion of federal support in the S&E education and research during and after World War II by the establishment of the Office of Naval Research (ONR) in 1946 and the National Science Foundation (NSF) in 1950. Federal funding of the S&E education and research grew rapidly in the late 1950's after the launching of Sputnik in 1957 and passage of the National Defense Education Act in 1958.

Enrollment

The number of students enrolled in graduate education has increased steadily since the formation of graduate institutions in the 19th century. An average 2% annual increase in total graduate enrollment occurred during the most recent decades. Most bachelor's degrees recipients, however, still do not go to graduate schools. For example, only about one quarter of students receiving an undergraduate degree in 1992–1993 had earned a graduate degree, either master's (20%) or doctorate (2%), or a first professional degree (4%) 10 years later.

The composition of graduate students has also been changing, resulting in more diverse campuses. Since the mid-1980s, the number of women in graduate schools has continued to exceed the number of men. In 2008, for example, women represented 59% of the first-time 428 000 graduate enrollment across all fields. This is mostly due to the large number of women pursuing master's degrees, particularly in the education field. Women currently comprise also the vast majority of graduate student enrollment in health sciences, and public administration, but only a third in the physical sciences and less than a quarter in engineering. Beginning in 1998, an average annual increase of about 4% was also seen for all underrepresented minority groups enrolling in graduate schools, while non-Hispanic white student enrollment stayed relatively flat.

In fall 2009, there were 611 600 S&E graduate students enrolled in the United States; 48% of them were women. The proportions of S&E women graduate students differed considerably by field, with the lowest proportions in engineering (22%), computer sciences (26%), and physical sciences (33%). On the other hand, women constituted the majority of graduate students in psychology (76%), life sciences (76%), biological sciences (57%), and social sciences (54%). Among the social sciences, economics had an unusually low proportion of women (37%). The same year minority students accounted for 12% of students enrolled in graduate S&E programs. As a group, they made up 6%–7% of graduate enrollment in many S&E fields (engineering; mathematics; physical sciences; and computer sciences), 9%–10% of graduate enrollment in biological sciences, 15% in life sciences, 17% in social sciences, and 19% in psychology. Whites accounted for about 48% of S&E graduate enrollment in 2009.

Growth in the number of graduate students also has not been uniform across fields. Enrollments in science and engineering started to decline in the mid-1990s, but have been

consistently rising in the 21st century and are now at an all-time high. Most of this growth has resulted from the enrollment of international students, with modest growth for minority students and slight declines for non-Hispanic white men and women. Enrollment in engineering has been rising steadily in the last 20 years; the number of full-time engineering students reached a new peak of 114 600 in 2009. Approximately, 130 000 full-time students were enrolled for the first time in S&E graduate programs in 2009 - 23% in engineering, 49% in the natural sciences, and 27% in the social and behavioral sciences.

In 2009, 168 900 foreign students were enrolled in S&E graduate programs - about 60% of all foreign graduate students. The concentration of foreign student enrollment was highest in computer sciences, engineering, physical sciences, mathematics, and economics. India and China accounted for nearly two-thirds of the foreign S&E graduates in November 2010. South Korea, Taiwan, and Turkey also sent large numbers of S&E graduate students, although South Korea and Taiwan sent far larger numbers of graduate students in non-S&E fields (primarily business and humanities).

The number of "traditional" students who typically apply to graduate school within a few years of receiving an undergraduate degree is decreasing. But, other types of "nontraditional" students are appearing on the horizon. A growing number of "nontraditional" students are older, engage in work, family, and school activities at the same time, and view graduate education as a means of changing or improving their employability. There also is a growing trend to return to graduate school after having spent time in the workforce. The current economy certainly contributes to this trend; a growing number of "career changers" or laid-off workers are looking to graduate education in hopes that an advanced degree will ensure continued employability and/or career advancement. To that end, employer-supported education benefits are very common.

Graduate Degrees

Master's-level education has been experiencing growth over the past decade, with a 31% increase in the number of engineering master's degrees and a 22% increase in social science master's degrees. Overall, many more master's degrees are awarded than doctoral degrees in the U.S. For example, 10 times the number of master's degrees were awarded compared to doctoral degrees in 2007.

Master's degree as a terminal degree is much more common in some fields than in others. In other fields, master's degrees are a step toward doctoral degrees. For example, about a quarter of the students with bachelor's degrees in education earned master's degrees within 10 years, but only 1% went on to earn a doctoral degree. The same is true for students with bachelor's degrees in engineering: About one quarter earned a master's degree within 10 years, but only 3% earned a doctoral degree. However, the picture is different in the natural sciences and mathematics fields where 19% of the students received a master's degree and 9% earned a doctoral degree.

Master's degree recipients also vary by gender as well as by ethnicity and race. For example, women accounted for 68% of the growth in master's degrees and 84% of the growth in doctorates. Despite this increase, in 2005 women received 60% of master's degrees but less than half of doctoral degrees. Given the continued growth of women in graduate schools, the graduate degree attainment rate for women could surpass that of men in the future.

Many master's programs have moved away from having an arts and science focus and became professional programs. Professional master's degree programs, which stress interdisciplinary training and prepare students for careers in business, government, and nonprofit organizations, are a relatively new direction in graduate education. This shift is one of the major factors contributing to the rapid growth in master's-level programs.

Master's degrees awarded in the S&E fields increased from 96 200 in 2000 to about 120 900 in 2005, remained fairly consistent through 2007, but increased 12% in the years 2008–09. Since 2000, increases occurred in all major science fields. Master's degrees in engineering and computer sciences declined between 2004 and 2007, but have since increased. While the number of S&E master's degrees earned by both men and women rose between 2000 and 2009, the number for women grew slightly faster. In 2000, women earned 43% of all S&E master's degrees; by 2009, they earned 45%.

Women's share of S&E master's degrees varies by field. In 2009, women earned a majority of master's degrees in psychology, biological sciences, and social sciences and a smaller share of master's degrees in engineering. The number of master's degrees awarded to women in most major S&E fields increased fairly consistently throughout the last decade. In computer

sciences, the numbers increased through 2004, declined sharply through 2007, but increased 14% in the years 2008–09.

In 2009, foreign students earned 27% of S&E master's degrees. Their degrees were mostly in computer sciences (46%), economics (45%), and engineering (43%). The number of S&E master's degrees earned by foreign students reached 36 000 in 2009, after a sharp decline between 2004 and 2007.

Doctoral education prepares a new generation of faculty and researchers in academia, as well as a highly skilled workforce for other sectors of the economy. It also generates new knowledge important for the society as a whole and for U.S. competitiveness in a global knowledge based economy.

The number of S&E doctorates awarded annually increased rapidly between 2003 and 2007, but growth slowed in 2008, and the number declined slightly to 41 100 in 2009. The largest increases during the 2000–09 period were in engineering, biological sciences, and life sciences.

The number of S&E doctoral degrees earned by U.S. citizen and permanent resident women grew faster than that of men. The number of women earning doctorates in S&E increased from 8 700 in 2000 to 15 000 in 2009, while the number earned by men increased from 10 700 to 12 800 in the same time period. In 2009, women earned half or more of doctorates in non-S&E fields, in social sciences, and in life sciences. However, they earned considerably fewer doctorates degrees in physical sciences (33%), mathematics/computer sciences (26%), and engineering (25%). A decrease in the number of doctorates earned by men in the early years of the last decade occurred in non-S&E fields and in most S&E fields. Since 2005, the number of doctorates earned by men has increased in all major S&E fields.

The number and proportion of doctoral degrees in S&E fields earned by underrepresented minorities increased between 2000 and 2009. They accounted for 7% of all S&E doctoral degrees earned in 2009, up from 6% in 2000.

Foreign students earned approximately 13 400 S&E doctoral degrees in 2009, up from 8 500 in 2000. In some fields, foreign students earned sizeable shares of doctoral degrees. In 2009,

they earned half or more of doctoral degrees awarded in engineering, physics, computer sciences, and economics.

The time required to earn a doctoral degree and the success rates of those entering doctoral programs are concerns for those pursuing a degree, the universities awarding the degree, and the agencies and organizations funding graduate study. Time to degree (as measured by time from graduate school entry to doctorate receipt) increased through the mid-1990s but has since decreased in all S&E fields from 7.7 to 7.0 years. The physical sciences, mathematics, biological sciences, and engineering had the shortest time to degree, while the social sciences and life sciences had the longest.

The vast majority of students entering graduate programs fail to complete a degree, which is a serious problem in generating the number of doctoral programs. Some estimates indicate that the attrition rate in doctoral education is in the range of 40% to 50%. In particular, for a majority of students, financial support is the most significant factor contributing to the ability to complete the doctoral degree. Even among doctoral students who are awarded very competitive graduate research fellowships, such as those from the Graduate Research Fellowship Program of NSF, the dropout rate is still a problem, being about 25% among this rigorously selected set of students.

Financial Support for S&E Graduate Education

More than one-third of all S&E graduate students are primarily self-supporting (37%). The other two-thirds receive primary financial support from a variety of sources, including the federal government, state funds, university sources, employers, nonprofit organizations, and foreign governments. Other than self-support, other support mechanisms include research assistantships (RAs), teaching assistantships (TAs), fellowships, and traineeships.

In 2009, 27% of full-time S&E graduate students were supported primarily by RAs, 18% were supported primarily through TAs, and 12% relied primarily on fellowships or traineeships. Most federal financial support is in the form of RAs funded through grants to universities for academic research. The National Institutes of Health (NIH) and NSF support most of the full-time S&E graduate students whose primary support comes from the federal

government. In 2009, these institutions supported about 26 400 and 21 600 students, respectively.

Workforce

Master's degrees recipients have traditionally worked outside of the university, and doctoral recipients have generally taken positions within academia. But, about half of the doctoral recipients recently obtained jobs outside of the academy, but the percentages vary widely by field (85% from engineering, 66% from physical sciences, and 38% from social sciences). Since 1980s, the U.S. economy has shifted to a knowledge-based economy favoring more educated and academically skilled workers. This trend is expected to continue, with growth in jobs in service-providing industries and fewer jobs in the goods-producing sectors of the economy. More and more workers will be asked to *think* rather than *produce* in the traditional manner of manufacturing industries of the past. By 2018, it is projected that the number of jobs requiring a master's degree will increase by about 18% and those requiring a doctoral degree by about 17%. The largest projected growth of jobs is expected to be in the healthcare and social assistance industry, followed by professional, scientific, and technical service industries.

International Competition

For many years the U.S. has been the world's dominant nation in attracting international students for graduate programs. The proportion international doctoral students make up 24% of the total graduate population. In 2004–2005 over 100 000 international students were enrolled in doctoral programs in the US; the United Kingdom's total as the next closest country was about 20 000.

The dominant position of U.S. graduate education is now threatened as the rest of the world rapidly catches up. Increasingly, many countries around the world have come to regard movement toward a knowledge-based economy as key to economic progress. Realizing that this requires a well-trained workforce, they have invested in upgrading and expanding their higher education systems and broadening participation.

In 1999, 29 European countries initiated a system of reforms in higher education to achieve common standards and promote student mobility among the member nations with the Bologna Declaration. Most likely driven by this initiative, the number of international

students in EU countries increased, preserving their lead share at 39.1% by 2006. The number of international students in the U.S. also increased, but the U.S. share dropped to 20% from 25.1% in 2000. Also, other countries, such as China and India, are investing substantially in improving their graduate education systems and in the undergraduate programs that feed those graduate programs. Within China, for example, approximately 5 000 S&E doctoral degrees were awarded in 1997, and by 2004 this number had grown to 13 000. The number of international students in China now exceeds the number of Chinese undergraduate and graduate students sent abroad. The growing competition points to the need for changes in U.S. graduate education so that the U.S. does not fall behind in its production of graduate degree recipients.

The Path Forward

The U.S. system of graduate education faces considerable internal challenges, as well as a number of external challenges:

- Many bachelor degree recipients who have the potential to obtain a graduate degree never enroll in a graduate program, and many who do enroll leave without a degree. Especially, the rates at which students leave doctoral programs remain a national problem.
- Adequate financial support is critical if the number of successful graduates is to increase.
- The average time to complete a doctoral degree has increased.
- The numbers of international students enrolled in the U.S. graduate institutions continues to decline as opportunities for quality education in their home countries increase.
- New research and development needs have been arising in emerging production, service, and information enterprises. The increasing rate of change in job opportunities suggests a need for scientists and engineers with graduate degrees who can readily adapt to continuing changes.

Such challenges present real threats to the dominant position of the U.S. in graduate education and the knowledge economy. Time has come for major participants – universities, government, industry, and foundations – to come together to discuss these issues.

References

1. *Science and Engineering Indicators 2012,* NSB 12-01. NSF, 2012.

2. *Graduate Students and Post doctorates in Science and Engineering: Fall 2009*, NSF 12-300, 2011.
3. *The Path Forward: The Future of Graduate Education in the United States.* Princeton, NJ: Educational Testing Service, 2010.
4. *InfoBrief*, NSF 10320, 2010.
5. *Doctorate Recipients from U.S. Universities: 2009*, NSF 11-306, 2010.
6. *Reshaping the Graduate Education of Scientist and Engineers*, NAE Press, Wash., D.C., 1995.
7. Bound, J., Turner, S. and Walsh, *Internationalization of U.S. Doctorate Education*, Report 09-675, Population Studies Center, Univ. of Michigan, 2009.
8. *Graduate Education – Parameters for Public Policy*, NSB-69-2, NSF, 1969

1.4 MESSAGES

In this section messages of the former Deans of Graduate Schools are given together with the messages of two of our international partners.

1.4.1 Messages of the Former Deans

Graduate School of Natural and Applied Sciences

Professor Polat Gülkan (1981-1981)

When, fifty years ago, the first graduate students received their degrees at METU few people were aware of the fundamental significance of the event. These students were required to focus on a topic that had been relatively unexplored, and the study they presented to the graduate division represented work that was in some way, however modest, novel. In the engineering fields there were indeed degrees equivalent to the Masters title, and students did perform work that (retrospectively) were called theses, this was no more than a graduation exercise that examined some problem in a rote way. A professional, new ground-breaking graduate thesis written in the scholarly fashion was a METU-inspired novelty.

Professor Bilgin Kaftanoğlu (1984-87)

My thoughts about 50 Years of Graduate Research in METU,

I feel very lucky to be one of the first students entering the Mechanical Engineering Department of our University at its first year in 1956 after being successful in the entrance examinations. When I graduated in 1960 as a student with the highest grade point average, I received a special prize from the President of METU, Prof. Dr. W. H. Woolrich. Following this, I was encouraged to continue my graduate research at Imperial College of Science and Technology, University of London, by my distinguished instructors and the Dean of Engineering, Prof. Dr. Mustafa N. Parlar. When I received the highest grade point average in the graduate class of the Mechanical Engineering Department of Imperial College, rated among the top ten universities of the world, I was directly accepted to the PhD program. This is a good indication of the academic standards of METU even in its first years. We, as

students of METU in those years, were always encouraged by our distinguished instructors to learn, to do research, and be productive.

After having completed my PhD at Imperial College and teaching and research experiences in U.K. and Canada, I returned to METU in 1969 as an Assistant Professor. As a faculty member and later as Chairman and Head of Research Centers at METU, I always promoted high quality education, research and industrial applications.

After having completed a sabbatical leave in a US University for two years, in 1984, I was appointed as the Director of the Graduate School of Natural and Applied Sciences in METU. I promoted interdisciplinary research at the Graduate School with more than 35 graduate programs, thinking that it will enhance the research capability of the University. I supported the projects of the Energy Group and the newly founded High Technology Group. Faculty members in these groups, worked in interdisciplinary projects and graduate students made important contributions. We had increased our international relations. We started international projects where our graduate students took part.

The 21st century is a century of science and technology. METU should continue the tradition of research and application to industry, without any hesitation and even with an accelerated motivation. To spread the research culture to undergraduate students can be a new perspective. To increase the research partnership with universities and industries at home and abroad, to encourage alumni to take part in these activities, to develop our research network should be among the objectives. To open new avenues for research partnership with developing countries such as Pakistan will help our prestige in the world.

METU, taking its rightful place among the best 100 universities of the world in 2012, should provide a good motivation for the faculty members, students and alumni to work together to reach new horizons and achievements!

Professor Halim Doğrusöz (1987-1988)

My Concern in Graduate Education"My Concern in Graduate Education"

My work at METU was overwhelmingly in Graduate Studies. I have started my work at METU with the founding '**Graduate Preprogram in Operational Research**" in 1965. I have also chaired this preprogram. Later in all my positions (including administrative positions) I have continued to work in Graduate Studies. In my opinion the main aim of graduate education is to train the competent researchers of the future. The courses offered and the

theses written are no doubt the fundamentals of this education. But they are not sufficient to train researchers. A candidate researcher should mature in research efforts related to **real life problems**. That is why there must be a research unit focused on this and the candidates must be put to work there. This is a basic part of "**Operational Research**" and my field of interest. The Operational Research is responsible for the problems of the social systems. Parallel to establishing the **Graduate Program of Operational Research** at METU we also have founded the **TÜBİTAK Operational Research Unit** which shared some of the support to the program. Later, TÜBİTAK management decided to move the unit to a research institute in Gebze and we have established the **Research Institute of System Sciences** (SİBAREN).

Although it is not as necessary in other fields of graduate education, they also could have benefited from the same organizational changes. During my tenure as **Vice President** responsible for research in 1971 we also have developed **Regulations for Applied Research** and we have included the same mission in these regulations. There were 18 research unit established according to these regulations. Also other graduate programs received support in the same regard. Unfortunately, the Council of Higher Education's (YÖK) laws disrupted these developments.

Professor İsmal Tosun (1993-1996)

Graduate education enables students to think critically and creatively in solving challenges that confront them. To cope with problems of the future, we must engage in research. Maintaining strong and dynamic graduate education is imperative to stay competitive in today's knowledge-based global economy.

Professor Tayfur Öztürk (1996-2003)

Graduate education has the ability to combine all three; *research, teaching and public service* into a *single* activity.

Graduate School of Social Sciences

Professor Haluk Kasnakoğlu (1993-1994)

I believe that METU has completed its mission regarding the undergraduate education and now it should accelerate the pace by which it is improving the quality of its graduate education, especially its PhD programs. This change should be reflected in the number of students as well as in the distribution of funds.

Today, only twenty per cent of METU's student population is pursuing a Master's degree and only five per cent of students are PhD students. The numbers of students who have graduated are also similar to these percentages (twenty per cent and ten per cent, respectively). On the other hand, more than half of the students in the top ten universities in the world, such as MIT and Harvard, are either Masters or PhD students and these are the universities whose quality levels we set ourselves as targets.

As we emphasize the importance of graduate education, we may especially focus on the field of social sciences since there is a high demand for academics working in this field in Turkey. Also, we may contemplate on designing solidarity networks among the academic staff in Ankara and joint programs with other Ankara universities in order to build strong PhD programs.

Professor Sencer Ayata (2003-2010)

METU GSSS is seen as one of the most prominent institutions in the country in the field of graduate education and research in social sciences. Having been the Dean of METU GSSS for two tenure periods is a source of pride for me. In my years of tenure we have focused on the objective of improving the international character, international collaborations and international reputation of the GSSS. Our work in this regard can be summarized under three headings: 1) to establish long term and institutional collaborations with the leadings research and education institutions in the world; 2) to increase the number and quality of the area studies programs and centers in order to provide Turkey with accurate and reliable knowledge of global developments; 3) to increase the number of educational partnerships especially in the fields of the dual degrees and exchange programs. Within this framework, many new institutes and programs were established, which included Asia Studies, Latin and North American Studies, German-Turkish Masters in Social Sciences, Area Studies PhD Program and Confucius Institute. As a result of these developments, we observed a rise in the international activities of both our faculty members and our students which was a source of joy for us. As a result of these activities, there was also a significant rise in the numbers of joint research projects and joint publications. Many students were granted scholarships and found the opportunity to continue their academic work abroad.

A second field of focus was to create an institutional structure that would help in improving our understanding of the social problems of our country and in suggesting solutions to these problems. The best examples of the interdisciplinary programs that were founded with this specific purpose are Social Policy Program and Migration Research Group. During my tenure as the Dean of GSSS my primary aim was to create solid institutional infrastructure around these two main topics.

Today, the opportunities for international collaborations are rapidly increasing and the scientific field is becoming more and more transnational every day. I have full confidence that GSSS will continue to contribute greatly to Turkey's efforts of becoming one of the most prominent knowledge economies and to achieve greater success in the global competition.

Graduate School of Marine Sciences

Professor İlkay Salihoğlu, (1998-2003)

Among others, one of the important missions of IMS-METU is to promote a multidisciplinary education and research in ocean and atmospheric sciences in an innovative fashion. Throughout the history of the Institute of Marine Sciences this has been achieved fabulously leading to a good reputation both among the national and the international scientific community. The accomplishments of the Institute have changed the oceanographic understanding of the country. The decision making authorities also appreciated this reality and recently funded the METU-Center for Marine Ecosystem and Climate Research (DEKOSİM). All these factors point out to a clear future for the ocean and atmospheric sciences at METU.

Associate Professor Şükrü Turan Beşiktepe, (2003-2007)

IMS-METU gained global recognition in excellence in oceanography through evolving from a local research institute and graduate school to a regional leader. We engage with scientists, institutes, international agencies, governmental bodies, industry and non-governmental organizations throughout the world to address critical issues like climate change, water quality, ecosystem management and conservation, and other issues in marine environment. Participation in large scale projects and success in carrying out world class research attracts students and scientists to study and work in and with IMS-METU.

Professor Ferit Bingel, (2007-2012)

In 2011, an infrastructure project was funded by DPT which was supported through the contributions of the university administration. With this project, DEKOSIM (Marine Ecosystems and Climate Research Centre), expertise in climate, environment and the earth sciences will be built. In this way, the ability to create new projects and also to improve the infrastructure of the institute will provide the institute with more academic staff and students.

I hope the institute will continue to contribute to the highest level of prosperity and health, be successful in of all its endeavors, to pioneer the concept of marine science and to pursue the development of our country in both culture and thought.

Graduate School of Informatics

Professor Neşe Yalabık (1996-2005)

METU Graduate School of Informatics Institute was established in 1996 with the purpose of developing interdisciplinary graduate programs intersecting the area of informatics.

The Institute, whose first programs were 'Information Systems' and 'Cognitive Science', aims to support interdisciplinary research about these areas. For accomplishing these aims, it provides support to interdisciplinary projects; brings together academicians and experts from different disciplines in the educational field. The institute, having 50 students enrolled in its programs at its first years, started many new interdisciplinary programs later on. In addition, while being the pioneer on e-learning studies, the first online master program (Informatics Online) in Turkey was initiated by the Institute.

Besides, the institute was the forerunner of promotion, development and application of e-learning programs within METU and at YÖK. The educational platform developed in the Institute, METU Online is still used frequently by students and academicians. Each semester around 3 000 students are registered in the platforms on the basis of classes. Graduate School of Informatics Institute has accomplished its mission with nine Masters and three doctorate programs, 566 students, 500 graduates, 23 full-time and many part-time faculty members from different departments. It contributes enormously to graduate programs in METU by teaching %7 of the total number of graduate students (7 800).

Graduate School of Applied Mathematics

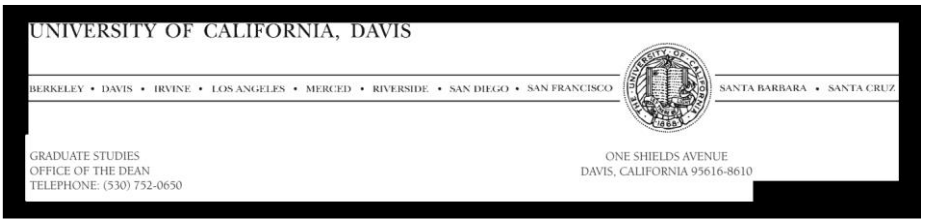
Professor Aydın Aytuna (2002–2005)

The Institute of Applied Mathematics was founded in August 2002 with the following motto: "mathematics is the common language for a better understanding of nature, technology, and economy". Graduate programs of the Institute attracted tremendous interest from the students, researchers and practitioners from the industry. Within the first month of its founding, the number of applications to the graduate programs was well over one hundred.

Professor Ersan Akyıldız (2005-2012)

By means of the projects undertaken by the Institute of Applied Mathematics, I not only had the opportunity to see how mathematics is used to solve industry and technology problems, but also observed how those problems enrich the purely theoretical areas of mathematics

1.4.3 Messages of METU Graduate Studies Partners



May 1, 2012

Professor Canan Ozgen Director, Graduate School of Natural and Applied Sciences Middle East Technical University

Ankara, Turkey

Dear Professor Ozgen:

The UC Davis College of Engineering (CoE) was just about ten years old when Timur Dogu (now Professor at METU) and Gulsen Dogu (now Professor at Gazi University) decided to come to Davis to pursue their PhDs in chemical engineering. After they completed their degrees, they joined METU as faculty members in 1974. As CoE also celebrates its 50th anniversary this year, we recognize that as a historic moment that led to the vibrant exchange of students and faculty between the two institutions that exists today. While the initial focus was in engineering disciplines, the relationships have broadened to encompass physical and biological sciences as well as social sciences. Today, several UC Davis graduates are faculty members at METU. Conversely, some METU graduates now serve in the faculty ranks at UC Davis.

The Agreement of Cooperation (AOC) that was established between UC Davis and METU in 2005 continues to provide the framework within which various interactions are carried out. A good example is the protocol signed between the chemical engineering programs at our two institutions that provides an articulation of the graduate courses that streamlines transfer of course credit

Jeffery C. Gibeling
Dean – Graduate Studies

I visited METU for the first time in summer 2005 when I was the director of the Berlin Graduate School of Social Sciences and was trying to evaluate pathways for future cooperation. During my talks with the rector, the director of the Graduate School of Social Sciences and other staff at METU, I very quickly realised that we do share much more than a lose interest in academic collaboration. Rather, we felt a strong common understanding on why, how and in which respect we should work together.

From our perspective there were two reasons for this immediate sympathy: first the overall academic quality of METU which is impressing and absolutely meets international standards; second the focus on European and area studies, especially the deep knowledge about the Middle East and Central Asia, regions which are also of special interest for Humboldt-Universität.

In addition, we as a German university residing in a country with millions of inhabitants of Turkish origin, also wanted to contribute more intensively to the research of problems such as integration, migration, democratisation. Thus, we also wanted to open new accesses for students of these topics and to show how rich and diverse academic research already is on these topics.

This was the founding idea of the German Turkish Masters Program in Social Sciences (GeT MA). We quickly developed a curriculum and already in 2007 we were able to accept a first cohort of students.

The program has developed very successfully and today we can say that it is not only a German-Turkish, but a truly international program which students choose because of its academic profile and the reputation of the participating universities, above all that of METU. My resume, after seven years now, is that I have very rarely experienced such an engaged, goal-oriented and professional cooperation in my international activities as we do have with METU.

Prof. Dr. Gert-Joachim Glaessner

Academic Advisor of International MA-Programs
at the Institute of Social Sciences at Humboldt-Universität zu Berlin

CHAPTER 2

MISSION, VISION and HISTORY OF THE GRADUTE SCHOOLS OF METU

The missions, visions and the history of all Graduate Schools (Graduate School of Natural and Applied Sciences, Graduate School of Social Sciences, Informatics Institute, Institute of Applied Mathematics and Institute of Marine Sciences) are given below.

2.1 Graduate School of Natural and Applied Sciences

Mission: The mission of METU GSNAS is to educate the graduate students in various fields (for career in teaching, research, industry and other) for professional success with ethical standards. GSNAS assists in the realization of university policies in collaboration with the other units in accordance with the above objective. It contributes to the maintaining of high standards in student admissions and increasing the acceptance of highly qualified students from different sources. It aims to develop interdisciplinary programs by enabling communication and coordination among disciplines through joint projects. In addition to academic programs, it also creates a conductive atmosphere for the preparation of graduate programs towards individual professional development. It strives for the enrichment of the interdisciplinary research activities so that METU acquires the identity of a research university and supports partnership and collaborative projects with industry and government. It tries to simplify and minimize the procedures and stages in all these activities. It endeavors to increase the quality and numbers of projects that involve high-level technology which is in line with the country's science and technology policy. This will serve humanity in general and Turkey's welfare in particular. It will also make a positive impact on the economy of Turkey.

Vision: GSNAS is committed to become a graduate school whose departments are preferred by the best students of Turkey and neighboring countries. It supports high level international research to increase Turkey's competitiveness in the global market; tries to educate graduate students for a career in teaching at the newly established universities in our country and to become high quality professionals and researchers in our society.

History: GSNAS was founded in **1982**. The Directors of GSNAS are given on **Table 2.1.** The graduate programs were under the umbrella of Faculties until 1982. In 1981-1982 a Graduate

School was founded and Professor Polat Gülkan from Civil Engineering Department was appointed as director for one year.

Table 2.1 Directors of GSNAS		
	Department	**Period of Work**
Professor Kemal Gürüz	Chemical Engineering	1982-1984
Professor Bilgin Kaftanoğlu	Mechanical Engineering	1984-1987
Professor Halim Doğrusöz	Industrial Engineering	1987-1988
Professor Alpay Ankara	Metallurgical and Materials Engineering	1988-1993
Professor İsmail Tosun	Chemical Engineering	1993-1996
Professor Tayfur Öztürk	Metallurgical and Materials Engineering	1996-2003
Professor Canan Özgen	Chemical Engineering	2003-

The first **15** degrees were awarded as **Master Degrees** from **Mechanical Engineering and Architecture** Departments in the academic year **1960/1961,** while the first degrees of **PhD** were awarded by the **Chemistry** and **Physics** Departments for the academic year of 1966/1967. The number of departments increased to **35** later on through the foundation of **10** Interdisciplinary departments. Five of these departments had started education in the last seven years.

2.2 Graduate School of Social Sciences

Mission: The mission of the GSSS is to promote and support excellence in graduate education and research. The Graduate School, together with departments and programs, develops common goals, sets common standards and promotes best practices to apply across disciplines. In accomplishing its mission, the GSSS values excellence, collaboration, integrity, efficiency and innovation.

Vision: The GSSS promotes graduate studies in going beyond the traditional disciplinary boundaries, thus supports collaboration between the scholars, as well as interdisciplinarity.

Through a myriad of interdisciplinary programs on area studies as well as issue-specific subjects, the Graduate School aims to create new synergies in research and teaching.

By way of its connections with national and international higher education organizations, the GSSS aims to encourage a creative environment for research and teaching as well as social impact. Faculty and student exchanges, joint degree programs, ÖYP, joint conferences and workshops all facilitate interaction with national and international partners. This year the GSSS started a Graduate Research Workshop that is open to all graduate students in Turkey in Social Sciences. The Workshop aims to have a debate on ongoing research by the PhD students as well as to create a network among them.

History: The GSSS was established in **1982**, offering then nine MA programs and one PhD program. Today the GSSS offers the PhD and MA in departments of programs across all disciplines. GSSS offerings include interdisciplinary programs, which bring social scientists from various disciplines together. As of 2012 there are 54 MA and 22 PhD programs within the GSSS. There are 1 473 MA and 984 PhD students currently enrolled in these programs. There are 250 students/research assistants in ÖYP Program. This program not only contributes to Turkey's scientific development, but also adds to Turkey's academic capacity. The Directors of GSSS are given on **Table 2.2.**

Table 2.2 Directors of GSSS		
	Department	**Period of Work**
Professor Yahya Tezel	Economics	1982-1984
Professor Sabri Koç	Foreign Language Education	1985-1992
Professor Haluk Kasnakoğlu	Economics	1993-1994
Professor Bahattin Akşit	Sociology	1994-2003
Professor Sencer Ayata	Sociology	2003-2010
Professor Meliha Benli Altunışık	International Relations	2010-

2.3 Graduate School of Marine Sciences

Mission: The mission of the Institute is to provide post-graduate education in marine sciences to enable our scientists to conduct research compatible with international standards; to perform systematic and integrated research utilizing both observations and modeling techniques to acquire information pertinent to the needs of our society and to publish our results so that they may be of use to decision makers.

Vision: Parallel to the developments in marine sciences to obtain the most benefit from both living and non-living marine resources in our country, to attain infra- and superstructure facilities in a shortest period possible, to carry out the needed systematic and integrated research based on observations and modeling techniques to allow recognition, conservation and sustainable management of the marine resources; and to be among the foremost in training qualified scientists, in the direction of the university's mission: respectful to nature, enriched with knowledge, and talented to be able to make independent decisions.

History: The IMS was established in **1975** with the objectives of conducting oceanographic research and providing graduate level education in marine sciences with respect to the mission and the vision of the institute. The Institute has four main divisions: Chemical Oceanography (including Atmospheric Science); Marine Biology and Fisheries; Marine Geology and Geophysics; Physical Oceanography. In its brief history, research accomplished by the Institute has resulted both in vastly increasing our knowledge of the seas surrounding Turkey and in establishing a knowledge database to help in the management of the marine environment.

The most important projects which contributed to the institute's research facilities and maintenance were from DPT (a few infrastructure projects), miscellaneous ministries, UNEP, NATO and EU-FP projects (SESAME, MOMA, etc.). The Directors of IMS are given on **Table 2.3.**

Table 2.3 Directors of IMS

	Department	**Period of Work**
Professor Turgut İ. Balkaş	Chemical Oceanography	1975-1982
Professor Teoman N. Norman	Marine Geology & Geophysics	1982-1984
Professor Ümit Ünlüata	Physical Oceanography	1984-1998
Professor İlkay Salihoğlu	Chemical Oceanography	1998-2003
Associate Professor Şükrü T. Beşiktepe	Physical Oceanography	2003-2007

Professor Ferit Bingel	Marine Biology and Fisheries	2007-2012
Professor Ahmet Kidevs	Marine Biology and Fisheries	2012-

2.4 Graduate School of Informatics Institute (GSII)

Mission: The mission of II is:

- To bring together academicians, researchers and experts from different disciplines to be a pioneer in interdisciplinary education and research and to create synergy between academy and industry,
- To contribute to Turkey's informatics politics,
- To bring together researchers from different faculties and departments, thus creating a synergy among them.
- To provide masters' and PhD programs for students with different knowledge bases.
- To execute theoretical and practical R&D projects.
- To enhance the collaboration between industry, university and government.
- To meet the need for the growing labor force in the informatics field.
- To perform national and international R&D projects in informatics and thus contributes to scientific and technological developments.
- To be a pioneer in e-transformation.
- To be a forerunner in developing and using information technologies as a contribution to the society.

Vision: Being a frontrunner institute in graduate education and research in the field of informatics, METU GSII, will enthusiastically continue its activities to strengthen information society by producing new technologies in the field and collaborating with the government and the industry, to keep up with the transdisciplinary sciences and scientific developments, and to be a pacesetter in this area.

History: The II, which was established in **1996**, is one of the first of its kind in Turkey. Our pioneering status in the field and our emphasis on the blend of teaching, research, and service uniquely position us as one of the leaders and innovators in informatics. Our mission is to promote creative and innovative interdisciplinary academic research from a comprehensive perspective and to cultivate an abundance of human resources with a wide range of vision. To provide an interdisciplinary education and research, to train the next generation of researchers in this area and to be a leader in this field, we are bringing together academicians and experts from different disciplines. The II provides a unique collaborative research and learning

environment in informatics. The faculty and students are a diverse group with a wide range of experience and interests and the curricula emphasizes the interaction and interchange between researchers working in all areas of informatics. II has established different specialization areas in five departments. Each area has pioneering initiatives in their respective academic field and each is strongly committed to interdisciplinary collaborations within the university and beyond. The Directors of II are given on **Table 2.4.**

Table 2.4 Directors of GSII		
	Department	**Period of Work**
Professor Neşe Yalabık	Computer Engineering	1996- 2004
Professor Nazife Baykal	Information Systems	2004-

2.5 Graduate School of Applied Mathematics

Nowadays, Mathematics plays a key role for solving large scale problems in science, technology, environment, finance and economics. In the last twenty years, in leading universities of the world, many interdisciplinary Applied and Computational Mathematics institutes/departments were founded to solve complicated problems efficiently by using new mathematical methods and ideas. IAM, as the first of its kind in Turkey, in the ten years that passes since its foundation acquired international recognition through the scientific achievements and training of graduates from different disciplines.

Mission: The mission of IAM is to solve challenging and fundamental problems in science and engineering. To this end, the institute:

- nurtures interdisciplinary collaboration between departments within METU, national and international research institutions as well as the industry
- tackles fundamental research problems in mathematical sciences that have an impact in the real world
- trains graduates coming from different disciplines at the Master's level with the aim of developing their skills in solving real life problems and being able to apply them to science, engineering and industry.

Vision: The IAM is committed to become an internationally recognized center for research in scientific computing, cryptography, financial mathematics, and a platform for active participation of research groups from METU in the international research community by establishing research networks and participating in international projects.

History: The IAM started offering programs in the areas of Financial Mathematics, Scientific Computing and Cryptography in 2002. Actuarial Sciences program started in 2008. The IAM is an interdisciplinary center encompassing diverse research and teaching activities. The research at the institute covers broad areas in applied mathematics with an emphasis on scientific computing, cryptography, financial mathematics. Graduate degrees are offered in Actuarial Sciences, Cryptography, Financial Mathematics, and Scientific Computing. The Directors of IAM are given on **Table 2.5.**

Table 2.5 Directors of IAM		
	Department	Period of Work
Professor Aydın Aytuna	Mathematics	2002- 2005
Professor Ersan Akyıldız	Mathematics	2005- 2012
Professor Bülent Karasözen	Mathematics	2012-

CHAPTER 3
GRADUATE PROGRAMS IN 50 YEARS

In this chapter, information about the graduates, projects, and scholarships of all graduate schools will be provided. The number of international students graduated from MS/MA and PhD programs and their home countries will also be given as well. The statistical values pertaining to the Faculty Developing Program (ÖYP) will also be introduced in this chapter.

3.1 The Number of Graduates of MS/MA and PhD Programs in 50 Years

In this section, the number of graduates of all graduate schools from 1960/61 to 2010/11 academic years is given in five-year intervals in **Figures 3.1-3.5**. As can be seen from **Figure 3.1**and **3.2**, for both GSNAS and GSSS the trends are increasing exponentially, in nature, especially after 1990s.

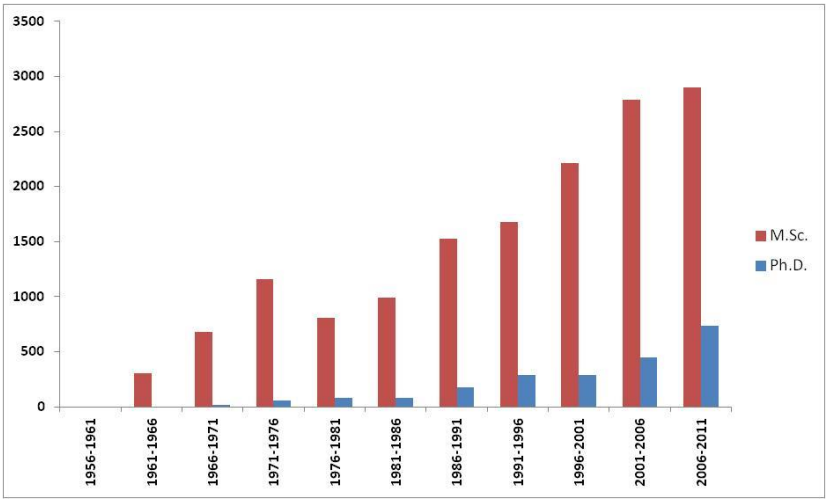


Figure 3.1 Number of Graduates of **GSNAS** in 50 years
(Total Number of Graduates**: MS/MA: 15 042, PhD: 2 163**).

The number of graduates has been increasing steadily. The percentage of graduates of graduate programs to the total graduates of METU (undergraduate and graduate programs) is increased from **22 %** in **1982** to **30 %** in **2011**. The total number of **MS/MA** and **PhD** degrees given by all graduate schools at METU is **20 267** and **2 771** as of 31st December 2011, respectively. The trends for the graduates of thematic graduate schools on **Figures 3.3-**

3.5 are showing differences depending on the demands of different sectors. The total number of MS/MA and PhD graduates for all graduate schools is given in **Figures 3.6 and 3.7** respectively. The exponential increase in both is clearly seen in these figures.

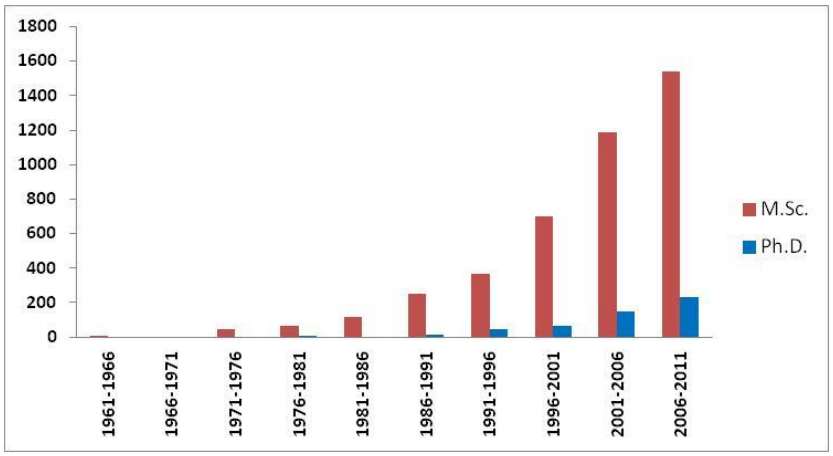


Figure 3.2 Number of Graduates of **GSSS** in 50 years

(Total Number of Graduates: **MS/MA: 4 267, PhD: 505**).

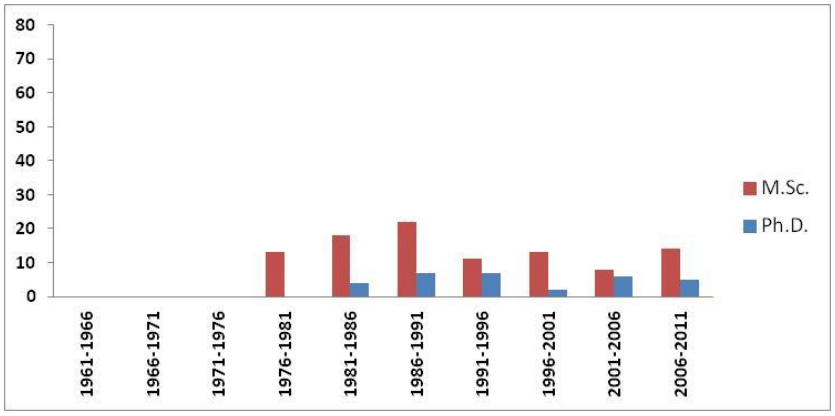


Figure 3.3 Number of Graduates of **IMS** in 35 years

(Total Number of Graduates: **MS/MA: 101, PhD: 29**).

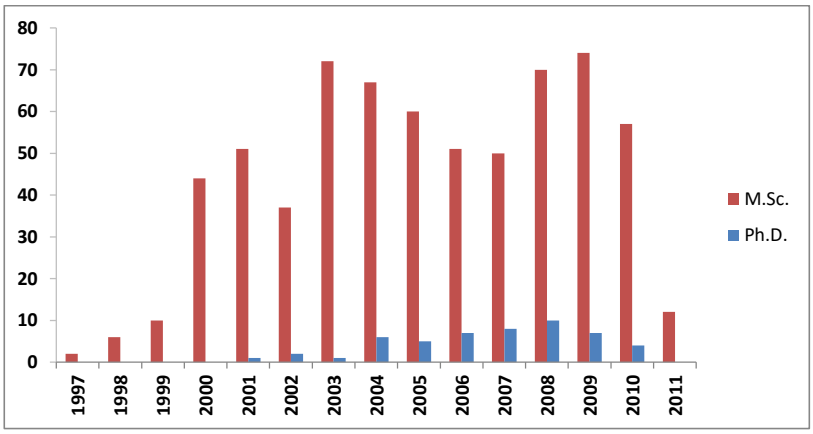


Figure 3.4 Number of Graduates of **II** in 15 years.

(Total Number of Graduates: **MS/MA: 663, PhD: 51**).

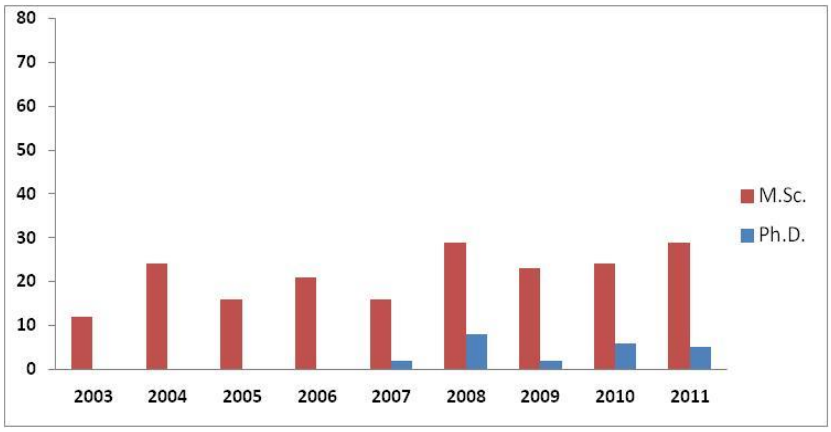


Figure 3.5 Number of Graduates of **IAM** in 10 years.

(Total Number of Graduates: **MS/MA: 194, PhD: 23**).

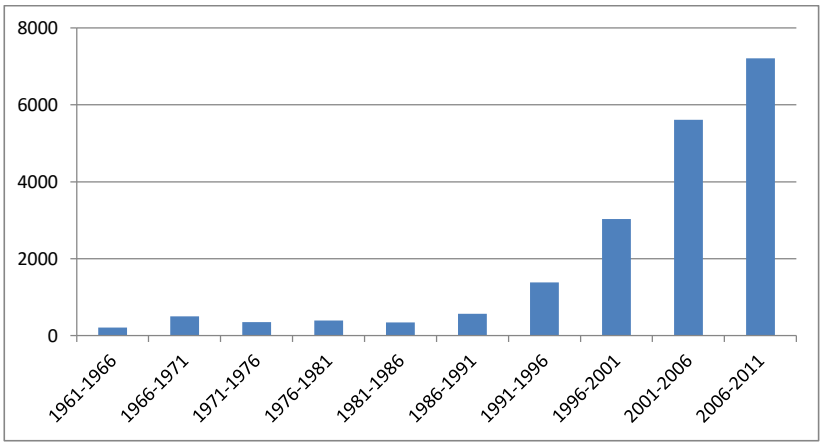


Figure 3.6 Total Number of Graduates of MS/MA Programs in years.

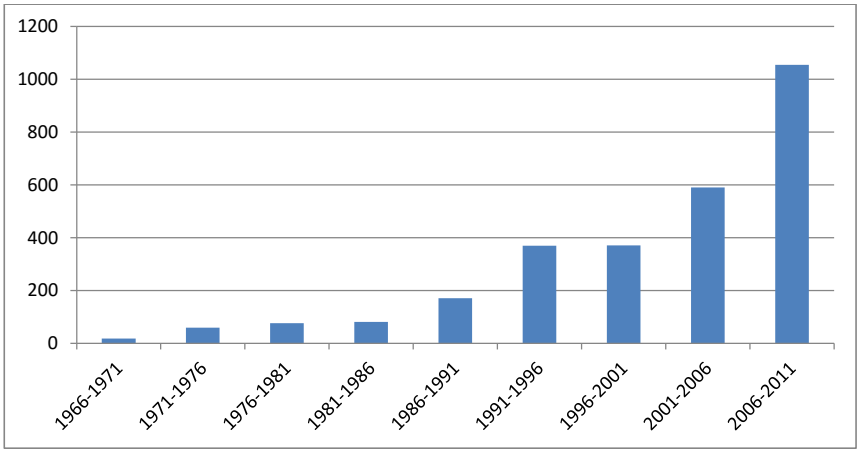


Figure 3.7 Total Number of Graduates of PhD Programs in years.

3.2. Graduates of Programs of Graduate Schools

The total number of graduates (MS/MA and PhD) of each program is given in **Figures (3.8-3.12).** Clearly the number of graduates depends upon the number of students enrolled in each program. Thus, total number of **MS/MA** programs' graduates that are above **500** are from the departments of Electronic and Electrical Engineering (2 293), Civil Engineering (1 900), Mechanical Engineering (1 724), Computer Engineering (833), Architecture (741), Chemistry (781), Chemical Engineering (746), Industrial Engineering (511), Metallurgical and Materials Engineering (568), Physics (512) and Business Administration (639).

As to the PhD programs, the total number of **PhD** programs' graduates above **100** are from the departments of Physics (248), Electronic and Electrical Engineering (202), Chemistry (191), Civil Engineering (159), Mathematics (110), Mechanical Engineering (118) and Educational Sciences (114). The maximum number belongs to the Physics Department. Also, the advisors who had graduated the maximum number of PhD students is Professor **Mehmet** Tomak (25), a faculty member of Physics Department.

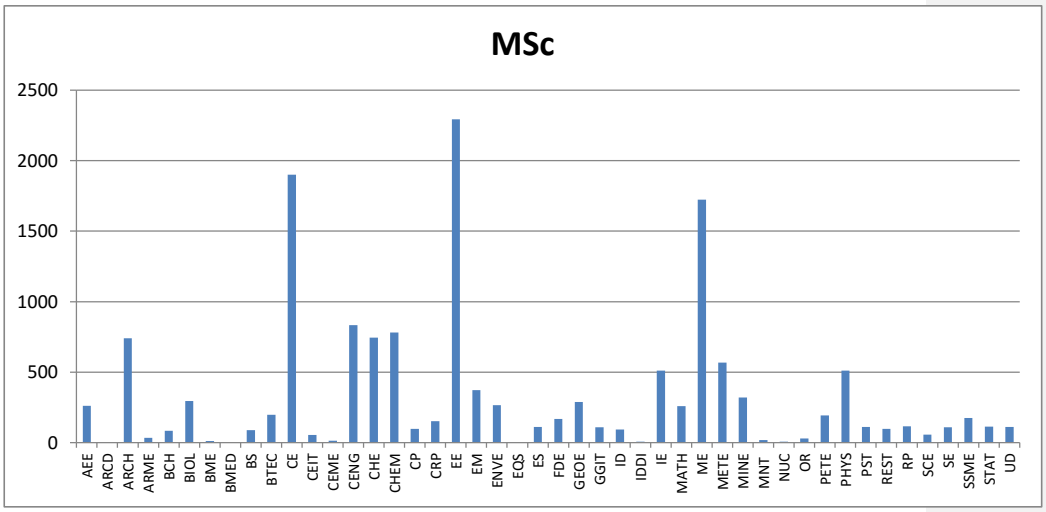


Figure 3.8a MS (15 042) Graduates of **GSNAS**.

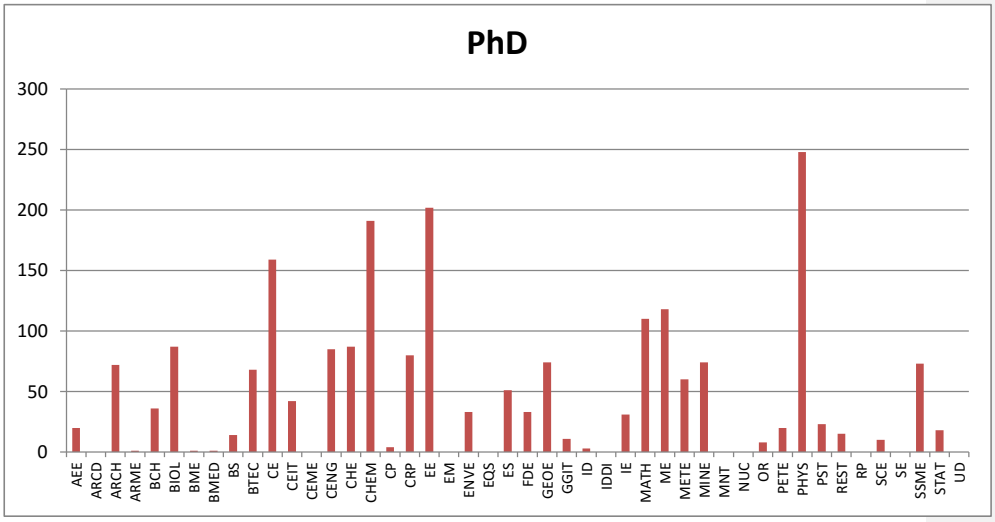


Figure 3.8b PhD (2 163) Graduates of **GSNAS**.

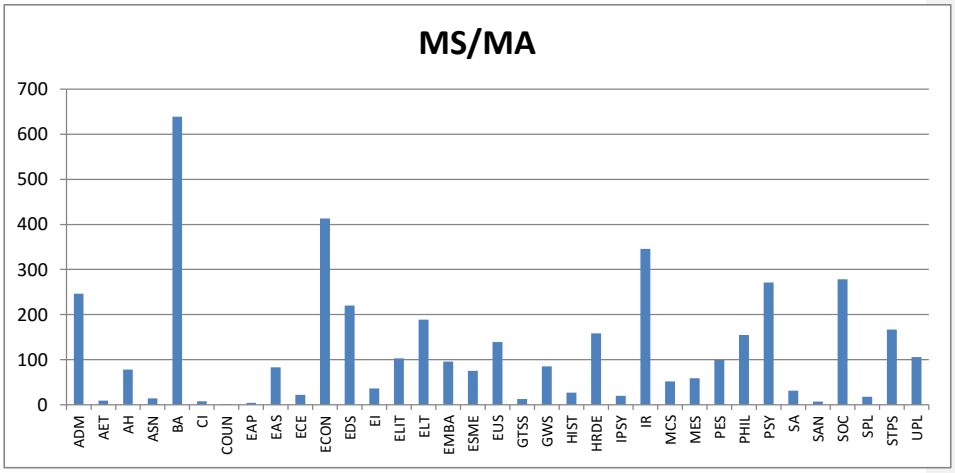


Figure 3.9a MS/MA (4 267) Graduates of **GSSS**.

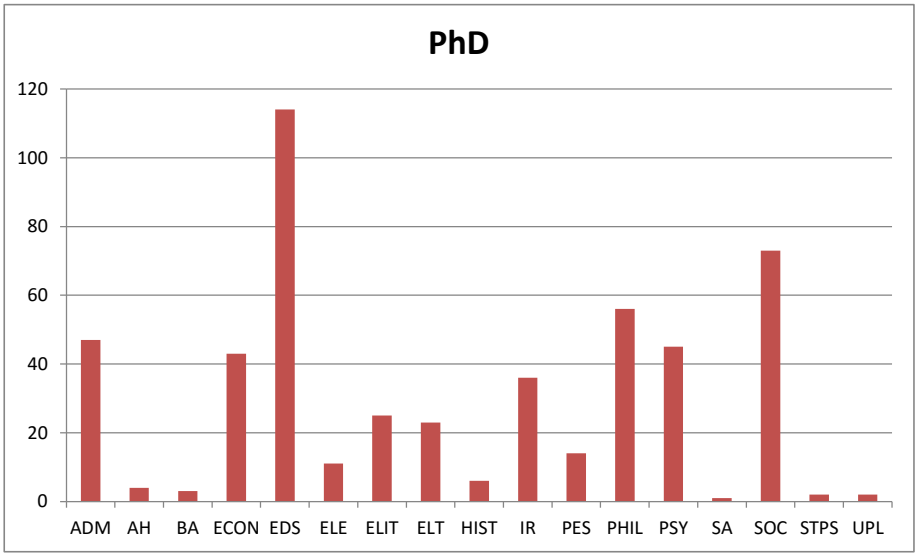


Figure 3.9b PhD (505) Graduates of **GSSS**.

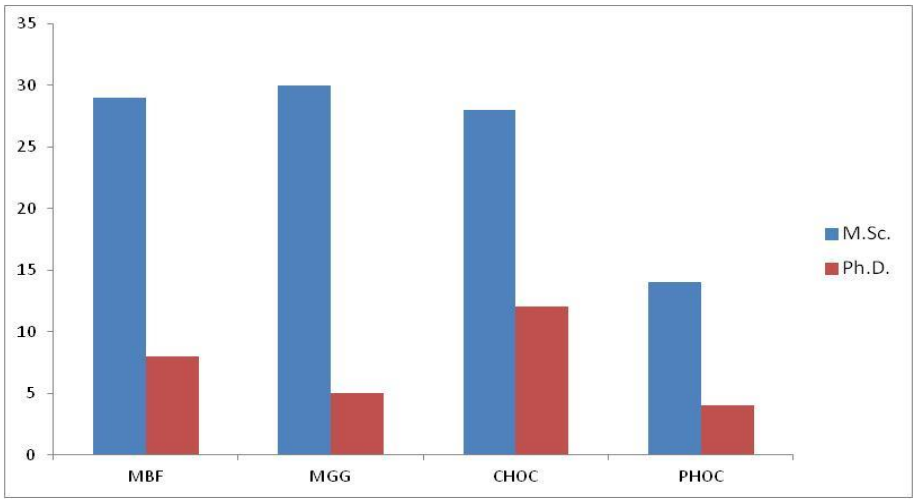


Figure 3.10 MS (101) and PhD (29) Programs' Graduates of **IMS**.

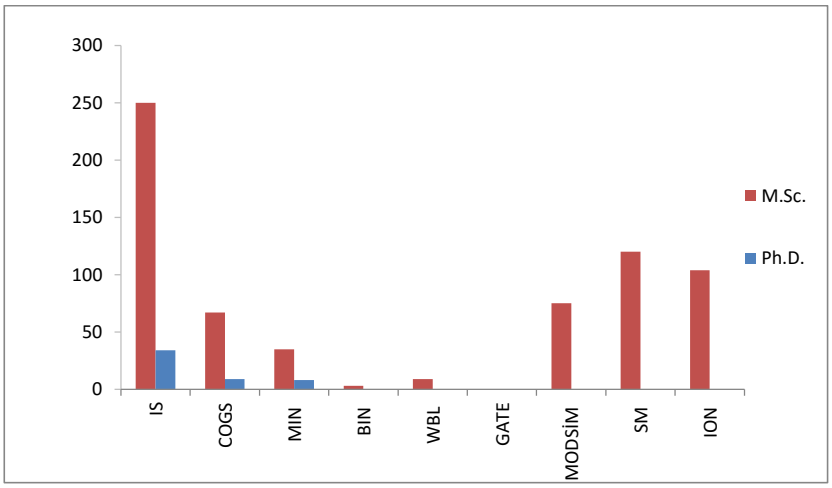


Figure 3.11 MS (663) and PhD (51) Programs' Graduates of **II**.

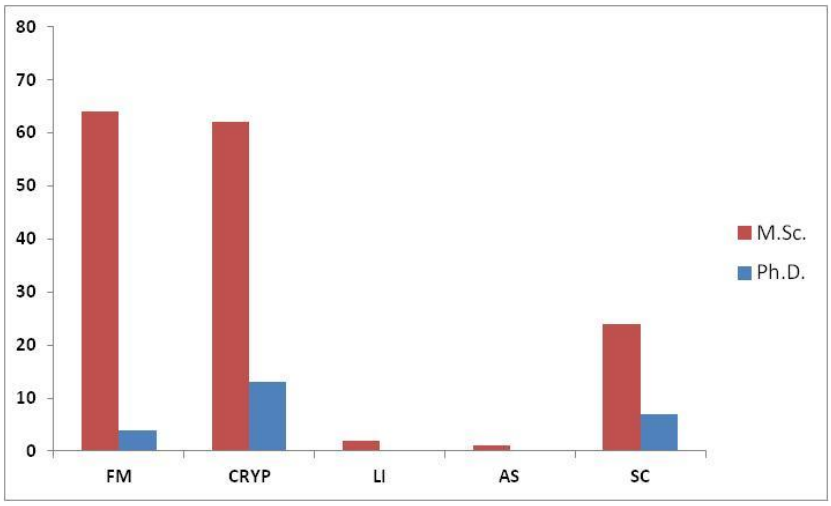


Figure 3.12 MS (194) and PhD (23) Programs' Graduates of **IAM**.

3.3 International Students

The mission of METU, starting from its foundation, has been to welcome international students especially from neighboring countries to enable diversity. In 50 years METU has attracted graduate students from **75** countries. Many of our international student graduates became leaders in their fields of work in their home countries. In recent years the University has announced the attraction of more international students as one of its goals in its strategic plans.

The number of international student graduates (**1 760**) in 50 years is given in **Figure 3.13**. Despite a decrease in the number of graduates briefly after 1996, the numbers have been increasing for the last five years as a result of the efforts shown in this respect. In the early years of the University most of the international students came from the Middle East. This was in line with the original mission of the university to attract students from this region. After the end of the Cold War and the disintegration of the Soviet Union there was a surge in the number of students coming from the Balkans, Central Asia and the Caucasus. In the last ten years there has been a diversification of international students enrolling at METU. This trend is expected to continue considering Turkey's policy of attracting students from different countries and of providing increasing numbers of scholarships. METU also has adopted a policy of attracting quality students from abroad.

The regional (Europe, Americas, Middle East and North Africa, Sub-Saharan Africa, Eurasia and Asia-Pacific) distributions are given in **Figures 3.14-3.19.** The percentage of students from the Middle East and North Africa Region (MENA) is **66%** (1 157). Among all **75** countries, the top five countries are shown in **Figure 3.20**.

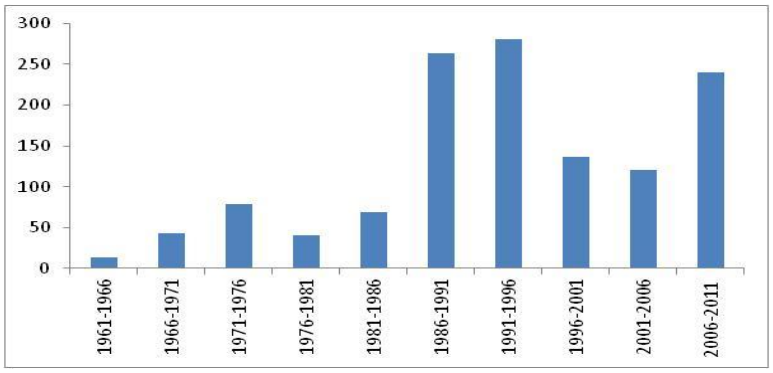


Figure 3.13 Numbers of International Graduates (**Total Number: 1 760**)

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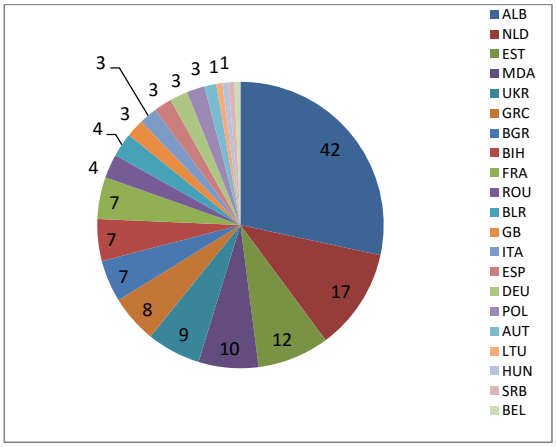

Figure 3.14 International Graduates (**Europe Region**), Total Number: 148.

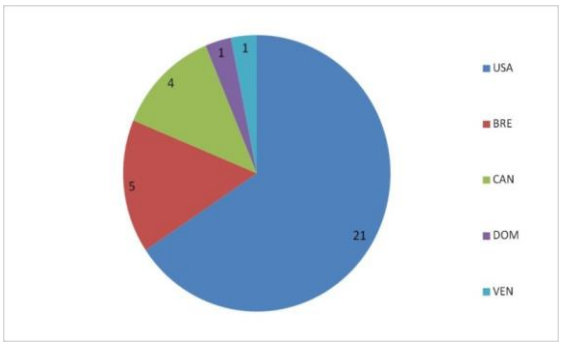

Figure 3.15 International Graduates (**Americas**), Total Number: 32.

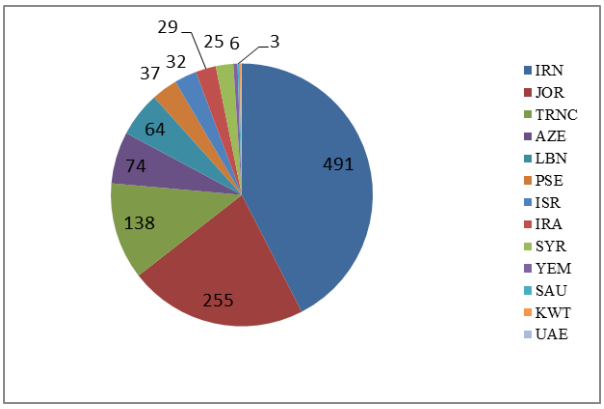

Figure 3.16 International Graduates (**MENA Region**), Total Number: 1157

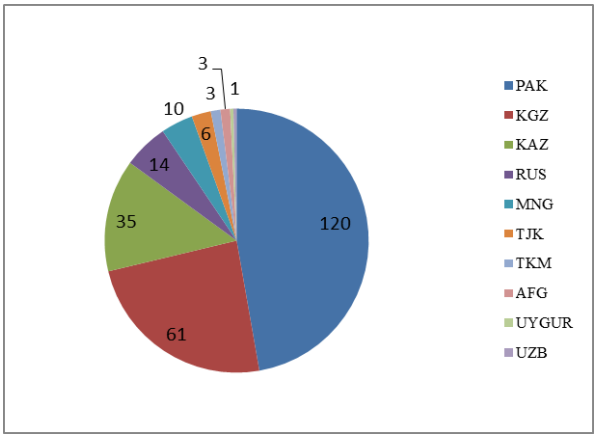

Figure 3.17 International Graduates (**Eurasia Region**), Total Number: 254

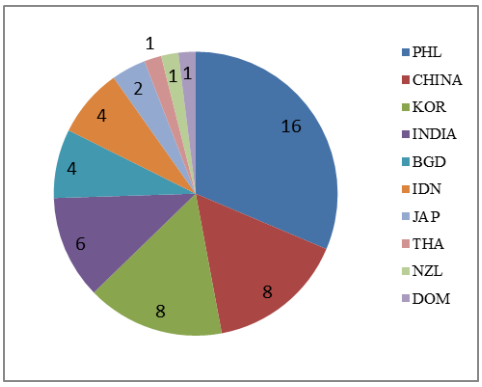

Figure 3.18 International Graduates (**Asia-Pacific Region**), Total Number: 53

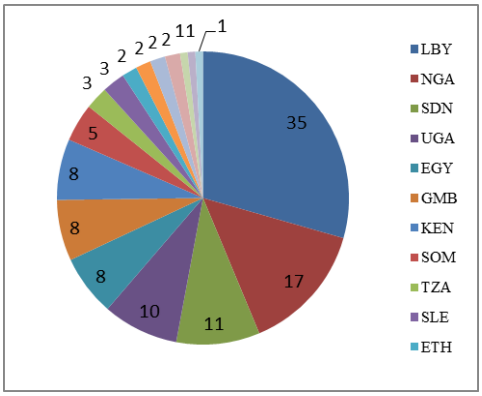

Figure 3.19 International Graduates (**African Region**), Total Number: 119

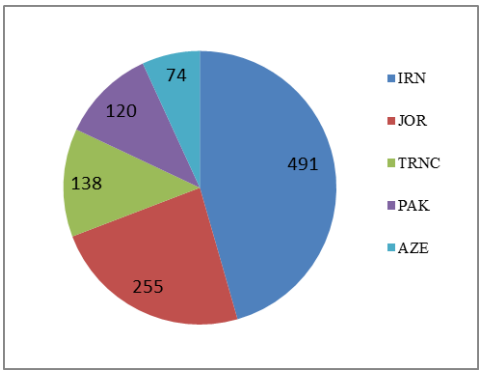

Figure 3.20 Top Five Countries (61.25 % of Total)

3.4 Projects

Graduate Schools evaluate projects from three sources: Scientific Research Projects (**BAP**), State Planning Organization Projects (**DPT and DPT-ÖYP**) and Ministry of Industry Projects titled as Thesis for Industry (**SAN-TEZ**).

3.4.1 Scientific Research Projects (BAP)

The budget share of BAP for Graduate Schools in total is %30; for faculties %50; and for Presidency Office of Research 20% of the overall budget. The share of graduate schools is distributed among different schools based on their student numbers. In general, the projects of interdisciplinary programs together with individual graduate student projects related to their thesis studies are supported by this source. Although the budget allocated to BAP is limited, it is effectively utilized by the graduate students.

3.4.2 State Planning Organization Projects (DPT-ÖYP)

(SOCIAL and SCIENTIFIC IMPACT)

In 2001, DPT and Higher Education Council (YÖK) worked together to start a project for training academic staff for newly established universities in Turkey and later extended it to some neighboring countries. This pioneering project, called as Faculty Developing Program (ÖYP), was taken up and implemented first by METU and financially supported by DPT. METU considered the ÖYP as a social responsibility project, through which it could not only help to train the much needed academic staff for the newly-established universities, but also to create a strong research base and a network among scholars. This project was initiated together with one of our former Directors of GSNAS Professor İsmail Tosun while he was the vice president of Higher Education Council (YÖK), then-METU President Professor Ural Akbulut, Dean of GSNAS Professor Tayfur Öztürk and Advisor to the President Professor Fatoş Yarman Vural. METU has developed an elaborate system of selection process as well as training for graduate students within the ÖYP. This system also includes training in respected universities abroad as part of the PhD studies. Today, the ÖYP project is administered by YÖK and the numbers of universities that are administering ÖYP have increased. Since 2001, **289** ÖYP Researchers have obtained their PhD degrees from METU as of 31st December 2011, and started their academic careers in universities all around Turkey.

The different outputs of this project are reflected in numbers in **Figures 3.21-3.22**. During their studies at METU, graduate students of the ÖYP program have a budget for attending international conferences, for their research projects and for spending longer period of time (6-16 months) abroad to work on their research topics after their qualifying examination. METU has taken this project very seriously and spent time and effort in administering the program, organizing different trips for the students to their universities as well as Orientation Graduate Seminars once a year on different topics for the development of students as instructors. In **Figure 3.21**, the numbers of graduates (Total: 289) are given as a function of time, while in **Figure 3.22**; the number of publications **(SCI, SSCI, AHCI)** (Total: 726) of the graduates (268) is given between years **2006-2011.** The average number of publications per graduate is **2, 71**. The target universities and the number of ÖYP graduates in their faculty are given in **Table 3.1**. The maximum number of ÖYP graduates (**45**) is in Selçuk University in Konya. The enrollment of ÖYP Research Assistants and their target universities are given in **Table C-1 and C-2** in the Appendices.

Through this project, METU has had a significant scientific and social impact. Due to ÖYP, METU has increased her number of Ph.D. graduates as well as the number of publications. Consequently, METU had contributed to Turkey's academic capacity which is a social and scientific impact on the education system.

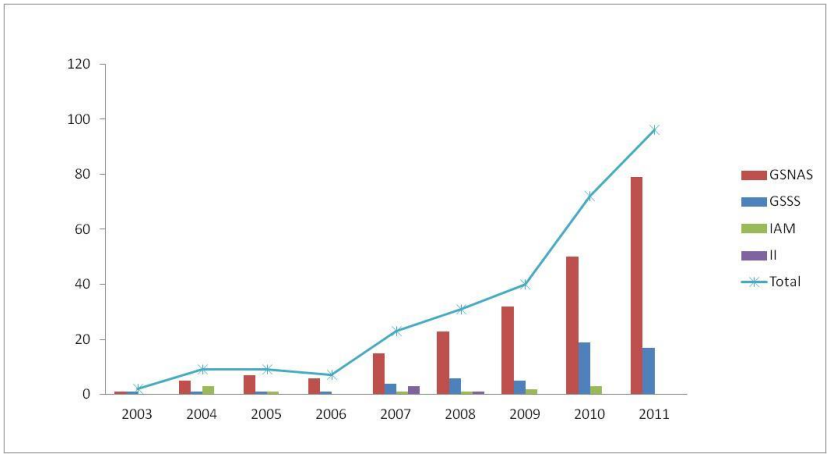

Figure 3.21 Number of **ÖYP** Graduates in years (Total Number: 289).

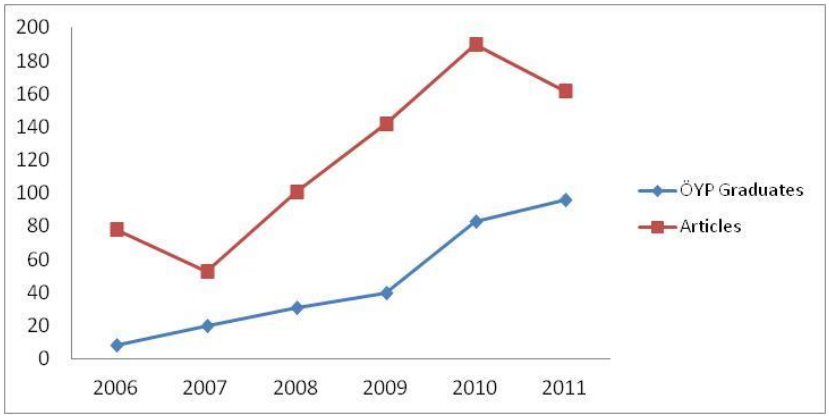

Figure 3.22 Number of **ÖYP** Graduates (268) and Number of Their Articles Published (SCI, SSCI, AHCI) (726) for the **Last Six Years**.

Table 3.1 Number of ÖYP Graduates and their Target Universities (As of December 2011)

Target University	#	**Target University**	#	**Target University**	#
Selçuk Uni.	45	**Erciyes Uni.**	8	**Amasya Uni.**	1
Atatürk Uni.	36	**Çanakkale 18 Mart Uni.**	6	**Balıkesir Uni.**	1
YüzüncüYıl Uni.	34	**OndokuzMayıs Uni.**	6	**Gaziosmanpaşa Uni.**	1
Kocaeli Uni.	33	**İnönü Uni.**	5	**Mehmet AkifErsoy Uni.**	1
Akdeniz Uni.	30	**Anadolu Uni.**	3	**Mustafa Kemal Uni.**	1
Süleyman Dem. Uni.	29	**Uludağ Uni.**	3	**Nevşehir Uni.**	1
Mersin Uni.	19	**Harran Uni.**	2	**Osmaniye Korkut. Uni.**	1
Karabük Uni.	10	**Trakya Uni.**	2		
Muğla Uni.	10	**Aksaray Uni.**	1	**TOTAL**	**289**

3.4.3 Ministry of Industry Projects (SAN-TEZ) (INNOVATION, TECHNOLOGICAL and SCIENTIFIC IMPACT)

There has been always a mission of Natural and Applied Science Departments at universities to cooperate with industry and to make research together with industry partners. This aim was also shared by METU **GSNAS**. Thus, the idea of SAN-TEZ was initiated by GSNAS and this pioneering idea was supported by the General Manager of Ministry of Industry Mr. Ziya Karabulut and his Vice Manager Ms. İvgen Özdal (a graduate of METU Metallurgical and

Materials Engineering Department). The project aimed to solve a problem of partners in industry to produce a product or a method that adds a value to the economy, via the research undertaken by a MS or PhD research study conducted by the graduate student. The financial support has to come 25% from industry and 75% from the Ministry of Industry. The graduate student can be supported monthly together with the technicians from the industry. The equipments that are used by the project can be owned by either university or company depending upon the contract signed at the start. The only constraint for the project to be accepted is to have a new product or a method that will have an added value for the country's economy. This idea was realized by a special law which was processed by the Minister of Industry Mr. Ali Coşkun. The extensions of the project are two folds: to provide support for the acquirement of property rights and support for the investment to start producing the good in question. The project is continuing to grow exponentially and many universities are involved in it. There are **44** projects 28 of which had ended and some are still continuing with many new proposals (**Table 3.5**). We are considering this project as an innovative one, demonstrating scientific and social impact of METU on Turkey's scientific community and also on the industry, generating an economic development by the value added products and methods.

Table 3.5 METU SAN-TEZ Projects

	Project supervisor	**Dept.**	**Thesis Title**	**Company**	**Year of Start**	**Graduate Students'Name**
1	**Prof.Dr.Mustafa İlhan Gökler**	ME	Design of Fixturing System for Forging Dies	Aksan Çelik Dövme San. Tic. Ltd. Şt.	2006	Özgür Cavbozar
2			Analysis and Design for Aluminum Forging Process	Aksan Çelik Dövme San. Tic. Ltd. Şt.	2006	Hüseyin Öztürk
3	**Prof. Dr. Abdullah Öztürk**	METE	Production and Characterization of Magnesiumoxychloride Based Cements for Polishing of Ceramic Tiles	Kaleseramik Çanakkale Kalebodur Seramik San. A.Ş.	2006 - 2008	Muhammed Said Özer
4	**Prof.Dr.Nesrin Hasırcı**	BME	Construction of Acrylic Bone Cements	Omro Medikal Makine ve Yazılım LTD Şti	2006	Tuba Erdoğan Aysel Kızıltay
5			Development of Biocompatiple Bone Cement Formulations	Omro Medikal Makine ve Yazılım LTD Şti	2005-2008	
6	**Prof.Dr.Engin Kılıç**	ME	Virtual Factory System Development for Small and Medium Enterprises (KOSAF)	Ostim Organize Sanayi Bölger Müdürlüğü	2006-2008	M. Ural Uluer Bahram Lotfi Sadigh

7	**Prof.Dr.Tayfur Öztürk**	METE	Test Equipment Design and Production of Gas Absorption	Özben Metal Makina Ltd Şti	2006	

Table 3.5 cont'd

8	**Assoc. Prof.Dr.Çiğdem Erbuğ**	ID	Bus Control Interface and Internal Elements are Appropriate Criteria for Ergonomic Design	Temsa Sanayi ve Ticaret A.Ş.	2006-2009	Nazlı Baltacıoğlu, Naz Atacan
9	**Prof.Dr.Bilgin Kaftanoğlu**	ME	Development of a Solar-Powered Cooling System Using Zeolite	Termoyıldız Isıtma Soğutma Sistemleri San Ltd.Şti.	2006-2009	İsmail Solmuş
10			Design, Development and Manufacturing of an Industrial Type Vacuum Sweeper	Müsan A.Ş.	2008-2010	Buket Aygün
11			Design, Testing and Manufacturing of the Elevator and Fan System for an Industrial Type Vacuum Sweeper	Müsan A.Ş.	2010-2012	Emre Şahin
12	**Assoc. Prof. Dr. Şebnem Düzgün**	GGIT	Development of a Methodology for Geospatial Image Streaming	Bilgi Coğrafi Bilgi Dönüşüm ve Yönetim Sistemleri Tic.Ltd.Şti.	2007-2012	Erdem Türker Kıvcı
13		GGIT	Geyopa Solar Energy Investment Optimization and Design Tool	Teknologis Teknoloji Yönetimi ve Danışmanlık LTD.Şti	2009-2011	Hilal Saydan
14	**Prof.Dr. S.Kemal İder**	ME	Development of Inclined Stair lift for Disabled	Lamasan Matbaa Bıçak Lamaları Makina İmalat İth.İhr.San.ve Tic.Ltd.Şti.	2007-2010	Mustafa Ekinci
15				ENDES Engelli Yaşam Cihazlar Mak.İm.San.Tic.Ltd. Şti.		
16	**Prof.Dr.Işık Önal**	CHE	Development of a Three Way Catalytic Converter for Elimination of Hydrocarbons, Carbon Monoxide and Nitric Oxide in Automotive Exhaust	TOFAŞ Türk Otomobil Fabrikası A.Ş	2007-2010	Nur Kandilli Zuhal Karakoç Canan Karakaya İbrahim Korkut
17	**Prof.Dr.Ülkü Yılmazer**	CHE	Preparation And Characterization Of Recycled Polypropylene Based Nanocomposites	Türk Otomobil Fabrikası A.Ş. TOFAŞ	2007-2011	Filiz Cengiz Şule Seda Yılmaz

18	**Dr. Hakan Altan**	PHYS	Fundamentals Of A Metal Surface Imaging System Based On Laser/Optic Principles /Imaging Of Metal Surfaces Using Confocal Laser Scanning Microscopy	Makine ve Kimya Endüstrisi Kurumu	2008-2011	Murat Bektaş Bilge Can Yıldız

Table 3.5 cont'd

19	**Asst. Prof.Dr.Alptekin Temizel**	IS	Parallel Processing for Security Applications Based Intelligent Video Analysis System	Titian Bina Elektronik Sis. Tek.San.ve Tic. Ltd.Şti.	2008-2010	Püren Güler Deniz Emeksiz
20	**Prof.Dr.Ali Kalkanlı**	METE	Processing and Assessment of Aluminum-Ceramic Fiber Reinforced Metal Matrix Composite Parts for Automotive And Defense Applications	Makine ve Kimya Endüstrisi Kurumu	2008-2011	Gökhan Türkyılmaz Murat Kanberli
21			Development of Automotive Chassis Parts Via Aluminum Extrusion Technology	Malkoçlar Oto Döşeme Ltd.Şti	2007-2010	Onur Demirel
22	**Prof.Dr.Mehmet Haluk Aksel**	ME	Exterior Ballistics Simulation Software Development	Makine ve Kimya End.Kurumu	2007-2009	Faik Danış
23			Barrel Internal Ballistics Simulation Program Development	Makine ve Kimya End.Kurumu	2007-2009	Serkan Körpe
24	**Prof..Dr. İrem Dikmen Toker**	CE	Development of Knowledge-Based Risk Mapping Tool for Construction Projects	INNOCENT-Teknoloji Tasarım Geliştirme Merkezi San. Ve Tic.A.Ş.	2007-2011	Açelya Ecem Yıldız
25	**Prof.Dr.Mustafa Tokyay**	CE	Using Cemented Chipboard Waste as Secondary Fuel and Raw Material for Cement Production	Tepe Betopan Yapı Malzemeleri Sanayi ve Tic. A:Ş	2007-2010	Mustafa Yılmaz
26	**Prof.Dr. Mehmet Polat Saka**	ES	Finite Element Analysis Of Discontinuous Contact Problems / Calibration Of The Finite Element Model Of A Long Span Cantilever Through Truss Bridge Using Artificial Neural Networks	Makine ve Kimya End. Kurumu	2008-2012	Mehmet Ata Bodur Ömer Burak Yücel
27	**Prof.Dr.Mehmet Kadri Aydınol**	METE	Development and characterization of high power density cathode materials for lıthıum-ion batteries	Yiğit Akü Malz. Nak. Tar. Tur San.Tic.A.Ş	2008-2010	Şafak Doğu Burcu Kayıplar
28	**Prof.Dr.Burhan Lemi Türker**	CHEM	Synthesis of hexanitrostilbene	Makine ve Kimya Endüstrisi kurumu	2009-2011	Hamza Turhan Çağlar Çelik Bayar (Researcher)
29	**Assoc. Prof.Dr.Ahmet Türer**	CE	Long-term monitoring of Structure Healths of wide span steel	Polarkon Metal Yapılar Endüstri ve tic ltd. şti	2009-2012	?

			structures under dynamic loads using electronic based measurement methods.			
30	**Prof .Dr. Raşit Turan**	PHYS	Fabrication and characterization of ingle crystal solar cell	Nurol Teknoloji	2008-2011	Fırat Es Mehmet Karaman Serim İlday

Table 3.5 cont'd

31	**Prof .Dr. Raşit Turan**	PHYS	Isolation and characterization of TAQ DNA polymerase and optimization and validation of newly designed thermal cyclers	Nano biz Nano-biyo Teknolojik Sistemler Eğitim Bilişim Danışmanlık Ar-ge San.Tic.Ltd.Şti	2008-2010	Lütfiye Yıldız
32	**Prof. Dr.Hüseyin Avni Öktem**	BIO	Development of Nanoparticles and nanotextiles based decontamination systems for biologic agents.	Arıteks Boyacılık Ticaret ve sanayi AŞ	2011-2013	Özge Kalman
33			Development of methods, kits and reference materials for GMO detection purposes		2011-2013	Batuhan Birol Keskin
34	**Prof. Dr. Deniz Üner**	CHE	Photocatalytic activity ın nano sized titanium dioxıde structures	KALEKİM KİMYEVİ MADDELER A.Ş.	2009-2012	Mert Mehmet Oymak İbrahim Bayar
35	**Prof.Dr. Mürvet Volkan**	CHEM	Preparation and characterization of magnetite nanoparticles by thermal decomposıtıon method for ıts potentıal use ın tumor ımagıng	Eczacıbaşı-Monrol Nükleer Ürünler Sanayi ve Ticaret A.Ş.	2008-2010	Zehra Tatlı Ümit Zengin
36	**Prof.Dr.Vasıf Hasırcı**	BIO	Collagen-based tissue engineered meniscus: design and application	Ars.Arthro Biyoteknoloji AŞ.	2009-2011	Albana Ndreu
37	**Prof.Dr.Nihan Kesim Çiçekli**	CENG	HAVELSAN Video Analysis System	HAVELSAN .A.Ş	2011	Esra Abacıoğlu Ulya Bayram Yousef Rezaeitabar Krani Kardaş
38	**Assoc. Prof.Dr.Veysi İşler**	CENG	Perseverance and Success World 3D Therapy Applications	Bilinçli Başlangıç Psikolojik Danışmanlık ve Rehberlik Ticaret Ltd.Şti.	2011	Lal Gamze Bozgeyikli Esra Cevizci
39			Efficient rendering of complex scenes on heterogeneous parallel architectures	Simsoft Bilgisaya Teknolojileri Ltd.Şti	2011	Gökçe Yıldırım

40	**Prof.Dr.Tayfun Akın**	EE	Probe of Vacuum packaged MEMS Gyroscope and the Development of CMOS Circuitry Reading	Aselsan AŞ	2011	Eren Çanga Şeniz Esra Küçük Şükrü Ufuk Şenveli

Table 3.5 cont'd

41			Development of wafer level vacuum packaged mems inertial sensors / integrated cmos readout and control electronics for mems / mems gyroscopes for tactical grade applicatıonsgyroscopes /	Aselsan AŞ	2011	Mustafa Mert Torunbalcı Burak Eminoğlu Tuncer Askarlı Soner Sönmezoğlu
42	**Assit. Prof..Dr.Demirkan Çöker**	AEE	Development of cohesive elements for delamination of composite structures	Tusaş- Türk Havacılık ve Uzay Sanayi Motor Sanayi AŞ.	2011	Denizhan Yavaş İmren Uyar Burak Gözlüklü
43	**Prof.Dr.Ozan Tekinalp**	AEE	Precision navigation and control of unmanned air vehicles	Aerotim Mühendislik Yazılım ve Danışmanlık San. Ve Tic. Ltd. Şti.	2011	Berk Korkut
44	**Asst.Prof.Dr.İlkay Yavrucuk**	AEE	Designs of FPGA-based sensor integration and navigation filters for Unmanned air vehicles Autopilots.	Aerotim Mühendislik Yazılım ve Danışmanlık San. Ve Tic. Ltd. Şti.	2011	Sait Mert Türkan

3.5 Publications

The departments in different graduate schools can have different traditions in preparing publications from graduate studies. Especially in natural sciences, engineering and education it is very common for a journal article to be prepared together by the graduate student and the supervisor during the time of graduate studies or later. In some other fields of study, particularly in architecture and in some fields of social sciences this is rather rare. This fact explains partly the difference in the number of publications produced from graduate work among different fields. In Architecture, Industrial Design and City and Regional Planning, awards/grants taken from national and international organizations are mostly seen together with different number of published books. Also, in Social Sciences, in addition to journal publications, publication of books can be more common.

In **Figures 3.23-3.27**, the number of journal publications (SCI, SSCI, AHCI) are given for each graduate school. In preparation of these figures, only the name and number of graduates between the years **2006-2011** and only the journal publications of these graduates were taken into consideration. Thus the numbers just reflect a snapshot for a limited time and the actual number should be higher.

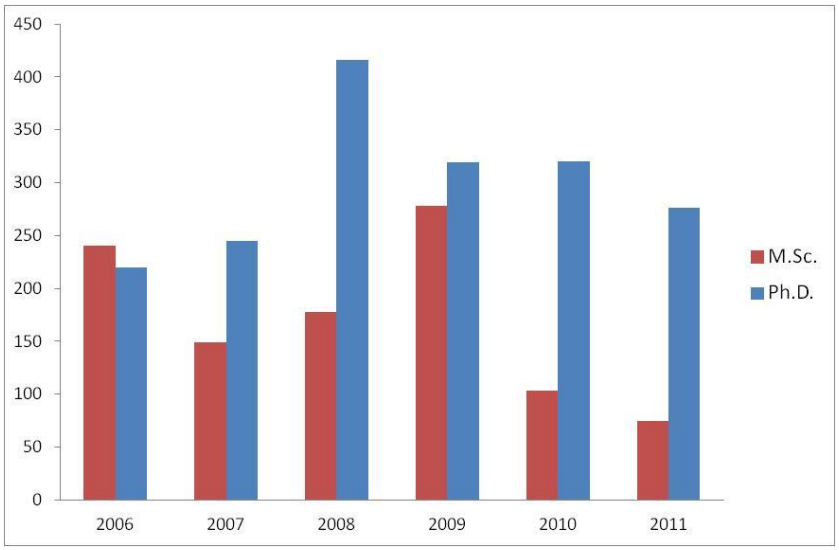

Figure 3.23 Number of Journal Publications of MS/MA and PhD Graduates of **GSNAS.**
(Total Number: 2 441)

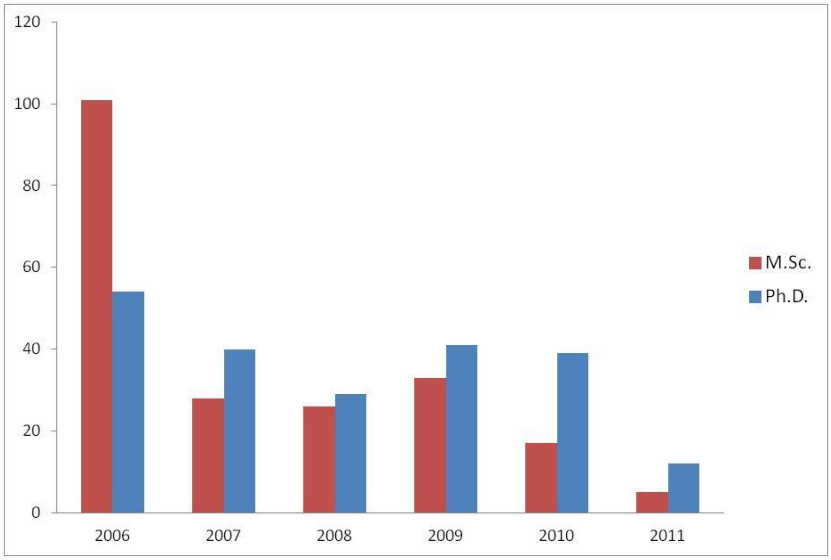

Figure 3.24 Number of Journal Publications of MS/MA and PhD Graduates of **GSSS**.
(Total Number: 450)

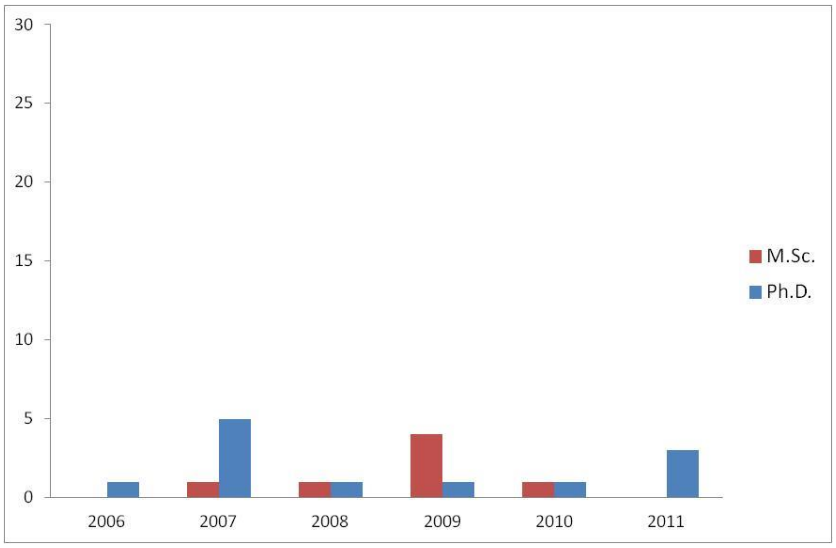

Figure 3.25 Number of Journal Publications of MS/MA and PhD Graduates of **IMS**.
(Total Number: 27)

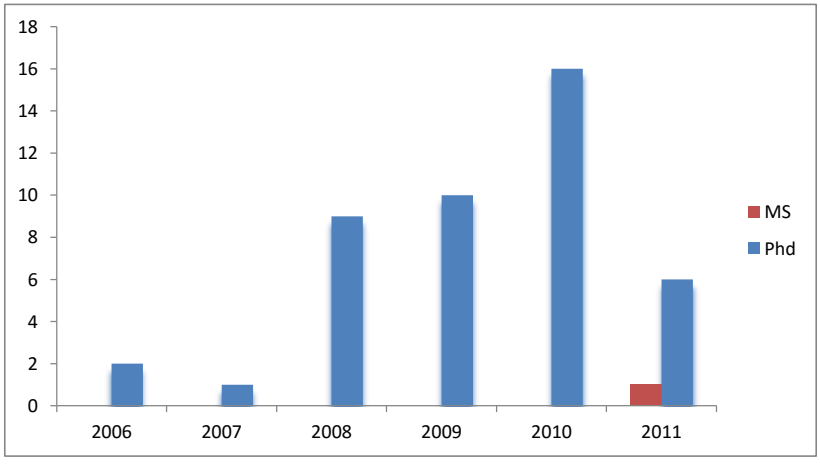

Figure 3.26 Number of Journal Publications of MS/MA and PhD Graduates of **IAM**.
(Total Number: 45)

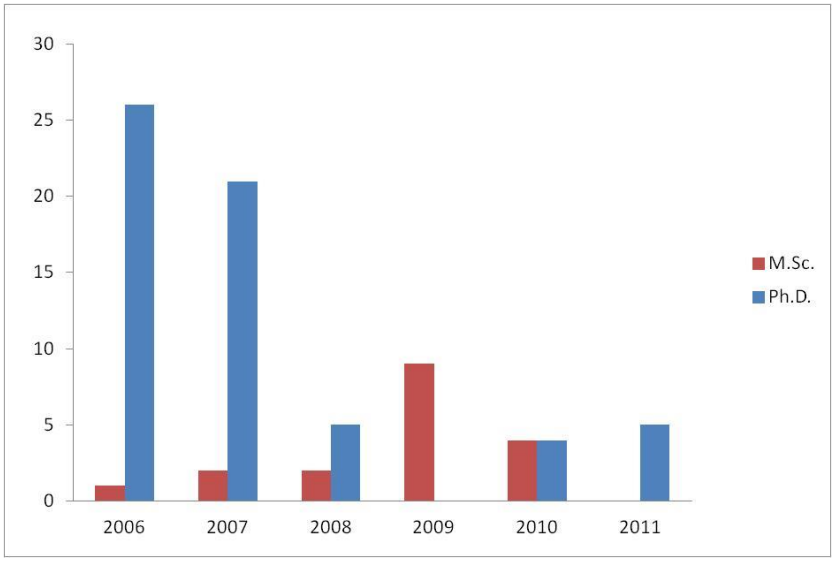

Figure 3.27 Number Journal Publications of MS/MA and PhD Graduates of **II**.
(Total Number: 79)

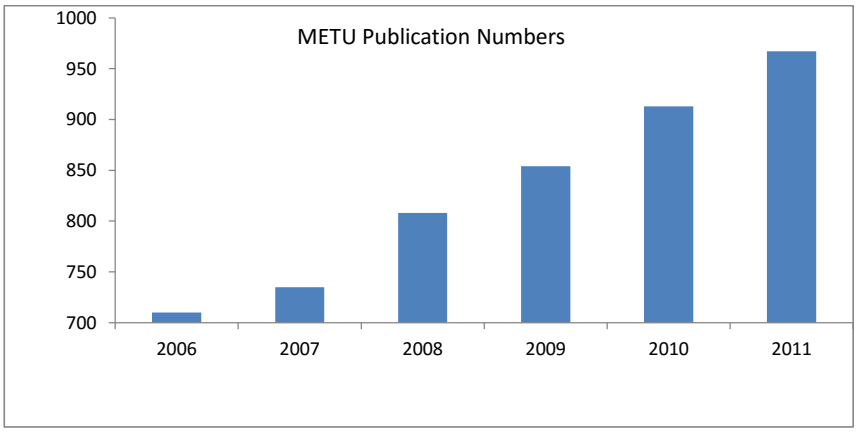

Figure 3.28 Number Journal Publications with METU Address
(Total Number: 4 987)

In the **GSNAS**, between the years **2006-2011**, the number of publications per PhD graduate is **4,38** for Science Departments (Physics, Chemistry, Mathematics and Biology) and **1,72** for Engineering Departments, while for Interdisciplinary Programs (Biochemistry, Polymer Science and Technology, Biotechnology, and GGIT) it is **2,59**. These ratios show the success of interdisciplinary programs and how they enhanced graduate studies and their outputs in terms of publications. The total number of journal publications (SCI, SSCI, AHCI) of our graduates of programs between the years **2006-2011** is **3 043.** The journal publications with METU address between the same years, as given in **Figure 3.28** is **4 987** from web of knowledge. Thus, the contribution of graduate studies done by our MS/MA and PhD graduates is **61%** in publications of METU**.** This is a significant impact on METU publications and on scientific studies.

3.6 TÜBİTAK and TÜBA AWARDS

There are various awards received by our graduate programs' alumni. However, here only TÜBİTAK and TÜBA awards are considered due to ease of accessibility. The awards received by our PhD Programs' graduates are **32** in number and are given in **Table 3.6**. Among the 32, **14** are the graduates of Physics and **seven** are the graduates of Chemistry Departments.

Table 3.6 TÜBİTAK and TÜBA Awards

TÜBİTAK Science Award	**Department**	**Year**
Prof. Dr. Tekin Dereli	PHYS	1996
Prof. Dr. Rahmi Güven	PHYS	1999
Prof. Dr. Metin Gürses	PHYS	2008
Prof. Dr. Levent Toppare	CHEM	2003
Prof. Dr. İskender Yılgör	CHEM	2003
TÜBİTAK Young Scientist Award		
Assoc. Prof.Dr. Tekin Dereli	PHYS	1982
Assoc. Prof.Dr. Rahmi Güven	PHYS	1982
Prof. Dr. Ferit Bingel	DBE	1983
Assoc. Prof.Dr. Metin Gürses	PHYS	1984
Dr. Hasan Gümral	PHYS	1998
Assoc. Prof.Dr. Erhan İltan	PHYS	1999
Prof. Dr. Durmuş Ali Demir	PHYS	2005
Asst. Prof..Ceyhun Bulutay	EE	2007
Assoc. Prof.Dr. Altan Baykal	PHYS	2000
Prof. Dr. Levent Toppare	CHEM	1991
Asst. Prof.Dr. Ömer Dağ	CHEM	2001
Assoc. Prof.Dr. Ufuk Gündüz	CHEM	1988
Assoc. Prof.Dr. Tuncay Birand	EE	1983
Assoc. Prof.Dr. Ülkü Yetiş	ENVE	1997
Assoc. Prof.Dr.Mustafa Versan KÖK	PETE	1999
Assoc. Prof.Dr. Mearl Azizoğlu	IE	2002
Prof. Dr. Nevzat G. Gencer	EE	2003
Prof. Dr. Ali Murat Güler	PHYS	2011
TÜBA-GEBİP Award		
Prof.Dr.Erhan Onur İltan	PHYS	2001
Dr. Alaattin Şen	BCH	2001
Dr. Ömer Dağ	CHEM	2002
Dr. Durmuş Ali Demir	PHYS	2002
Prof.Dr.Altuğ Özpineci	PHYS	2006
Prof. Dr.İrem Dikmen Toker	CE	2008
Prof Dr. Yusuf Baran	BIO	2010
Prof Dr. Atilla Cihaner	CHEM	2010
TÜBİTAK-TWAS Young Scientist Award		
Asst. Prof. Dr. Cevdet Uğuz	BIO	2005

3.7 Scholarships

The number of research assistantship posts provided by the state has continued to decrease since **2002**. Therefore, many of our graduate students apply for **TÜBİTAK** Scholarship to be

able to continue their graduate studies. In **Figure 3.29**, the number of graduate students awarded by TÜBİTAK Scholarship is shown. As can be seen from the figure, the number reached to a maximum in 2007 and it leveled off afterwards.

Erasmus programs also offer an opportunity for the graduate students to have an education experience in a foreign country. **Figure 3.30** gives the numbers of graduate students who have received Erasmus grant. Although mostly undergraduate students were preferred at the beginning of the program; this trend has changed throughout the years.

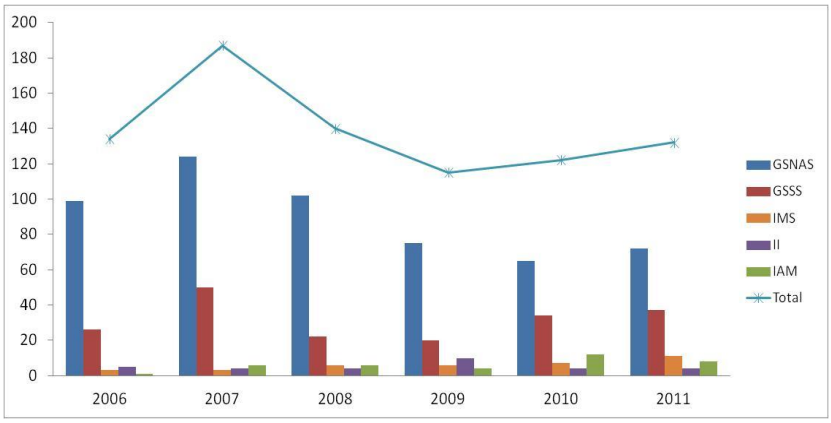

Figure 3.29 Number of students awarded TÜBİTAK Scholarships for Different Graduate Schools (**Total: 794**).

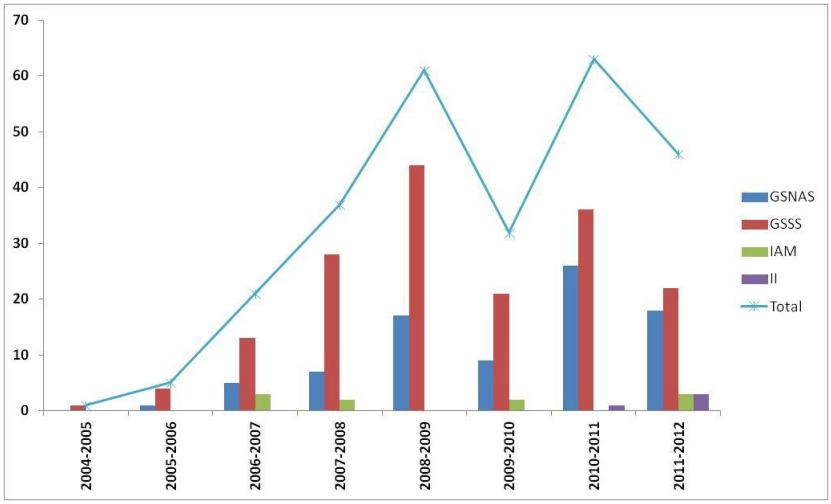

Figure 3.30 Number of students awarded ERASMUS Scholarships for Different Graduate Schools (**Total: 266**).

3.8 Graduate Courses

The number of graduate courses offered by different academic programs in the academic year 2010-2011 is illustrated in **Figures 3.31-3.33.** The total number of courses and the number of students registered to these courses are given in **Table 3.7**. As seen in **Table 3.7**, the total number of graduate courses is **1 325**, while the registered number of students to these courses is **18 441.** The average number of students per course is **~14**.

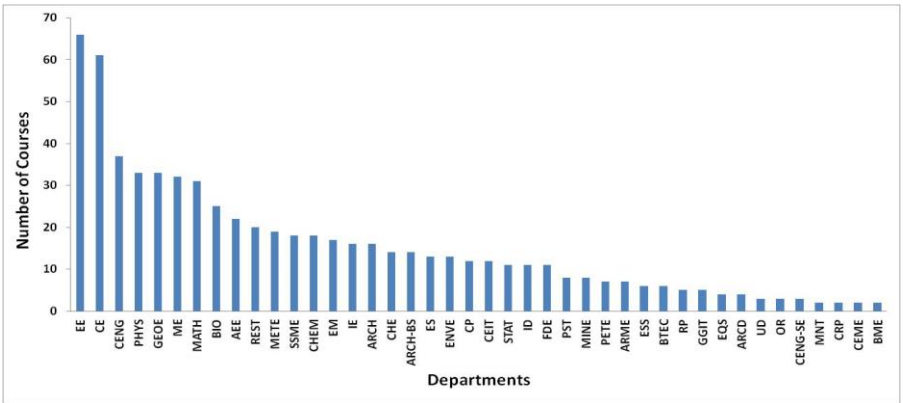

Figure 3.31 Number of Courses Offered by **GSNAS** in 2010-2011 Academic Year.

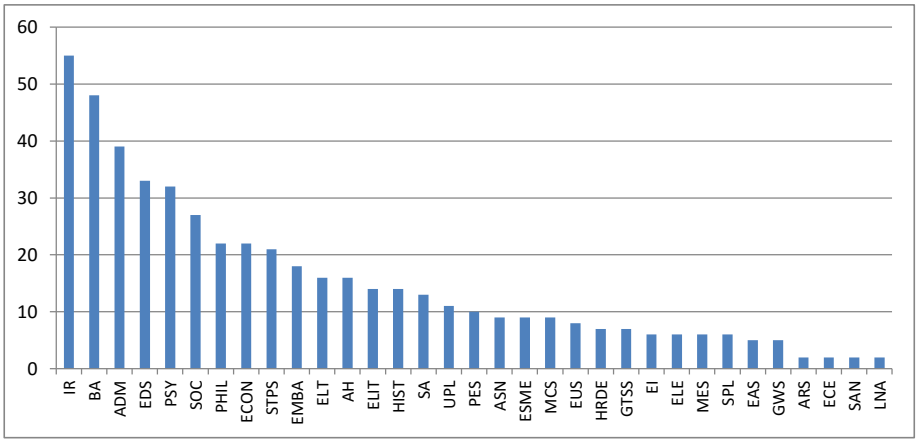

Figure 3.32 Number of Courses Offered by **GSSS** in 2010-2011 Academic Year.

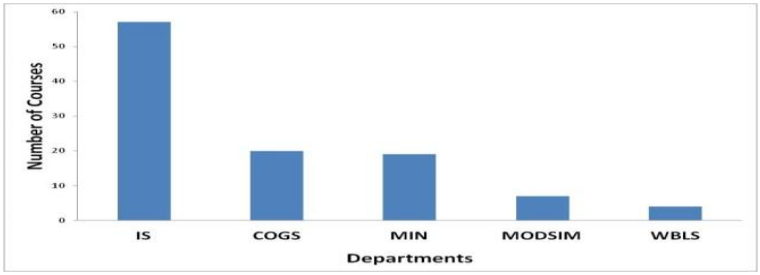

Figure 3.33 Number of Courses Offered by **II** in 2010-2011 Academic Year.

Table 3.7 Number of Courses, Number of Students Registered to These Courses and Number of Students per Course Opened.

	Number of Courses	**Number of Registered Students**	**# of Students/ # of Courses**
GSNAS	652	11 066	16,97
GSSS	503	5 383	10,70
IMS	24	20	0,83
II	107	1 469	13,73
IAM	39	503	12,90
TOTAL	**1 325**	**18 441**	**13,92**

3.9 METU Library and Electronic Thesis Repository

The METU main library has one of the largest collections in Turkey, containing nearly **400 000** books. The library subscribes to **1 500** print journals (170 270 volumes) and it provides access to **50 537** electronic journals, **71 256** electronic books, and **66** electronic reference sources. The library collections also hold over 1 780 book and serial CDs, 1 300 doctoral dissertations and 11 600 master's theses. Abstracts of doctoral dissertations and some master theses from North American colleges and universities and some accredited international universities are also provided, starting from 1 861, with full texts available from the year 1997 onwards. All of library's collections are predominantly in English, but there are also items in Turkish, German, and French. This is a very valuable source of information and knowledge for the graduate students involved in research studies.

In April 2003, in order to make all the MS/MA and PhD theses written in METU available for use in electronic media, METU Library has initiated the first initiative in this area in Turkey. Since September 2003, MS/MA and PhD students are required to submit their theses in electronic format along with the printed copy of their theses and these files are being archived. In April 2004, METU became a member of NDLTD (The Networked Digital Library of Theses and Dissertations) so that the submitted theses could be scanned in the NDLTD system. In 2005, the system has become compatible with OAI (Open Archives Initiative) and in the same year, the system became available for scanning by Google Scholar. Electronic theses that are in the archive are used for 692 162 times in 2011 and 281 662 times in the first three months of 2012. By 2012, there are 7 920 e-theses in the archive which is comprised of 1 527 PhD theses and 6 393 MS/MA theses. Of all these theses, 6 108 theses (which correspond to 77% of all theses in the system) are available for access from the entire world and 1 207 theses (which correspond to 15% of all theses in the system) are accessible only for the users in the METU Campus. 591 theses (which correspond to 7% of all theses in the system) are closed to access for one year. 14 theses are not accessible.

CHAPTER 4

AFFILIATIONS OF PHD GRADUATES

METU has **2 771** PhD graduates. The affiliation of 75% of the graduates could be found out. The affiliations of METU PhD alumni are grouped as follows: universities (international and Turkish), research institutes, governmental institutions, TÜBİTAK, private sector and the field of defense. The distribution of graduates in these areas is given in **Figure 4.1**. It is seen from **Figure 4.1** that, the greatest share is in the area of education **(73%)** of which **90%** (1 525) of this number are affiliated in national universities (**Table 4.1**). This is expected in a country where there are many new universities founded and there is a great demand for high quality academics. Affiliations in international universities are given in **Table 4.2**. This demonstrates a significant impact on the education and the scientific development of Turkey. The number of PhD graduates in private sector is the next highest affiliation as 10%, more than 200 graduates, which can be considered as the significant impact on the countries' technological development.

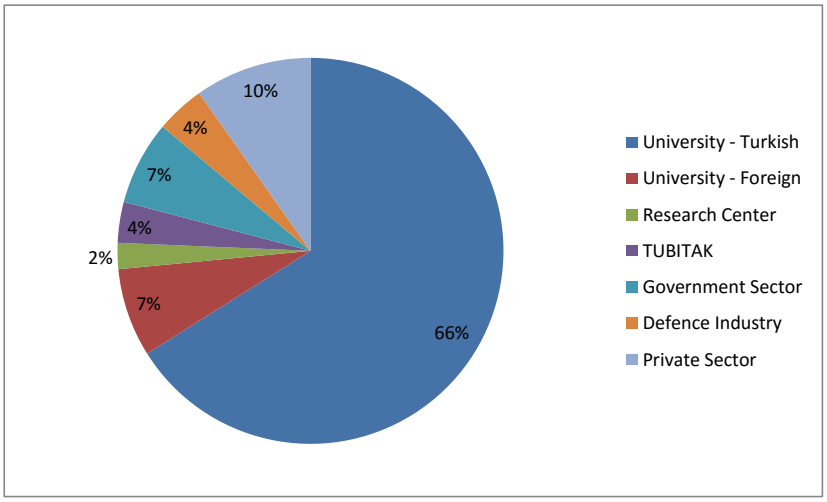

Figure 4.1 Affiliations of PhD Graduates.

As to the places of work preferred by the **PhD** graduates, it is interesting to note that there are **257** faculty members in the academic staff of METU. Considering that there are **841** academics involved in teaching and research at METU, the share of METU graduates is **30.5%.** The distribution of these graduates in programs in different Graduate Schools is given

in **Figures 4.2-4.5.** It can be seen from **Figures 4.2-4.5** that the percentage of METU graduates is higher in the departments of **GSNAS** compared to other Graduate Schools. METU commonly ranks close to the top among research universities in Turkey. In the Webometrics Ranking of World Universities published in July 2009, aiming to measure through web-based publications the institution size, research output, and impact, METU ranked as the world's 435th (1st place within Turkey) among 15 000 universities, being the only university from Turkey to be included among the top 500. The Times Higher Education World University Rankings published in September 2010 placed METU at the 183rd position worldwide based on indicators of teaching, research, influence, innovation, and international character, making it one of the two universities from Turkey listed among the top 200. METU was also listed among leading universities within the past year as reflected in many rankings of world universities, such as Times Higher Education, QS, URAP, Leiden, HEEACT, and Webometrics. According to URAP (University Ranking by Academic Performance), METU is placed at top 500 in the World in 2011. Moreover, in the field of Engineering, METU was listed as the best **192th** university. The rankings of the top universities across the globe are done based on 13 separate performance indicators designed to capture the full range of university activities, from teaching to research to academic publications.. The QS World University Rankings 2010 by Quacquarelli Symonds ranked METU as **185th** worldwide in the field of engineering and technology, and as **285th** in the field of natural sciences.

In 2011–2012 METU was selected by Times Higher Education among the top 100 universities by reputation in world university ranking. The survey is conducted with academics from approximately 150 countries, which carried out over 17 000 evaluations of over 6,000 universities. The academics who take part in the evaluation of the universities are selected according to their experience (approximately 16 years) and their publications (approximately 50). It is a pleasure to see that we are well known world-wide through our graduates and by their publications. The number of faculty who obtained their PhD degrees at METU is **235** and as stated above this is **28%** of the total number of faculty at METU. This means that at METU, which is placed in top **100** universities by reputation, the share of our own PhD graduates is approximately **1/3rd**. This is a measure of the success of PhD programs of METU. Samples of affiliations of some PhD graduates in national and foreign universities are given in **Table 4.1.**

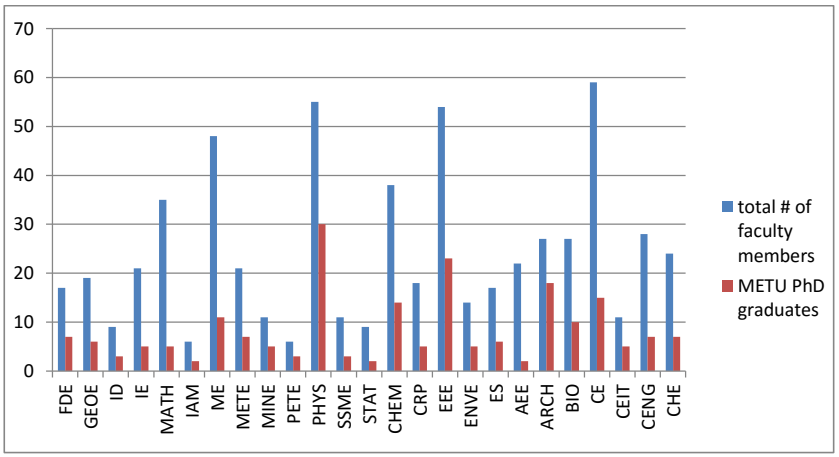

Figure 4.2 Total Number of Faculty Members and Number of METU PhD Graduates of Programs of **GSNAS.**

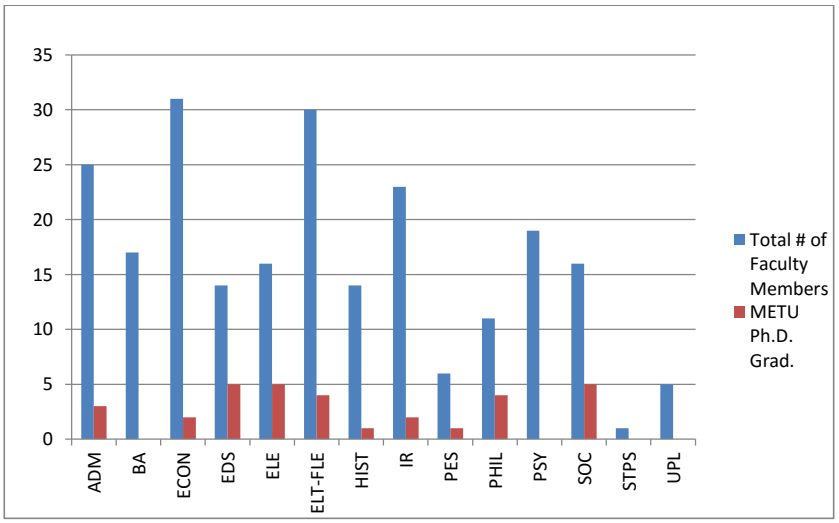

Figure 4.3 Total Number of Faculty Members and Number of METU PhD Graduates of Programs of **GSSS**.

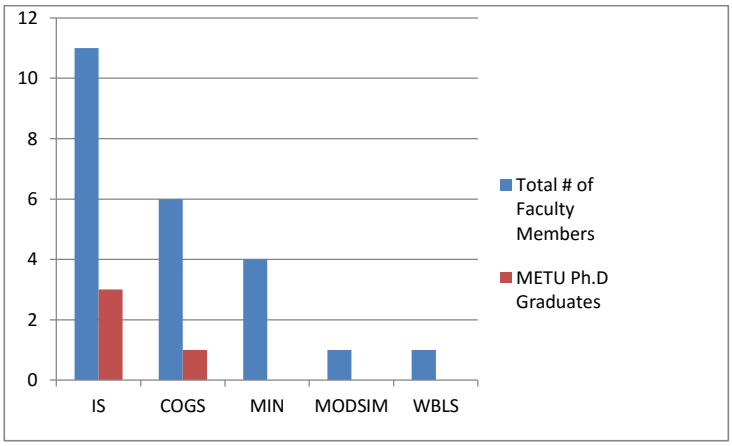

Figure 4.4 Total Number of Faculty Members and Number of METU PhD Graduates of Programs of **II.**

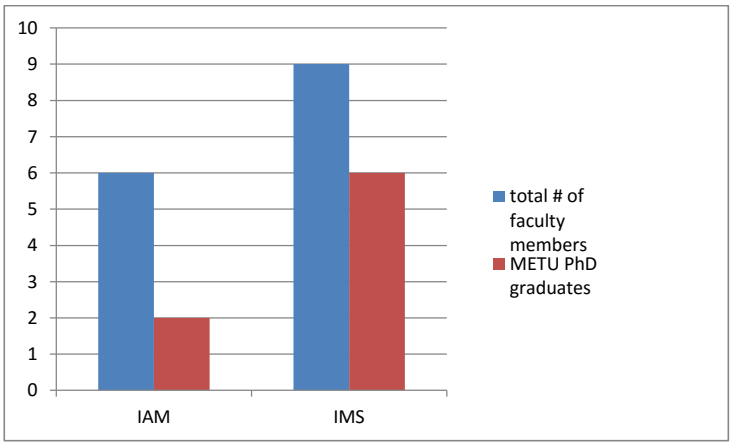

Figure 4.5 Total Number of Faculty Members and Number of METU PhD Graduates of Programs of **IMS** and **IAM**.

Table 4.1 A Sample of Affiliations of PhD Graduates in Turkish and Foreign Universities

Turkish Universities	Foreign Universities
Abant İzzet Baysal Üniv.	Ajman Univ., UAE
Acıbadem Üniv.	Al Fateh Univ., JOR

Adnan Menderes Üniv.	Al-Aqsa Univ, PLE
Afyon Kocatepe Üniv.	Al-Najah National Univ., PLE
Ağrı İbrahim Çeçen Üniv.	Arab American Univ., PLE
Akdeniz Üniv.	Arizona State, USA
Aksaray Üniv.	Bamberg Univ., DEU
Amasya Üniv.	Carleton Univ., CAN
Anadolu Üniv.	Case Western Reserve Univ., USA
Ankara Üniv.	Chuo Univ., JAP
Atatürk Üniv.	College of Engineering Univ. Od Damman, SAU
Atılım Üniv.	Connecticut College, New London, USA
Aydın Üniv.	Cyprus International Univ., TRNC
Bahçeşehir Üniv.	Dalhoise Univ., CAN
Balikesir Üniv.	Eastern Mediterrenean Univ., TRNC
Başkent Üniv.	Ecole Polytechnique Federale de Lausanne, SUI
Beykent Üniv.	Erhent Univ., SUI
Bilgi Üniv.	European Univ. of Lefke, TRNC
Bilkent Üniv.	Girne American Univ., TRNC
Bingöl Üniv.	Groningen Univ., NLD
Boğaziçi Üniv.	Gryounis Univ., LBY
Burdur Üniv.	Harvard Univ., USA
Bülent Ecevit Üniv.	Herriot-Walt Univ., Edinburgh, GB
Cumhuriyet Üniv.	Instituto Nazionale di Geofisca e Vulcanologia, ITA
Çağ Üniv.	Islamic Univ., Gaza, PLE
Çanakkale 18 Mart Üniv.	Islamshahr Azad Univ., IRN
Çankaya Üniv.	Kansas State Univ., USA
Çukurova Üniv.	King Saud Univ., SAU
Doğuş Üniv.	Lahore Univ., PAK
Dokuz Eylül Üniv.	Linköping Univ., SWE
Düzce Üniv.	Manas Univ., KGZ
Ege Üniv.	METU Northern Cyprus Campus, TRNC
Erciyes Üniv.	Michigan State Univ., USA
Fatih Sultan Mehmet Üniv.	Mutah Univ., JOR
Galatasaray Üniv.	Near East Univ., TRNC
Gazi Üniv.	Palestine Academy of Science and Tech., PLE
Gazikent Üniv.	Paul Scherre Ins., SUI
Gaziosmanpaşa Üniv.	San Diego State Univ, USA
Gediz Üniv.	Shiraz Univ., IRN
Hacettepe Üniv.	Simon Fraser Univ., CAN
Hakkari Üniv.	Sultan Qaboos Univ., OMN
Haliç Üniv.	Sunan Kalijaga Islamic State Univ., IDN
Harran Üniv.	Tampere Univ., USA
Hitit Üniv.	Tetovo International Univ., MKD
Işık Üniv.	Tilburg Univ, NLD
İnönü Üniv.	Univ. Lyon I, FRA
İstanbul Kültür Üniv.	Univ. of Michigan, USA
İstanbul Üniv.	Univ. of Surrey, GB
İstanbul Teknik Üniv.	Univ. of Bergen, NOR
İzmir Yüksek Teknoloji Üniv.	Univ. of Connecticut, USA
İzmir Ekonomi Üniv.	Univ. of Damman, SAU
İzmir Teknik Üniv.	Univ. of Haifa, ISR

Table 4.1 (cont'd)

Kadir Has Üniv.	Univ. of Jordan, JOR
Karabük Üniv.	Univ. of Massachusetts, USA
Karamanoğlu Mehmetbey Üniv.	Univ. of Miami, USA
Karatekin Üniv.	Univ. of Palestine, Gaza Strip, PLE
Kayseri Üniv.	Univ. of Sindh, PAK

Kemerburgaz Üniv.	Univ. of Stuttgart, DEU
Kırıkkale Üniv.	Univ. of Western Australia, AUS
Kocaeli Üniv.	Univ. Witwatersrand, SAF
Koç Üniv.	Upper Iowa Univ., USA
Karadeniz Teknik Üniv.	UW-Stout Wisconsin Poly. T. Ins., USA
Maltepe Üniv.	
Marmara Üniv.	
Mehmet Akif Ersoy Üniv.	
Mersin Üniv.	
Mimar Sinan Üniv.	
Muğla Üniv.	
Mustafa Kemal Üniv.	
Namık Kemal Üniv.	
Nevşehir Üniv.	
Niğde Üniv.	
ODTÜ	
Okan Üniv.	
Ondokuz Mayıs Üniv.	
Osmaniye Korkut Ata Üniv.	
Özyeğin Üniv.	
Pamukkale Üniv.	
Polis Akademisi	
Sabancı Üniv.	
Sakarya Üniv.	
Selçuk Üniv.	
Süleyman Demirel Üniv.	
Süleyman Şah Üniv.	
TED Üniv.	
THK Üniv.	
TOBB ETÜ	
Trakya Üniv.	
Tunceli Üniv.	
Ufuk Üniv.	
Uludağ Üniv.	
Yaşar Üniv.	
Yeditepe Üniv.	
Yıldırım Beyazıt Üniv.	
Yıldız Teknik Üniv.	
Yüzüncü Yıl Üniv.	
Zirve Üniv.	

CHAPTER 5

INTERNATIONAL COOPERATIONS: JOINT DEGREE PROGRAMS AND RESEARCH

Graduate School of Natural and Applied Sciences

From the very first days of its foundation, GSNAS has given great importance to international cooperation. By 2011, GSNAS has built 12 joint PhD programs and four double MS/MA programs in cooperation with various universities in the world. In this context, three students have graduated from the Design Research for Interaction graduate program with thesis and one student has graduated from Computational Design and Fabrication Technologies in Architecture graduate program with thesis which are programs that are carried in partnership with the Technical University of Delft. Besides, one student has graduated from Chemical Engineering joint PhD program with Technical University of Eindhoven, one student has graduated from Aerospace Engineering joint PhD program with University of Poitiers, one student has graduated from the Biology joint PhD program with Paul Sabatier University. GSNAS has also signed a Joint Research Protocol with University of California Davis in 2006. Two postdoctoral researchers from METU have joined two research programs on campus in 2007 (one in Nutrition and one in Molecular Cell Biology). Two METU faculty members have spent sabbatical leaves at Davis (one in Chemical Engineering and Materials Science and one in Physics). Ms. Susan Cobey, a bee geneticist at Davis, visited METU to give seminars in Biology Department. Professor Robert F. Berman, Chair of Graduate Program in Neuroscience at UC Davis, participated in a workshop at METU in October 2008. As part of the ÖYP, several METU PhD students spent 6-12 months in campus research laboratories. More than 10 students have completed their programs. These students participated in research collaborations that involved faculty from Plant Science, Civil and Environmental Engineering, Chemical Engineering and Materials Science, Neurobiology Physiology and Behavior, Food Science and Technology and Textiles and Clothing. A new collaboration is being started between a faculty member in Environmental Science and Policy at UC Davis and another in International Relations at METU, through the participation of the METU ÖYP student. Departments of **GSNAS** that have Joint PhD Programs with International Universities are shown in **Table 5.1**.

Table 5.1 Joint International **PhD** Programs of Departments of **GSNAS**

Department	**University**
Aerospace Engineering	University of Poiters-France University of D'Orleans –French
Biology	Universitè Paul Sabatier-Toulouse-France
Biotechnology	Claude Bernord Lyon 1-France
Chemical Engineering	Eindhoven University of Technology-Holland INSA of Lyon (Institut National des Sciences Appliquées de Lyon)-France
Civil Engineering	Carnegie Mellon University-USA Ecole Nationale Supérieure des Mines de Paris-France Joseph Fourier-Grenoble1-French
Environmental Engineering	Carnegie Mellon-ABD
Food Engineering	University Bordeaux 1-France

Table 5.2 Joint International **MS Degree** Programs of Departments of **GSNAS**

Department	**University**	**Program**
Architecture	DELFT University of Technology (Holland)	Computational Design and Fabrication Technologies in Architecture
Civil Engineering	The University Joseph Fourier-Grenoble 1 (France) The University of Patras (Greece) The Rose Sch. of Ins. for Adv. Study Pavia (Italy)	Erasmus Mundus Masters in Earthquake Engineering and Engineering Seismology
Industrial Design	DELFT University of Technology (Holland)	Design Research for Interaction
Industrial Engineering	Eindhoven University of Technology (Holland)	-

Graduate School of Social Sciences

The GSSS initiated a unique, interdisciplinary, integrated Masters' Program operated together with the Institute of Social Sciences at the Humboldt-Universität zu Berlin, named as German-Turkish Master's Program in Social Sciences (GeT MA), in 2007. All students attend their first year of studies in Ankara and their second year in Berlin. GeT MA offers a wide range of topics in the field of social sciences such as modernization, democratization and migration. Students enjoy the assets of the two universities by the specific "Joint-Teaching": Courses taught by faculty from both partner universities. The student profile of GeT MA is unique with respect to students' country of origin which gives a specific international character to the Program. From 2007 onwards, students from 19 countries, from the regions of the European Union, Americas, Asia and Africa, have been part of the program. Upon completion of the program, graduates receive the Dual Masters of Arts in Social Sciences from both universities. Joint Degree Programs of GSSS with International Universities are shown in **Table 5.3**.

The GSSS has also developed institutional links with Asian countries to support the Asian Studies Program, which was established in 2008, and to increase the capacity that existed at METU in this newly-developing field. Since 2008 the GSSS has secured the support of the "Korean Foundation" and "Academy of Korean Studies" in financing a visiting scholar from Korea. Furthermore, since 2008 Korean Embassy in Ankara has granted scholarships to six students from Asian Studies Program to study in Korea. Furthermore the GSSS has facilitated the establishment of the Confucius Institute (CI) at METU, the first of its kind in Turkey. The CI, which became operational in 2008, functions under an agreement between METU and the Office of Chinese Language Council International (HANBAN) in China, in partnership with Xiamen University.

Table 5.3 International Joint Degree Programs of Departments of **GSSS**.

Department	**University**
German-Turkish Social Sciences	Humboldt-Universität zu Berlin
Political Science and Public Administration	Lumière Lyon 2 University

International Cooperations of IMS, II and IAM are given in **Tables 5.4-5.6.**

Table 5.4 Joint International Programs of Departments of **IMS**

Department	**University**	**Program**
Physical Oceanography	Helmholtz Zentrum Geesthacht (HZG),Germany AWI-Alfred-wegener-Institut (Institute for Polar and Marine Research),Germany	TÜBİTAK-Helmholtz joint PhD scholarships

Table 5.5 Joint International **MS Degree** Programs of Departments of **II**.

Department	**University**	**Program**
Work Based Learning Studies (WBLS)	Middlesex University (UK)	Masters in Informatics, e-business, e-learning and e-health.

Table 5.6 Protocols of Cooperation of **IAM** with International Institutions.

Institution	**Field**
Universitat Kaiserslautern (Germany)	Cooperation in the Field of Financial and Insurance Mathematics at IAM.
University of the Aegean (Greece)	Cooperation in the fields of Financial Mathematics, Actuarial Sciences and Establishment of a Joint Doctoral Program at Institute of Applied Mathematics
The Institute of Mathematics of The Polish Academy of Sciences (Poland)	Memorandum on Extending and Strengthening Links Between Polish Academy of Sciences and the Department of Mathematics and IAM
Laboratoire de Mathématiques et	Turkish-French University and Scientific

Applications Université de La Rochelle (France)	Cooperation Projects: Exchange of know-how in Financial Mathematics, Development of common teaching and research programs, Joint participation to European research projects.
University of Ballarat, (Australia)	Collaboration between the Centre for Informatics and Applied Optimization, University of Ballarat Australia, and the IAM -METU, Turkey.

Table 5.6 cont'd

Universitat Ulm LLP (Lifelong Learning Programme) ERASMUS Academic Years 2009/10-2011/12 (Germany)	Both parties agree to abide by the principles and conditions set out in the Guidelines for Applicants and the Erasmus Charter at IAM
- MPI for Mathematics in the Sciences, Research Group on Complex Systems, Leipzig (Germany) - Interdisciplinary Center for Bioinformatics, University of Leipzig (Germany) - CAS-MPG Partner Institute for Computational Biology, Shanghai (China) - Koç University - Işık University	Collaboration in the fields of mathematical modeling of biological networks, network dynamics and information processing, algebraic structure of graphs and discrete and continuous optimization problems in computational biology.
The Value Price AG(Germany)	Cooperation is intended to contribute to scientific and industrial cooperation and Exchange between both countries at IAM
Universitadeglii Studidell' Aquila (Italy) ERASMUS Academic Years 2008/2013	Both parties agree to adhere to the principles and conditions as stated in the Erasmus University charter and conditions are stated in the LLP/Erasmus Guidelines at IAM

CHAPTER 6
THE FIRST GRADUATES

Among the 19 966 graduates of MSc/MA and the 2 763 graduates of PhD programs', the first MS/MA graduates were in the 1960/61 academic year and that of the PhD Programs' were in the 1969/70 academic year.

6.1 The First Graduates of MS/MA and PhD Degree Programs

The first graduates (**15**) of MS/MA programs and the **first six** of PhD programs are given below in **Tables 6.1 and 6.2.**

Table 6.1 First **MS/MA** Graduates of METU **(1960/1961-2).**

Name	**Department**	**Advisors**
Osman Gencer Armangil	ARCH	
İnci Aslanoğlu	ARCH	
Aydan Bulca	ARCH	
Aykut Erten	ARCH	
Güldenen Girin	ARCH	
Gürol Gürkan	ARCH	
Bilge İşman	ARCH	
Yücel Okçetin	ARCH	
Önder Sonad	ARCH	
Olcay Tan	ARCH	
Alpay Ankara	ME	Dr.Veli Aytekin
Arshad Jamil	ME	Dr. Mahmut Mucuoğlu
İbrahim Koyuncu	ME	Dr. Kudret Selçuk
Saner Özden	ME	Dr. Mahmut Mucuoğlu
Ünsal Yönak	ME	Dr.Veli Aytekin

Table 6.2 First **PhD** Graduates of METU between **1966/1967-1969/70**.

Name	**Department**	**Academic Year**	**Advisors**
Dr. Ali Emre Usseli	PHYS	1966/67-2	Dr.Erdal İnönü
Dr. Namık Kemal Tunalı	CHEM	1966/67-2	Dr.Vedat Enüstün
Dr. Güneri Akovalı	CHEM	1967/68-2	Dr.Bahattin Baysal
Dr. Sacit Başol	CHEM	1967/68-2	Dr.Bahattin Baysal
Dr. Ulviye Yücelik	CHEM	1967/68-2	Dr.Bahattin Baysal
Dr. Ahmet Altay Birand	CE	1969/70-1	Dr.Ilgaz Alyanak
Dr. Mehmet Ersen Ülküdaş	ES	1969/70-1	Dr.Murat Dikmen
Dr. Altunkan Hızal	EE	1969/70-2	Dr.Alexandre Movinciç
Dr. Mahmoud Mohammad Haifawi	MATH	1969/70-2	Dr.M.Gündüz İkeda

6.2 Names of the First Five PhD Programs' Graduates

In **Tables 6.3-6.8** the first five graduates' names of each department /program are given based on the graduation semester. In some departments, the number of students listed is more than five, due to the fact that, in the same academic semester, more than one student was graduated.

The Graduate School of Natural and Applied Sciences

Table 6.3 First Five **PhD** Graduates of Departments/Programs (**GSNAS**).

Department	**Name**	**Year/Semester**
AEE	**SARTUK KARASOY**	**19981**
	LEVENT GÖKKUŞ	19982
	ERDAL YILMAZ	19991
	NADİR SERİN	20002
	TURGUT SERKAN ŞEN	20011

ARCH	***ARCH***	**EMİN MAHİR BALCIOĞLU**	**19722**
		SÜHA ÖZKAN	19792
		OKAN ÜSTÜNKÖK	19862
		EMEL AKÖZER	19891
		NİLGÜN ÇUHA	19891
	BS	**HALİME DEMİRKAN**	**19882**
		AYDAN KESKİN	19931
		LEVENT TOPAKTAŞ	20022
		SAADET TOKER	20032
		ZEHRA TUĞÇE KAZANASMAZ	20042
	REST	**NİLGÜN ÇUHA**	**19822**
		BAŞAK İPEKOĞLU	19922
		EMRE MADRAN	19952
		MELTEM UÇAR	20062
		TUBA AKAR	20081
ARME		**ALİ AKIN AKYOL**	**20082**
BCH		**ORHAN ADALI**	**19792**
		TÜLÜN GÜRAY	19792
		EMİNE SUNA TÜRKOĞLU	19792
		ALI AWSAD MELLATI	19802
		GÜZİN CANDAN GÜRAKAN	19802
BIOL		**DOĞAN ALPSAN**	**19792**
		UFUK GÜNDÜZ	19792
		MERAL YÜCEL	19792
		YUSUF PLAMENKO TAN	19802
		İNCİ TOGAN	19802

Department	Name	Year/Semester
BMED	**AHMET BAYKAL**	**19921**
BTEC	**KEZBAN ULUBAYRAM**	**19971**
	FARZIN ROOHVAND	19981
	ÜLKÜ BAYKAL	19982
	ÖZLEM OSMANAĞAOĞLU	19982
	OSMAN ÇATALOLUK	19991
CE	**AHMET ALTAY BİRAND**	**19691**
	TURHAN YAŞAR ERDOĞAN	19692
	MEHMET KARAN	19721
	RÜŞTÜ YÜCE	19721
	ENGİN KEYDER	19722
CEIT	**SERPİL YALÇINALP**	**20002**

	YASEMİN ÜLBAHAR	20021
	NERGİZ ERCİL	20022
	HOSEIN MOEINI	20022
	RECEP ÇAKIR	20031
	YUNİS ŞAHİNKAYASI	20031
	NEŞE ZAYİM	20031
CENG	**ASUMAN DOĞAÇ**	**19801**
	HALİL BAŞOĞLU	19802
	ABDULLAH UZ TANSEL	19802
	FAZLI CAN	19851
CHE	**A.BİRİÇİM SİPAHİ**	**19752**
	AYŞE SEMRA KERMAN	19752
	ALİ ESİN	19772
	CANAN ÖZGEN	19772
	COŞKAN ILICALI	19781
CHEM	**NAMIK KEMAL TUNALI**	**19662**
	GÜNERİ AKOVALI	19672
	SACİT BAŞOL	19672
	ULVİYE YÜCELİK	19672
	GÜLER SOMER	19702

Department		**Name**	**Year/Semester**
		MELİH ERSOY	**19812**
		AHMET SAFFET ATİK	19832
		GÜVEN GÜLOKSUZ	19842
		ÖZCAN SEZER	19821
	CRP	**GÜLDEN BERKMAN**	**19911**
		H.MURAT GÜVENÇ	19912
		SALAHELDINE M. OSMAN	19921
		FEYZAN BELER	19931
		KHALED ELDOUNI	19931
EE		**ALTUNKAN HIZAL**	**19692**
		ÖZAY HÜSEYİN	19692
		KHALDUN ABDUL BAQI ABDULLAH	19701
		CEMİL ARIKAN	19702

	MEHMET TUNCAY BİRAND	19702
ENVE	**ÜLKÜ YETİŞ**	**19881**
	FİLİZ BENGÜ DİLEK	19902
	LABEEB MUKHALLALATI	19932
	GÜLFEM BAKAN	19941
	GAYE TUNCER	19942
ES	**MEHMET ERŞEN ÜLKÜDAŞ**	**19691**
	ORHAN AKSOĞAN	19722
	ALİ ÜNAL ERDEM	19742
	MUHSİN MERT	19742
	YAŞAR ERSOY	19752
	EMİNE ENGİN KARAESMEN	19752
FDE	**ŞÜKRÜ KARATAŞ**	**19871**
	ALİ SÜMER	19881
	A.LEVENT BAYINDIRLI	19891
	ALEV BAYINDIRLI	19891
	NEŞE ÜLGEN	19911
	FÜSUN YÖNDEM	19911
GEOE	**MUSTAFA CENGİZ BAŞTUĞ**	**19792**
	NURKAN KARAHANOĞLU	19822
	NİYAZİ TÜRKELLİ	19831
	FONGSAWAR SUVAGONDHA	19851
	İLYAS YILMAZER	19851
GGIT	**DİLEK KOÇ SAN**	**20081**
	ARZU ERENER	20091
	DENİZ GERÇEK	20092
	EMRAH TUFAN	20092
	TAHSİN ALP YANAR	20092

Department	**Name**	**Year/Semester**
ID	**ALİ EMRE BERKMAN**	**20092**
	GÜLÇİN CANKIZ ELİBOL	20102
	AYDIN ÖZTOPRAK	20102
IE	PAUL SAGALA	19901
	MERAL AZİZOĞLU	19902
	FATMA SEDEF MERAL	19931
	AYŞEGÜL TOKER	19941
	HALDUN SÜRAL	19951
MATH	**MAHMOUD MOHAMMAD HAIFAWI**	**19692**

	SADI ABDEL	19701
	GÜLTEKİN BÜYÜKYENEREL	19712
	ULUĞ ÇAPAR	19712
	SADI ABDEL ABU-SAYMEH	19742
	HALİL İBRAHİM KARAKAŞ	19742
ME	**EYÜP YALÇIN DENKER**	**19721**
	HAFİT YÜNCÜ	19741
	ATOM DAMALI	19742
	RÜKNETTİN OSKAY	19752
	BİROL YÜCEL	19752
METE	**ETİ UYGUR**	**19702**
	AHMET GEVECİ	19721
	RAUF HÜRMAN ERİÇ	19782
	ALİ ŞAKİR BOR	19802
	MACİT ÖZENBAŞ	19802
MINE	**GÜLHAN ÖZBAYOĞLU**	**19771**
	CELAL KARPUZ	19812
	TEVFİK GÜYAGÜLER	19821
	ABDURRAHIM ÖZGENOĞLU	19841
	MUSTAFA GÜREL ŞENYUR	19851
OR	**SİBEL GÜVEN**	**19852**
OR	**HAYRİ ÖNAL**	**19861**
	MEHMET SALTIK	19892
	GAMZE TOKOL	19931
	AZER ÖNEL	19952
PETE	**ALİ SUAT BAĞCI**	**19861**
	MEHMET RAİF BİROL DEMİRAL	19862
	FEVZİ GÜMRAH	19881
	MAHMUT PARLAKTUNA	19881
	İ HAKKI GÜCÜYENER	19902
	MUSTAFA VERSAN KÖK	19902

Department	**Name**	**Year/Semester**
PHYS	**ALİ İMRE USSELİ**	**19662**
	HÜSEYİN AKÇAY	19711
	MEHMET KOCA	19711
	GÜLSEN ÖNENGÜT	19712
	MERAL SERDAROĞLU	19721
PST	**İLKSEN HİLAL DARA**	**20011**
	GÜRALP ÖZKOÇ	20031

	CEMİL ALKAN	20032
	TONGUÇ ÖZDEMİR	20052
	ELİF ÖZTÜRK	20052
SCE	**MÜGE SAYGI**	**19892**
	ÖMER GEBAN	19901
	MEHMET SANCAR	19912
	MEHMET ÇAĞLAR	19922
	CANAN TOSUNOĞLU	19922
SSME	**İBRAHİM BİLGİN**	**20012**
	ÖZLEM SILA ÇAKIR	20012
	AYKUT İNAN İŞERİ	20012
	MUSTAFA BAŞER	20022
	GÜLCAN ÇETİN	20031
	HÜLYA ERYILMAZ	20031
	DENİZ GÜRÇAY	20031
	SEMRA SUNGUR	20031
	ESEN UZUNTİRYAKİ	20031
STAT		
	MOHAMMAD QAMARUL ISLAM	19891
	EL-BASHIR-ALI ZENBİL	19911
	ABDULLAH AHMET MUST SMADI	19931

Biçimlendirilmiş Tablo

The Graduate School of Social Sciences (GSSS)

Table 6.4 First Five **PhD** Graduates of Departments/Programs (**GSSS).**

Department	**Name**	**Year/Semester**
ADM	**MOHD MUSTAFA TAAMNEH**	**19911**
	MERİH RAFET AKGÜNAY	19912
	YILMAZ ÜSTÜNER	19912
	AYŞE AKBAŞ	19921
	HÜSEYİN ÇAĞATAY KESKİNOK	19922
AH	**KEMAL REHA KAVAS**	**20082**
	FATMA GÜL ÖZTÜRK	20092
	KENNETH LEONARD HAYES	20092
	ÇILGA RESULOĞLU	20102
BA	**HASAN TAPKIN**	**19792**
	AYŞE ELİF ŞENGÜN (UZUN)	20041
	TAHİR GÖKHAN ÜNÜVAR	20052
ECON	**SAK GÜVEN**	**19931**

	DAYIOĞLU MELTEM	19942
	TIKTIK AHMET	19952
	TUNÇ GÜL İPEK	19962
	ÇELEBİ HASAN KUDRET	19981
EDS	**ABDELRAHMAN SHUKRI H**	**19881**
	OTRAGHCHI MADJED	19882
	YOUNIS BAKER	19882
	YÖNTER HATİCE AYŞENUR	19892
	KÖSE MEHMET RUHİ	19892
ELE	**TOPÇU MUSTAFA SAMİ**	**20072**
	ÖZGELEN SİNAN	20091
	ÖZSOY SİBEL	20092
	HACIEMİNOĞLU ESME	20092
	KURT GÖNÜL	20101
ELIT	**PULTAR GÖNÜL**	**19931**
	ÖZDAĞ MEHMET HAKAN	19941
	ÖZ FAHRİ	20021
	MADRAN CUMHUR YILMAZ	20032
	ÖZYURT KILIÇ MİNE	20042
ELT	**EKEN DENİZ**	**19992**
	ÖNİZ AYŞE SUZAN	20002
	YAĞCIOĞLU DİLEK	20011
	ELLİDOKUZOĞLU HASANBEY	20011
	UZEL FATMA ELİF	20012

Department	**Name**	**Year/Semester**
HIST	**NESİM ŞEKER**	**20011**
	ORHAN AYBERS	20022
	SEDAT ÇİLİNGİR	20061
	NİLGÜN DALKESEN	20062
	YUNUS EMRE GÜRBÜZ	20071
IR	**DAVUT ATEŞ**	**20032**
	DİLEK LATİF	20042
	FIRAT BAYAR	20042
	GÖKHAN BACIK	20042
	HASAN ULUSOY	20051

PES	**HAYRİ ERTAN**	**20061**
	YAŞAR SALCI	20072
	ÜNAL KARLI	20072
	MUSTAFA SÖĞÜT	20082
	PINAR ARPINAR AVŞAR	20082
PHIL	**ŞAHABETTİN DEMİREL**	**19872**
	M.AMIN ABDULLAH	19901
	KOMARUDDIN HIDAYAT	19901
	YAMAN ÖRS	19911
	ŞULE ELKATİP	19921
PSY	**ZAHİDE KARAKİTAPOĞLU**	**20012**
	SEDA USUBÜTÜN	20022
	İBRAHİM DALMIŞ	20022
	SELEN İMAMOĞLU	20042
	GÜLAY DİRİK	20052
SA	**ELİF KOPARAL**	**20102**
SOC	**SEMRA FERİHA AŞÇIGİL**	**19921**
	WILLIAM AL SCHROEDER	19912
	ORHAN TEKELİOĞLU	19931
	MOHAMAD IQBAL SAIF	19931
	HAYRİYE ERBAŞ	19922
STPS	**VEDAT SİNAN TANDOĞAN**	**20101**
	BERNA BEYHAN BOZKIRLIOĞLU	20102
UPL	**GÜLÇİN TUNÇ**	**20092**
	ALİ CENAP YOLOĞLU	20102

Institute of Marine Sciences (IMS)

Table 6.5 First Five **PhD** Graduates of **IMS.**

Department	Name	Year/Semester
MBF	**ALİ CEMAL GÜCÜ**	**1991**
	DURSUN AVŞAR	1993
	ZAHİT UYSAL	1993
	ALİ İŞMEN	1995
	ERHAN MUTLU	1996
CHOC	**ÖZDEN BAŞTÜRK**	**1982**
	METE SUNAY	1982
	SÜLEYMAN TUĞRUL	1982
	AYŞEN YILMAZ	1986
	SEMAL YEMENİCİOĞLU	1990

PHOC	**HALİL İBRAHİM SUR**	**1988**
	ŞÜKRÜ TURAN BEŞİKTEPE	1991
	TÜLAY ÇOKACAR	2005
	MURAT GÜNDÜZ	2008
	SERKAN SANCAK	2011
MGG	**MEHMET NURİ BODUR**	**1991**
	VEDAT EDİGER	1991
	MAHMUT OKYAR	1991
	DEVRİM TEZCAN	2008

Institute of Informatics (II)

Table 6.6 First Five **PhD** Graduates of Departments/Programs of **II.**

Department	Name	Year/Semester
COGS	**ULAŞ BAŞAR GEZGIN**	**2005**
	TEVFIK AYTEKIN	2006
	HACER KARACAN (ÜKE)	2006
	NARTBEDIN ATALAY	2006
	EROL ÖZÇELIK	2007
IS	**KEMAL BIÇAKÇI**	**2003**
	HASAN OĞUL	2006
	ÇIĞDEM GENCEL	2004
	SEVGI ÖZKAN	2005
	HABIL KALKAN	2005
MIN	**KEMAL HAKAN GÜLKESEN**	**2008**
	KAYA KURU	2009
	ERGIN SOYSAL	2010
	PINAR YILDIRIM	2011
	OYA DENIZ KOÇGIL BEYAN	2009

Institute of Applied Mathematics (IAM)

Table 6.7 First Five **PhD** Graduates of Departments/Programs **of IAM.**

Department	Name	Year/Semester
CRYP	**ZÜLFÜKAR SAYGI**	**20071**
	ORHAN ÇETİNKAYA	20071

	MELTEM SÖNMEZ TURAN	20072
	MURAT CENK	20082
	ELİF KURTARAN ÖZBUDAK	20082
FM	**AYŞEGÜL İŞCANOĞLU**	**20101**
	ÖZGE SEZGİN ALP	20102
	İREM TALASLI	20111
SC	**SELÇUK HAN AYDIN**	**20072**
	SIRMA ZEYNEP ALPARSLAN GÖK	20082
	SÜREYYA ÖZÖĞÜR	20082
	SEVİN GÜMGÜM	20092
	BAŞAK ÖZTÜRK	20092

APPENDICES

APPENDIX-A

PROGRAMS OF GRADUATE SCHOOLS

Different programs of Graduate Schools, with very short explanations, are given below. The total number of programs in GSNAS is 34 and among this, 10 of them are interdisciplinary. The total number of programs in GSSS is 33 and among this, 15 of them are interdisciplinary. The others are thematic institutes and they are interdisciplinary in nature. The total number of programs in IMS is 4. The total number of programs in IAM is 3. The total number of programs in II is 5.

A1. The Graduate School of Natural and Applied Sciences

Aerospace Engineering (AEE) Established in 1981 with four faculty members, the department is growing very fast and developing pace with academic and industrial projects. The research areas are aerodynamics, aero propulsion, aero structures and aerospace system simulation control and avionics. The current number of faculty is 18.

Architecture (ARCH) Founded in 1956 as the first department of METU, it offers degrees in architectural design, building science, restoration and preservation of historical monuments, and history of architecture. The primary mission is to train students further for their professional careers in architectural practice, research and education.

Archaeometry (ARME) It was established in 1990 as a joint interdisciplinary program of ten departments: physics, chemistry, statistics, architecture, biology, philosophy, metallurgical and materials engineering, geological engineering, industrial design and city and regional planning. Students have to attend archaeological excavations under supervision of either a Turkish or a foreign archaeologist for at least three weeks as a summer internship. The department aims to develop cooperation between archaeometry students and scientists dealing with archaeology.

Biochemistry (BCH) BCH is a joint interdisciplinary program of five departments; biology, chemistry, food engineering, chemical engineering and environmental engineering. The department is open to students with a variety of backgrounds and career goals. Research subjects are molecular biochemistry, chemistry, enzyme kinetics, molecular biology, biochemical toxicology, structural biology and molecular genetics. These are supplemented by several applied elective courses such as food processing, biochemical engineering, and enzyme technology. Research areas span nearly all aspects of the structure, function, and dynamics of proteins, nucleic acids, and other biomolecules, providing many opportunities to select an area of specialization.

Biomedical Engineering (BME) A joint interdisciplinary program composed by many departments (biology, chemistry, physics, chemical engineering, electrical and electronics engineering, engineering sciences, metallurgical and materials engineering, mining engineering, mechanical engineering, physical education and sports, and institutes of applied mathematics and informatics). It was established in 2006 in order to apply to the problems in the medical field. It advances fundamental concepts and creates knowledge from the molecular to the organ systems levels, research in medical imaging, image processing, physiological signal processing, synthesis and design of biocompatible prostheses, medical devices, material-cell interactions, nano-patterned surfaces, biosensors, biocompatibility, tissue engineering, mechanical analysis of locomotion and movement, cell and tissue mechanics, mechanical characterization and identification of biological materials, biomechanical modeling and simulation, biostatics and biodynamic of solids and fluids, biomolecular systems, genome assembly, protein structure and alignment, prediction of gene expression, etc.

Biotechnology (BTEC) BTEC is a joint interdisciplinary program of chemistry, biology, food engineering, chemical engineering and environmental engineering. Biotechnology is an area of bioscience and technology which involves the practical application of biological organisms or their subcellular components to manufacturing and service industries and to environmental management. Biotechnology utilizes bacteria, yeasts, fungi, algae, plant cells, whole plants, cultured mammalian cells, or whole organisms and their constituents as catalysts of industrial processes. Biotechnology includes fermentation processes, water and waste treatment, food technology, and an increasing array of novel applications ranging from biomedical to metal recovery from low grade ores. In the long run it offers a means of solving some major world problems, in particular in relation to medicine, food production, pollution control and the development of new energy sources.

Biology (BIO) Biology Program provides diverse graduate and post-graduate training opportunities, research with integrative approaches and modern experimental systems addresses to the most challenging problems of life at molecular, cellular, organismal and population level, together with the problems in sensible management of the environment.

Civil Engineering (CE) Civil Engineering MS Program aims to provide advanced level of knowledge in the field as well as tools and techniques of research with their implementation within the context of a comprehensive thesis. It does so through the courses it offers as well as through the thesis projects it supervises. The program aims to provide maturity in the knowledge of the students as well as to advance it further. The ability to conduct independent research, the creativity in the tools and techniques of research, ability of formulating steps to reach new synthesis are the main objectives.

Cement Engineering (CEME) It was established in 2006. It is a joint interdisciplinary program of chemical, mechanical, mining, geological, electrical, industrial, environmental, and civil engineering departments proposed and backed by the Turkish Cement Manufacturers' Association (TÇMB) aims to provide the engineers with the necessary knowledge and technical background demanded by the cement industry.

Computer Education and Instructional Technologies (CEIT) The program provides advanced education to qualified students. It established an opportunity for active research in broad area for individuals seeking to be practitioners in the field of instructional technology. The program provides its graduates who will become teachers with relevant contemporary information, training and prerequisite skills to enable them to guide their students through the 21st century.

Computer Engineering (CENG) Established in 1967, the program is the leading computer engineering department in Turkey. The main goals of the department are to produce and disseminate theory, principles, practice and know-how of computing in the information age, for the critical design, evaluation, and improvement of computing systems in the context of computers and man/society/industry and services.

Chemical Engineering (CHE) With 27 faculty members, the program has a rich past and a bright future. Active research is being conducted in the following areas: materials, biotechnology, renewable energy, hydrogen energy, fuel cells, boron compounds, process design and control, reaction engineering and catalysis, wastewater treatment.

Chemistry (CHEM) With a faculty with a respectable number of academy members and TUBITAK awardees., the program offers research opportunities in atom trapping atomic spectrometry, determination of trace elements, pollution modeling, polymer chemistry, polymer micro and nano-composites, mass spectrometry, quantum chemistry, chiral chemistry and catalysis, carbonyl, olefin or donor ligands, genetics, genomics and proteomics, artificial enzymes, photodynamics therapy.

City and Regional Planning (CRP) Established in 1961, the program is the oldest as well as one of the largest schools of planning in Turkey. It offers degrees in city planning, regional planning and urban design. The program played a key role not only in planning education but also in the development of urban research in Turkey.

Earthquake Studies (EQS) The program started education in 2008. It is a joint interdisciplinary program of civil, geological, environmental engineering, psychology, city and regional planning and architecture departments for teaching and research related to natural disasters (earthquakes).

Electrical and Electronical Engineering (EE) The program started education in 1958 and recruits students from the top 800 of about 1.5 million candidates in Turkey. The faculty has an expertise ranging from high voltage to microwaves and "MEMS". It has the second largest number of PhD Degrees awarded within the university.

Environmental Engineering (EE) With 12 faculty members, EE provides a high quality education as required by the industry and the public. The research areas are as follows: water supply, wastewater, air pollution and control, water quality management, soil and ground water pollution, environmental modeling, environmental impact assessment environmental chemistry and microbiology. The program is in continuous interaction with the industry and consulting activities.

Engineering Sciences (ES) Established in 1969, the program accepts graduates of engineering, basic and life sciences (i.e. medicine, dentistry, pharmacy). ES includes a variety of closely related areas of the physical and biological sciences, mathematics and engineering. Degrees are offered in computational mechanics and biomechanics.

Food Engineering (FDE) FDE Provides graduates with the knowledge and skills to design, develop and manufacture safe, high quality food products and value-added by-products. The program is constantly updated for rapid adaptation of the graduates to the dynamically growing industry. Graduates' employments are in the private sector enterprises to design, control, and operate the existing equipment and processes as well as to perform research, development, marketing and management.

Geodetic and Geographic Information Technologies (GGIT) A joint interdisciplinary program for teaching and research in geographic information science, remote sensing and space geodesy. The program is designed to meet the growing demands for skilled manpower at graduate level particularly in areas modern space technologies and their applications, GIS, spatial data analyses and remote sensing technology. Equipped with research and computer labs each having sufficient number of powerful PCs equipped with necessary software applications (such as Arc-info Arcview, Arcgis, Tnt-mips, Map-info, Intergraph, MGE, Idrisi, PCI-Geomatica, Erdas Imagine, etc.), the lab also has a software for GPS data processing and adjustment.

Geological Engineering (GEOE) Research areas are geochemistry, mineralogy-petrography, geotechnology and engineering geology, stratigraphy/paleontology/sedimentology, groundwater resources, structural geology-tectonics, remote sensing, GIS and geoarchaeology. It provides education for investigating the composition, structure and evolution of the Earth's crust, for exploring natural sources and seeking causes and effects of the natural hazards.

Industrial Design (ID) Established in 1979, the program pursues a design education philosophy stressing the integration of innovative and critical thinking with technical ability and technological awareness. ID gives importance to developing strong ties with local firms and the professional community such as automotive, furniture, electronics, ceramics sanitary ware and white goods. It has international programs with TU/DELFT.

Industrial Engineering (IE) Established in 1969, degrees offered are in engineering management and industrial engineering. Faculty is active in several sponsored research projects conducted for industry and the government. The education provided is in a wide range. The program partakes part in joint research projects and engages in all types of national and international activity. Degrees are also given in operational research.

Mathematics (MATH) Established in 1959, the program has 40 faculty members, 50 teaching assistants, 80 PhD students. METU library has one of the largest mathematics collections in Turkey and subscribes to the main research journals.

Mechanical Engineering (ME) The department conducts research for the present and future requirements of the industry with an emphasis both on technology development areas and/or practical application. ME educates technically competent engineers with a sense of civic responsibility and critical thinking capabilities.

Metallurgical and Materials Engineering (METE) Established in 1966., it has 23 faculty members working on research in material processing, extraction of metals with the use of novel techniques, steel and steel chemistry, structural materials, monolithic materials with refined or nanoscale microstructure.

Micro and Nanotechnology (MNT) A joint interdisciplinary program of the following departments: biological sciences, chemistry, physics, chemical engineering, electrical and electronics engineering, engineering sciences, metallurgical and materials engineering and mechanical engineering. It is open to the students with undergraduate degrees from physical and/or life sciences and engineering departments.

Mining Engineering (MINE) Established in 1960, it provides students with the opportunity to develop advanced competence in mining methods, rock mechanics, mine ventilation, mine mechanization, mineral processing and coal preparation.

Petroleum and Natural Gas Engineering (PETE) Established in 1981, PETE is known as one of the best in the region. It provides specialization in the fields of drilling, production and reservoir engineering, enhanced oil recovery, natural gas engineering and geothermal energy. It is also in collaboration with CSCA Consortium for providing advanced educational opportunities to CSCA region students.

Physics (PHYS) METU has the biggest physics department in Turkey. The department has a well-established infrastructure and highly qualified faculty to carry out advanced research and educational programs offering degrees in physics and astrophysics. Research areas are as follows: electronics and materials industries; measurements; characterization and testing; computational services; science teaching; nuclear and solar energy; material analysis.

Polymer Science and Engineering (PST) PST is a joint interdisciplinary field by its very nature.

New polymers and polymeric materials can only be developed by the combined effort of chemists, physicists and engineers. Program accepts graduates of all departments, mainly by departments of chemistry, chemical engineering and metallurgical and materials engineering.

Secondary Science and Mathematics Education (SSME) MSc program without thesis is designed to give relevant contemporary information, training, and practical skills required for fully qualified secondary science or mathematics teachers. MSc Program with thesis is designed to prepare graduate students as academicians, science and mathematics supervisors, curriculum consultants, and measurement and evaluation specialists in science and mathematics education.

Statistics (STAT) Established in 1983, it is a leading institution in the area of statistics. It provides highly qualified statisticians and researchers to both public and private sector and to the academic

community. It equips the students with necessary technical skills and analytical thinking so that they can develop solutions and contribute to science and research.

A.2 The Graduate School of Social Sciences

Area Studies (ARS) The PhD Program in Area Studies seeks to enhance the academic studies on the major regions of the rapidly changing world in terms of international relations, economics, politics, culture and history. It also aims at explaining the dynamics of change in different regions and their relations with each other from an interdisciplinary perspective. Another objective of this program is to develop new approaches and perspectives on Turkey's multi-dimensional relations with various regions around the world. The program also intends to improve the quality of research on historical, socio-cultural, economic and political characteristics of major areas in the world. It is hoped that the Program will contribute to the academic world as well as the policy-making communities in the areas of foreign policy, business, technology, culture, the mass-media, and civil society. The program seeks to contribute to the development of these areas constructively.

Asian Studies (ASN) The Asian Studies is an interdisciplinary non-thesis M.S. program designed to study the history and culture of Asian societies. The interdisciplinary character of the Asian Studies Master's Program enables multilateral and diverse discussions by combining different experiences and points of view. Additionally, the Asian Studies Program works in coordination with the Confucius Institute established in Middle East.

Business Administration (BA) The program offers participants from various disciplines a comprehensive background in management skills. The sound formation provided in the program equips students with an enhanced awareness of the organization and its problems, and is aimed at developing the students' ability to apply managerial concepts and techniques in practical business situations. The program incorporates a comprehensive and well-balanced range of MBA foundation courses and provides the opportunity to develop a particular area of expertise through the elective courses offered. Students have the option of selecting a thesis or non-thesis Master's track. The Master's thesis entails supervised research where the student can explore in detail a topic of interest to himself or herself under the supervision of a faculty member. In the non-thesis option, the student is allowed to take additional elective courses and conducts a term project research, again under the supervision of a faculty member.

Business Administration for Executives (EMBA) The purpose of the program is to improve and update the managerial skills of those employed at the mid- and high- level management positions in various sectors. The curriculum combines fundamental tools and core concepts with new developments in the business administration area. The program offers participants with various backgrounds a comprehensive coverage in managerial skills. The sound formation provided in the program equips students with an enhanced awareness of the organization and its problems and is

aimed at developing the students' ability to apply managerial concepts and techniques to practical business situations. The courses are designed to incorporate problem solving approaches, ethical considerations, international developments, team-work and leadership abilities in interactive settings. They also provide a working knowledge of the tools and software technologies used in managerial decision making. The non-credit term project is a supervised project where actual problems from business life applications are addressed within a research project setting.

Curriculum and Instruction (CI) Curriculum and Instruction program aims to improve students' knowledge and understanding in relation to curriculum development and evaluation theories, curriculum development models and approaches; to develop students' skills in instructional processes and design; to help students carry out research by using scientific research methods and techniques; and to develop understanding and skills in other areas of educational sciences based on their interests. In this framework, students gain lifelong learning skills to follow the developments in the field of curriculum and instruction in Turkey and abroad.

Early Childhood Education (ECE) MS in Early Childhood Education is a new program that is offered for six years. The mission of the program is to prepare reflective, caring, and highly skilled educational practitioners and scholars who lead in the field of early childhood education. The program aims to help the students become experts in working with young children by reaching to a deeper understanding of how children learn and develop, and be able to set up and maintain the optimum early childhood environment guided with best practices for the health and welfare of young children. Graduates equipped with up-to-date knowledge and skills can work in the field as practitioners or pursue an academic career. The applicants should have a Bachelor's degree in Early Childhood Education, Child Development and Education, Child Development and Health programs or related programs of School of Education. Students who do not have a Bachelors' Degree in one of these programs should take introductory courses for two semesters. Interviews are required during the admission process when possible.

Economics (ECON) The Department of Economics, in addition to its noteworthy position in undergraduate education, in recent years has placed a special emphasis on expanding its graduate programs. The Master's degree is made up of two alternative strands. One consists of seven courses, four of which are compulsory and involves the writing of a thesis. The other consists of ten courses plus a term project, with the same four compulsory courses. The compulsory courses consist of mathematics for economists, macroeconomic theory, microeconomic theory and econometrics. The PhD program is one of specialization. The graduates will probably become academics and experts in their field of specialization; thus, the selection of courses and subjects in their education becomes crucial.

Educational Administration and Planning (EAP) The aim of the MS Program in Educational Administration and Planning is to become a center of excellence in educational administration, educational policy development and school management by promoting advanced level of teaching and

research. Within this framework the program targets to build students' knowledge and understanding in the field of educational administration and planning, school leadership and management, educational policy development and some other allied disciplines including curriculum development, instruction, measurement and assessment; to build the capacity of the students to design and carry out research in various domains of educational administration and planning and allied disciplines; and to develop understanding and skills in other fields of education.

Elementary Education (ELE) PhD program in Elementary Education is designed to provide students with advanced theoretical, empirical, and methodological knowledge in specific fields of elementary education and prepare them to become a scholar who can discover, integrate, and apply knowledge, as well as communicate and disseminate it. The program prepares students in one of the following specialty concentrations: science education, mathematics education, and early childhood education. Students are required to select their specialty concentrations during their application to program.

Elementary Science and Mathematics Education (ESME) MS in Elementary Science and Mathematics Education is a recently established program that aims to develop reflective and highly skilled educational practitioners and scholars who lead in the field of elementary science and mathematics education. The program aims to help the graduate students become proficient in the fields of science and mathematics education. Graduates are equipped with up-to-date knowledge and skills which will enable them work in the field as practitioners or pursue an academic career. The applicants should have a Bachelors degree in science education, mathematics education, elementary education, or related programs of Faculties of Education.

English Language Teaching (ELT) The MA and PhD programs in ELT introduce major theoretical and methodological issues in English Language Teaching and provide students with a firm foundation in the theoretical and applied aspects of the field. Both programs focus on current issues in teaching and learning languages and professional development of language teachers.

English Literature (ELIT) The MA and PhD programs in ELIT aim at providing students with a thorough knowledge of English literature from the Middle Ages to our day. With this purpose, outstanding writers and their work are studied, and the relationship between literature and intellectual trends and ideologies as well as the relationship between literature and social and political issues are investigated. Since students are expected to develop a critical approach to literature, they are taught the critical theories from Plato to the present. Our programs intend to encourage and train students to become successful masters of an academic discipline which requires the development of the analytic faculties. Enthusiastic, intelligent students highly-fluent in English, with a broad range of interests and able to read fast in English, are encouraged to apply to the program. During the interview, students are asked questions about English literature and their reasons for wishing to join the program.

European Integration (EI) European integration is a multi-dimensional project with its political, economic, legal, social and cultural integration aspects. Therefore, this multi-dimensionality brings the European Integration Program into an interdisciplinary position. European Integration gained the

necessity of being a distinct specializing area in the graduate level because of the changing position of Turkey with the impact of negotiation process within the EU. The aims of the Graduate Program in European Integration are to help forming specialist managerial staff about different aspects of the European integration and the EU in different institutions and establishments; to make EU policies in the negotiation process examined and understood by getting touch with the EU authorities; to constitute a public opinion about the EU and Turkey-EU relations by means of internal and international seminars and conferences, projects; to determine those changes that Turkey will encounter in its policies and constitutional context during the integration process; and to provide a deeper understanding as to Turkey- EU relations, particularly by increasing familiarity of the officials to the issue in an internationalized academic environment.

European Studies (EUS) After the Second World War, European Union (EU), as a new regional cooperation shaped in the Western Europe, has become one of the most important models of regional integration in the World with its extensive institutional structure and extending policy areas. While the legal, political and economic aspects of the European integration process were primary along the Cold War era, with the 1990s foreign policy, security and defense has become important aspects beside internal policy developments. With the mid 1980s, EU has turned towards restructuring its relations with the countries out of the union by means of enlargement policies. When looking from these sides, European integration is a multi dimensional project with its political, economic, legal, social and cultural integration aspects. Therefore, this multi dimensionality brings the European Studies into an interdisciplinary position. European Studies gained the necessity of being a distinct specializing area in the graduate level because of the changing position of Turkey after the Helsinki Summit.

Eurasian Studies (EAS) The Eurasian Studies is an interdisciplinary MS program designed to study the history and culture of Eurasian societies, to introduce domestic sources of international change in the region, to provide academic atmosphere for students from different countries with different backgrounds enabling them to exchange their views and to train qualified regional specialists. The interdisciplinary character of the Eurasian Studies Master's Program enables multilateral and diverse discussions by combining different experiences and point of views.

Gender and Women's Studies (GWS) The Gender and Women's Studies Graduate Program is an interdisciplinary program, established in 1994. It provides an integrated framework through courses both designed specifically for the purpose of this program and those taught in various departments of the University. The program includes both theoretical and applied courses in gender and women's studies. The Gender and Women's Studies Graduate Program, which offers a two year interdisciplinary curriculum, aims to examine the issues of knowledge, society and gender within a feminist perspective in order to contribute towards an understanding of the social position of women and the inequality between women and men with a primary focus on the case of Turkey

German-Turkish Masters Program in Social Sciences (GTSS) The German-Turkish Masters Program in Social Sciences (GeT MA) is a unique, interdisciplinary, integrated Masters Program at the Institute of Social Sciences at the Humboldt-Universität zu Berlin and at METUs Graduate School of Social Sciences. All students attend their first year of studies in Ankara and their second year in Berlin. GeT MA students can enlarge their knowledge on political processes in both countries and regions of Europe as well as can cultivate the analytical and methodological tools used in comparative government, integration theories, and social change. The Program has a special focus on democratization and modernization, migration and Europeanization. Courses in Political Science, Sociology and International Relations offer students a specialized perspective on politics and society in Turkey and Germany, German-Turkish relations as well as the European dimension of domestic and foreign politics in both countries. Furthermore, students gain practical experience through an internship in either Turkey or Germany between their first and second year.

History (HIST) MS and PhD programs in the department of history aim to train future historians, either as researchers and academicians or prospective functionaries in the various walks of life. Thus the philosophy of the curriculum is to increase the intellectual ability of graduate students in historical studies and to monitor them to develop analytical capability in their field of research. The focus of the program is on Turkish and Ottoman history. The curriculum is arranged in a way to teach the subjects other than Ottoman and Turkish history in English language, enabling the students to use and read literature in both languages. In MS and PhD Graduate programs, the students are required to take two courses on historical methodology and to complete the rest of the course load from among a wide range of elective courses in the department and other social science departments.

History of Architecture (AH) METU Graduate Program in Architectural History offers graduate studies at MA and PhD levels. The program provides training in different periods and geographical areas of architectural culture and built environment, aiming to equip its graduates with the requisite knowledge, research skills, and initiative to engage in innovative scholarship at both international and national levels. Research interests and disciplinary backgrounds of the faculty cover various fields of history and theory of art and architecture.

Human Resources Development in Education (HRDE) The MA program in Human Resource Development in Education (non-thesis) aims to prepare individuals to be training and development specialists in human resources units of government and private agencies and organizations. The major goal of the program is to enhance and develop the key competencies required of current and future practitioners in the training and development field. Goals include the preparation of practitioners who can contribute to enhancing the effectiveness of training and development programs, and to positively affecting performance of their human resources units through an integrated program. The program focuses on the needs of the following individuals: (1) New university graduates who are planning to seek careers in human resource departments of institutions/organizations, (2) Individuals who are currently employed as training and development specialists in human resources departments of public

and private organizations, (3) Individuals who are responsible for human resource training in public and private schools/institutions.

Industrial and Organizational Psychology (IPSY) The graduate program is designed to provide the students with advanced theoretical, empirical and methodological knowledge in Industrial/Organizational Psychology and to give them opportunities to apply this knowledge in their specialization areas. Students equipped with the advanced knowledge and skills of their fields of specialization would be expected to either proceed to an academic career or to work in the field as practitioners or researchers.

International Relations (IR) The MS program is a two-year degree course which seeks to provide students with a critical understanding of issues in International Relations and to develop their research and academic writing skills. It aims to encourage and develop their ability to argue critically and to produce in-depth analyses of issues within their chosen areas of study. The wide range of electives offered by the department enables students to choose from a variety of courses on International Relations theories, area studies and history, depending on their own specific fields of interest. The program aims at both those who intend to continue their studies in the academic field and at current and future professionals in the private and public sectors. The PhD program at the Department of International Relations is designed for students with an MA degree in International Relations or a related discipline, who have an interest in accomplishing further study in the field. The PhD program consists of seven courses, written and oral comprehensive exams, a thesis proposal defense and a PhD thesis. It is expected that students complete all work related to PhD within eight semesters. The comprehensive exams aim at evaluating student proficiency in "Theories of International Relations", a region of expertise (The Middle East, Europe, Central Asia, et. al.) and a non-departmental subject of specialization (i.e. sociology, philosophy, history and other related topics).

Latin and North American Studies (LNA) Our master's program binds North American and Latin American studies in a unique degree program that gives students specific expert knowledge from different disciplines and enables them to gain a broad view of both Americas as well as their global connections. The interdisciplinary nature of the program offers students the opportunity to learn about the history, culture, politics, society and economy of Latin and North America. Research, teaching and professional involvement of our faculty demonstrate a serious commitment to the study of Latin and North America. Several of our faculty who are contributing to the teaching at the program have both the experience and knowledge of Argentina, Brazil, Canada, Chile, Cuba, Mexico, and the United State based on their academic research and/or diplomatic service. Some of their special interests are in cultural history, economic history, development economics, religion, democratization, migration, decentralization, race and ethnicity, gender and public policy. Approximately 20 courses offered every year by various departments exploring historical development of Latin and North American societies, states, economies and political systems. We believe the breadth of these courses offered can accommodate varied interests of our students.

Media and Cultural Studies (MCS) The graduate program in Media and Cultural Studies (MCS) is an interdisciplinary framework for studying the relations between media and culture in the complex and changing context of contemporary societies. It draws its main disciplinary resources and academic strengths from METU's departments of Political Science and Public Administration, Philosophy and Sociology. Students benefit from METU's tradition of academic Excellency through shared teaching across a number of optional courses alongside MCS courses. The interdisciplinary approach enables students to choose courses both from the participating and other departments and structure their studies and specialize according to a wide range of interests. Graduate Program in Media and Cultural Studies aims to relate contemporary theory and criticism to mass mediated communications and culture and focuses on issues such as mass culture, popular culture, visual culture, commodification of culture, globalization, gender and subculture, media economics, media power, influence and effects, new communication technologies, normative, legal and ethical issues in media, visual representation. The program is designed for students from diverse disciplinary backgrounds. Yet it expects students to have or to develop an interest in social and political theory, critical theory and cultural criticism. It is to be noted that it does not seek to provide students with any kind of professional skills or competence nor does it encourage students whose sole concerns are professional to apply for.

Middle East Studies (MES) The Middle East Studies Graduate Program aims to offer an interdisciplinary study especially in the fields such as History of the Middle East, Religion and Culture in the Middle East, Regional and International Affairs in the Middle East. The basic objective of the program is to educate the graduate students in issues regarding the Arab World, Turkey, Iran and North Africa, to train the researchers and area experts for both public and private sectors, universities, research centers, and archives and libraries, to conduct academic and scientific research, to organize conferences and to publish about the history and contemporary affairs of the region. The program also aims at increasing the academic cooperation between research centers in the Middle East and METU, and developing the national and international dialogue among the scholars working in the field of study. The Middle East Studies Program is open to students with an undergraduate degree in any field of study owing to the interdisciplinary nature of the program. The applicants from humanities, social sciences and sciences have the same possibility of admission. The Search Committee, however, has the authority to ask the students to attend 'scientific preparation' courses up to 18 credit hours to build up their knowledge in the field. The graduates of history, sociology, international relations, and political sciences may not be required to take preparatory courses.

Philosophy (PHIL) The goal of the philosophy department at METU is to contribute to the cultural life of the community at large and to produce free-thinking individuals, through distinguished scholarly activity, research, and teaching. We are a pluralistic department in which the major thematic areas and historical periods are represented. Department members have research interests in such traditional areas as logic, philosophy of science, epistemology, ethics and aesthetics, as well as in

newer fields like ecophilosophy and philosophy of technology. Analytic and Continental-historical approaches are both represented. The department is committed to creating and maintaining an intellectual environment conducive to the communication and sharing of ideas through conferences and regularly held seminars.

Physical Education and Sports (PES) The Physical Education and Sports Department was established in 1982. Currently the department offers only graduate level degrees in physical education and sports management and sport psychology are the specialization areas of the faculty members. The department also offers elective courses to the students of other departments to broaden their cultural background and to increase their understanding of sports sciences in general. METU Physical Education and Sports (PES) Department aims at total education through the physical, intellectual, emotional, and social development of people in order to raise healthier, happier, and more successful people in society. The department mainly functions in teaching, research and public service areas. PES Department trains researchers and academic staff members by means of its graduate program. Academic staff conducts research and studies which produce solutions and bring new developments to the physical education field in order to provide this information to the benefit of the public.

Political Science and Public Administration (ADM) Founded in 1956, the Department offers graduate programs for MS degree and PhD. The department's graduate programs, designed to prepare students for advanced specialization in the twin disciplines of political science and public administration, are distinguished by the quality and flexibility of their curricula. With faculty that have a variety of specializations, extending into such disciplines as history, sociology, cultural studies, media and communication studies and area studies, the Department of Political Science and Public Administration offers courses beyond those in the specific fields of political science and public administration.

Psychology (PSY) The Department offers graduate programs leading to the degrees of MS in developmental, clinical, industrial/organizational, social, traffic/transport and family psychology; PhD in clinical and social psychology. The graduate program is designed to provide the students with advanced theoretical, empirical and methodological knowledge in specific fields of psychology and to give them opportunities to apply this knowledge into their specialization areas. Students equipped with the advanced knowledge and skills of their field of specialization would be expected to either proceed for an academic career or to work in the field as practitioners or researchers. At the Master's level MS degree (Thesis-program) in Psychology is offered in 4 different areas. These are, Clinical Psychology, Social Psychology, and Developmental Psychology. At the Doctorate level, PhD in Psychology is available in two areas; these are Social Psychology and Clinical Psychology options.

Psychological Counseling and Guidance (COUN) Psychological Counseling and Guidance master's program is designed to meet the educational needs of individuals who seek to advance their skills and career options in the psychological counseling field. The program offers courses to enable students to acquire knowledge, skills and experiences in counseling as well as to contribute to the advancement of

profession through research. Graduates of Psychological Counseling and Guidance master's program are qualified to work as psychological counselor at public and private schools, university counseling centers, and other mental health related institutions.

Science and Technology Policy Studies (STPS) The graduate program in "Science and Technology Policy Studies" (METU-STPS) is designed to equip students with necessary know-how in economic, social and cultural policy-making as well as endowing them with scholarly approaches to the question concerning modern science and technology. It aims to deal with economic, social-cultural, philosophical, ethical, environmental as well as engineering aspects of today's information-based economy and society. Modern science and technology has evolved to such a degree of complexity that calls for appropriate policies which can no longer be formulated adequately within the matrix of any single discipline. In order to match that level of complexity, truly multi-disciplinary approaches are required in addressing emergent policy issues. As expected, similar graduate programs have recently been designed in other countries. By encouraging both curiosity-driven and applied interdisciplinary research in science and technology, the METU-STPS, too, aims at preparing its students towards engaging in not merely theoretical but empirical issues as well. Graduates will be qualified to work in technology and research-oriented organizations in government and industry or in universities.

Settlement Archaeology (SA) The objective of the program is to provide students with a solid academic background in archaeological theory, research techniques and modern interpretative methods with particular emphasis on settlement and environmental archaeology. Settlement archaeology is the study of the selection criteria and implantation of settlements in the landscape, interrelationships between cities and their rural surroundings, the impact of human occupation on the natural environment and vice versa under past conditions. Settlement archaeology has as its aim the holistic reconstruction of the cultures of ancient settlements and urban communities and their hinterlands. Settlement archaeological research is, by definition, a multidisciplinary enterprise requiring expertise from the disciplines of the natural and social sciences, architecture and city planning, as well as specialized techniques related to the retrieval, recording, analysis and data bank management of archaeological data (GIS), site conservation and cultural resource management. Disciplines and interdisciplinary sub-disciplines required in addition to archaeology include geology, environmental geomorphology, archaeozoology, paleontology, paleobotany, archaeometry, ancient history, anthropology, sociology, urban geography, classical architecture and city planning.

Social Anthropology (SAN) METU Graduate Program in Social Anthropology is offered by the METU Department of Sociology, The program requires students to carry out field research for their thesis work. The faculty members work on politics, migration, gender, religion, and trans nationality, particularly in Europe and the Middle East. International students are encouraged to apply as full time students or special students. Social Anthropology students at METU can spend a semester abroad in the following universities as part of the Erasmus exchange: Humboldt Universität (Berlin), Johann

Wolfgang Goethe Universität (Frankfurt am Main), New Bulgarian University (Sofia), University of Vienna (Vienna).

Social Policy (SPL) Founded in 2007, the Social Policy Master of Science Program at METU prepares students for research aimed at better understanding and addressing the social issues which will inform decisions related to policies, programs and interventions. The program aims to analyze social phenomena such as poverty, unemployment, increasing income gaps, women's low participation in the labor market discussions surrounding the pros and cons of existing international and national policies with the aim to develop relevant policy recommendations. The overarching objective of the Social Policy MS Program is to improve overall social conditions by examining and understanding how policies affect individuals' lives and how individuals can analyze and develop social policy according to various social needs. The program, with its interdisciplinary focus characterized by sociological, economic, anthropological, political science and educational sciences approaches, leads to MS degrees by providing a curriculum of education and training in human and policy development, implementation and evaluation of policies.

Sociology (SOC) The Department of Sociology offers graduate programs leading to the degrees of "Master of Science in Sociology" and "Doctor of Philosophy in Sociology". In accordance with the basic principles of METU, all degree programs in Sociology aim at developing an in-depth conceptual understanding of theoretical debates; employing techniques of collecting, analyzing and interpreting data informed by different methodological standpoints; and empowering sociological knowledge with research experience and an historical and comparative perspective, with a specific emphasis on Turkey.

Urban Policy Planning and Local Governments (UPL) The aim of the graduate program in Urban Policy Planning and Local Governments (UPL) is to help students specialize in the fields of urban policy analysis and design, urban project management and local governments. With this aim the program offers degrees in MS and PhD levels. The complexity of urban problems and policy processes require a multi-disciplinary approach. UPL is a joint program established by the Department of Urban and Regional Planning and the Department of Political Science and Public Administration to meet this objective. As part of the multi-disciplinary approach, the program admits not only the graduates of these two main disciplines, but also the students from other fields such as law, economics, management, psychology, sociology, engineering and architecture. The program has two main orientations. On the one hand, it provides a synthesis of different disciplines, by enjoying the contributions of each field. On the other hand, the program aims to strengthen the link between theory and practice of urban management and policy making. By doing this; it challenges the pragmatic approaches which have traditionally dominated the urban policy processes.

A.3 The Graduate School of Marine Sciences

The Institute is located on the Mediterranean coast, near Erdemli, about 45km west of the town of Mersin. It houses office buildings, laboratories, computing and remote sensing facilities, a library and other services. Housing for staff and students, and harbor facility are also located on the campus. The programs are envisioned to provide future scientists with thorough education and hand-on training in their fields. Special emphasis is given to studying the national marine environment, in keeping with the Institute's objectives of developing and improving the marine resources of Turkey. Training of graduated students is greatly enhanced by active participation in research programs carried out at sea, and in laboratories of the Institute.

Today, the institute employs about 10 faculty, 4 research assistants, 31 administrative staff, 18 sailors and 5 workers. Totally 68 people is employed in 2011. The total number of alumni is about 56 which consist of directors (6), institute secretary (3), faculty members (32), captains and inspectors (19).

The institute operates three research vessels (Bilim-2, Erdemli, Lamas). Two of these are used for daily purposes, and the big one is used for long cruises and extensive studies. RV Bilim-2, which is 41 m long and 433 gross tons, was launched in 1987. The construction of RV Bilim was started with the visitation of the director of Scripps Institution of Oceanography. This ship was built in Turkey by METU; the vessel is same with the other vessel built in USA for researches activities. RV Lamas, which is 28 gross tones and 6 m long, is used mainly for fisheries purposes. This vessel is purchased by the DPT-an infrastructure project in 1980. RV-Erdemli is 30 gross tones and 17 m long. It was built in 1979. In addition to that, the first vessel that was built is Kuğu (in 1976). However, this vessel is not used anymore.

The Institute has four main divisions: Chemical Oceanography (including Atmospheric Science);Marine Biology and Fisheries; Marine Geology and Geophysics; Physical Oceanography
The programs are envisioned to provide future scientists with thorough education and hand-on training in their fields. Special emphasis is given to studying the national marine environment, in keeping with the Institute's objectives of developing and improving the marine resources of Turkey.
Students with BS degree (or equivalent) in one of the natural sciences or engineering may apply for MS/MA or PhD education. Training of graduated students is greatly enhanced by active participation in research programs carried out at sea, and in laboratories of the Institute. The institute offers graduate education in Masters and PhD degrees.

A.4 The Graduate School of Informatics

Information Systems Department (IS)

Information Systems Program (IS) was founded by a group of METU faculty members with the vision of an interdisciplinary education and research environment in the area of

Informatics. Ten years after its establishment, Information Systems Department has over ten full-time faculty members and 300 graduate students from diverse backgrounds. The Department offers degrees at both MS and PhD levels. With four different programs, the interests of a wide spectrum of students are satisfied. The Information Systems MS and PhD programs are geared towards students who would like to pursue research and development carrier in academic or industrial settings.

IS program at METU was established in 1997 as a graduate program within Graduate School of Informatics Institute. In 2000, students were accepted for the IS PhD program for the first time. Informatics-Online and Software Management non-thesis MS programs were opened under the IS Department in 2000 and 2001 respectively.

Main objective of IS Department is fostering the usage of information systems to improve the conditions of the society and contributing to the scientific and technological developments. To achieve this goal, the department, educates graduates from different disciplines to create scientists and meet the interdisciplinary graduate needs of the industry, and the public and private sectors. It also coordinates interdisciplinary research and technology development efforts among related scientific disciplines.

The department aimed to bring together METU professors interested in cognitive sciences for teaching and research, and it had a desire to establish research links with universities across Turkey and the world.

Informatics Online (ION) Program aims at providing expertise on the rapidly developing subjects of information technology and systems. It is intended for working professionals who need continuing education at anytime and anywhere without the need to come to the METU campus for lectures. Informatics Online is an online graduate program which is offered by the METU Graduate School of Informatics Institute. It is accepted by YÖK as a regular METU Master of Science program like other graduate programs.

The program is conducted mainly in an asynchronous manner. Collaboration among students and instructors is carried out by using both asynchronous (e.g. e-mail, forums/discussion lists) and synchronous (e.g. chat, exam / review meeting on-campus during a scheduled mid-semester weekend and final) tools. Web based material enriched with interactive animations, simulations and exercises form the basic course content.

MS in ION program has been designed for distance education with similar content as the MS in IS program. Courses are carried out independently from regular classes and participation is exclusively over the Internet. Therefore, it provides a flexible alternative for students who may

not be able to attend classes on regular campus hours, and who would like to carry out a master's education on their own schedule remotely.

Software Management (SM) Program MS program is the first program established in Turkey to target specialized software domain knowledge. The objectives of this program are to lead the advancement of software practice in Turkey, to disseminate the domain knowledge on principles, processes, methods and techniques required to manage the development and evolution of software systems and to bring forth experts and scientists in this field. The program targets professionals in the field. The students in the program will gain the ability to systematically define and use the knowledge on software development processes, methodologies, techniques and metrics. Students are also involved in a realistic team project to integrate the knowledge and experience built up in specialized courses.

Cognitive Science Department

Cognitive Science Program was established in 1997 as a graduate program within the Graduate School of II. It is the first and the only cognitive science program in Turkey to offer both MS and PhD degrees. The field spans artificial intelligence, computer science, philosophy, psychology, linguistics, neuroscience, education and anthropology. The courses and the theses are similarly diverse. We are open to applicants with BS, BA, MS/MA from any field, and offer our students study programs to satisfy core requirements of cognitive science, in modeling of structure, theory of computing, programing, logic and statistics. Some overlapping aspects of cognition are expected to be studied in a thesis (for example linguistics and computing, philosophy and psychology, psychology and computing, etc). Research areas of the department currently include experiments on child development and language acquisition, cooperative problem solving, visual reasoning and perception, computation and language processes (morphology, syntax, semantics, discourse, communication), fMRI studies and neural basis of cognition.

Modeling and Simulation Department

Game Technologies (GATE) is a joint interdisciplinary program with computer science and engineering, electronic engineering, human computer interaction, education science and art components. The program targets not only games for entertainment but also educational and serious games, games lab for evaluation of state of the art hardware and software in game design and development. The graduate students both carry out theoretical research into game technology and experience practical game development, "strong links with the games Industry in Turkey and beyond.

Modeling and Simulation (MODSIM) is a non-thesis program and mainly intended for working professionals. The objectives of the program are to foster and support interdisciplinary research in the field of modeling and simulation, to meet the modeling and simulation needs of the defense industry, and public and private sectors. It has no deficiency program and has two tracks: Decision Models and Virtual Environments. Each track has background requirements, core courses, and elective courses as defined in the curricula. Students are expected to complete the program in five semesters. Students enrolled in this program pay a tuition fee based on the number of credit hours they register for every semester. The amount of tuition fee per credit hour is determined at the beginning of every academic year.

Health Informatics Department (MIN)

Health sciences and medicine are one of the prominent application areas of information and technology. Measurement and imaging methods, testing, analysis and patient monitoring instruments are developing and increasing in numbers at a very fast pace. As a result, health information is getting richer and information collected from patients is increasing at a very fast rate. The importance of information technologies in adopting the research results into practice is indispensable, under the circumstances of the expanding pace of research conducted in medicine.

MIN established in 2003, has Medical Informatics master and doctorate programs. Since the beginning, the Department's focus has been on education and research. The mission of the Department is to reform medical systems and make social contribution, by applying information technology to medicine, and to improve health services through information systems in both the private and public sectors of the healthcare and public health systems.

Bio- Informatics Program(BIN) The aim of the Biomedical Informatics program is to design and implement novel methods that can be generalize to a defined class of problems—to focus on the acquisition, representation, retrieval, and analysis of biomedical data and knowledge.

The aim of the BIN program is to design and implement novel methods that can be generalize to a defined class of problems - to focus on the acquisition, representation, retrieval, and analysis of biological data and knowledge. It focuses on computational techniques and tools for data analysis, theoretical modeling of biological processes, and also design and development of biological tools and databases. Generally speaking, the program aims at researchers who work in biotechnology, life sciences, or related industries, and who wish to broaden or upgrade their skills to follow recent breakthroughs and lead research in the area of Bioinformatics.

Medical Informatics Program was established in 2003 with the cooperation of METU and Hacettepe University, as master and doctorate programs. It develops basic methods that are applicable to medical information systems in the areas of health care and information science, establishes infrastructures for the information environment where medical information is utilized effectively, and applies knowledge and technique acquired through these efforts to basic medical sciences and health care.

The main keywords of the target domain are medical and clinical information systems, next generation electronic health record systems, virtual health care environment, computer representations and standardization of medical concepts, ontology, medical knowledge engineering, hospital epidemiology, quality assessment of health care, clinical and bioinformatics engineering, privacy protection and encryption analysis of hospital.

The objectives of the Medical Informatics graduate program are as follows:

- To provide the specialists/researchers working in all health sectors with the necessary
- To knowledge and experience to carry out their work effectively
- To train academicians/researchers
- To bring together researchers from other disciplines to the field of Medical Informatics.

Work Based Learning (WBLS) Department

Work Based Learning (WBLS) Program is a non- thesis master's program which requires a work oriented project to be completed. It is a joint program between METU and Middlesex University leading to a dual diploma given by these universities. The program lets the individual create his/her own schedule to specialized in four subjects: Informatics, e-learning, e- business and e- health.

Work based learning is a new educational module customized for each individual's need and allows the individual's prior learning to be assessed and recognized at academic level. The program starts with what the individual knows now and where he/she wants to go.

A.5 The Graduate School of Applied Mathematics

Actuarial Sciences Program Actuarial Science is a discipline, which employs mathematics and statistics in modeling of the financial impacts of risk and uncertainty in various sectors and in designing solutions for risk management. It is a discipline that applies mathematical and statistical methods to assess risk in insurance and finance industries. Actuaries are professionals who are qualified in this field through education and experience.
The objectives of this program are

- to educate our graduates so that they can make significant contributions to the financial security of individuals through the ability to identify, quantify, assess and manage risk uncertainty,
- To provide students with the knowledge and skills necessary for comprehending and applying actuarial techniques,
- To produce theoretically sound and practical research, which contributes to the advancement of actuarial science and practice,
- To conduct research in practical applications of actuarial, insurance, risk management and risk analysis.

Cryptography Program Cryptography deals with data security and integrity. Regardless of who is involved, all parties in a transaction must have confidence that certain objectives associated with information security have been met. Among these objectives are privacy, data integrity, identification, signature, authorization, validation, access control, witnessing, receipt, and confirmation. Achieving information security in an electronic society requires a vast array of technical and legal skills

The objectives of this program are

- To conduct a graduate program leading to MS and PhD degrees in Cryptography
- To provide a mathematical treatment to the practical aspects of conventional and public-key cryptography.
- To introduce mathematical tools for serious practitioner in need of the latest techniques and algorithms.
- To evolve into an internationally recognized center for research in cryptography and related areas of information security.

Financial Mathematics Program The last two decades witnessed the projection of sophisticated mathematical techniques to the center of the finance industry. In the 80's the main investment banks hired mathematicians, physicists and engineers to become financial engineers. Gradually, the main skills defining this professional category are being clarified and today many universities all over the

world are designing programs to develop modeling and mathematical expertise in financial applications.

The objectives of this program are:

- To provide students with the knowledge and skills necessary for comprehending and applying existing techniques of Financial Mathematics and Life Insurance.
- To cultivate their ability in creating new, innovative techniques.
- To analyze and manage financial markets.
- To conduct research in risk modeling and management, interest rate models, pricing and hedging portfolio optimization.

Scientific Computing Program Scientific Computing (SC) is a broad, rapidly growing multidisciplinary area that encompasses applications in science/engineering, applied mathematics, numerical analysis, and computer science. Going from application area to computational results requires domain expertise, mathematical modeling, numerical analysis, algorithm development, software implementation, visualization and validation of results. SC makes use of the techniques of applied mathematics and computer science for the development of problem-solving methodologies, which will be the building blocks for solutions to scientific engineering problems of ever-increasing complexity.

The objectives of this program are:

- To train graduates coming from different disciplines at the Master's level with the aim of developing their skills in solving real life problems and being able to apply them science, engineering and industry,
- To cultivate collaboration among research groups in mathematics, science and engineering departments at METU,
- To provide a platform for active participation of research groups from METU in the international research community by establishing research networks and participating in international projects
- To establish contacts among in the Scientific Computing program and the industrial establishment in Turkey for the purpose of demonstrating modern methods applicable to industrial problems, and organize "Mathematics in Industry" workshops with representatives from the industry.

APPENDIX –B

MS/MA and PhD Programs of the Departments

Different programs of each Department of Graduate Schools and Institutes are given below in **Tables B1-B5.**

Table B.1 Programs of the Departments of GSNAS.

Departments	MS/MA (Thesis)	MS/MA (Non-Thesis)	MS/MA (Non-Thesis) (Secondary)	PhD on BS..	PhD on MS/MA
AEE	X			X	X
ARCD	X				
ARME	X	X		X	X
BCH	X				X
BIO	X				X
BME	X			X	X
BS	X			X	X
BTEC	X			X	X
CE	X			X	X
CEIT	X	X		X	X
CEME	X	X			
CENG	X		X	X	X
CHE	X			X	X
CHEM	X			X	X
CP	X				
CRP				X	X
ED	X			X	X
EE	X			X	X
EM			X		
ENVE	X			X	X
EQS	X				
ES	X			X	X
ESS	X	X		X	X
FDE	X			X	X
GEOE	X				X
GGIT	X			X	X
HE			X		
IDI	X				
IE	X			X	X
MATH	X	X		X	X
ME	X			X	X
METE	X			X	X

Table B.1 Programs of the Departments of GSNAS (cont'd).

Departments	MS/MA (Thesis)	MS/MA (Non-Thesis)	MS/MA (Non-Thesis) (Secondary)	PhD on BS	PhD on MS/MA
MINE	X				X
MNT	X			X	X
OR	X			X	X
PETE	X				X
PHYS	X			X	X
PST	X			X	X
REST	X			X	X
RP	X				
SE			X		
SM			X		
SSME	X	X		X	X
STAT	X			X	X
UD	X				

Table B.2 Programs of the Departments of GSSS.

Departments	MS/MA (Thesis)	MS/MA (Non-Thesis)	MS/MA (Non-Thesis) (Evening)	PhD on BS	PhD on MS/MA
ADM	X	X		X	X
AET			X		
ARS					X
ASN		X			
BA	X	X		X	X
COUN	X				X
EAP	X				X
EAS	X	X			
ECE	X				
ECON	X	X		X	X
EDS	X				X
EI			X		
ELE				X	X
ELIT	X				X
ELT	X				X
EMBA			X		
CI	X				X
ESME	X				
EUS	X	X			
FPSY			X		

Table B.2 Programs of the Departments of GSSS (cont'd).

Departments	MS/MA (Thesis)	MS/MA (Non-Thesis)	MS/MA (Non-Thesis) (Secondary)	PhD on BS	PhD on MS/MA
GTSS		X			
GWS	X	X			
AH	X				X
HIST	X				X
HRDE			X		
IPSY	X	X			X
IR	X		X		X
LNA	X	X			
MCS	X	X	X		
MES	X	X			
PES	X				X
PHIL	X				X
PSY	X			X	X
SAN	X				
SA	X			X	X
SOC	X	X			X
SPL	X	X			
STPS	X	X			X
UPL	X	X			X

Table B.3 Programs of the Departments of IMS.

Departments	MS/MA (Thesis)	MS/MA (Non-Thesis)	MS/MA (Non-Thesis) (Secondary)	PhD on BS	PhD on MS/MA
PHOC	X				X
CHOC	X				X
MGG	X				X
MBF	X				X

Table A.4 Programs of the Departments of II.

Departments	MS/MA (Thesis)	MS/MA (Non-Thesis)	MS/MA (Non-Thesis) (Secondary)	PhD on BS	PhD on MS/MA
IS	X	X			X
COGS	X				X
ION			X		
WBLS			X		
MODSIM			X		
MIN	X	X			X
SM			X		
BIN	X				
GT	X				

Table B.5 Programs of the Departments of IAM.

Departments	MS/MA (Thesis)	MS/MA (Non-Thesis)	MS/MA (Non-Thesis) (Secondary)	PhD on BS	PhD on MS/MA
CRYP	X	X			X
SC	X				X
FM	X	X			X
AS		X			

APPENDIX-C

ENROLLMENT OF ÖYP STUDENTS

Enrollment of ÖYP Students and their target universities are given in **Table C-1** and **C-2.**

Table C-1 Enrollment of ÖYP Students.

NO	Target University	Number of Student	NO	Target University	Number of Student
1	ABDULLAH GÜL	4	37	KAHRAMANMARAŞ SÜTÇÜ İMAM	5
2	ABANT İZZET BAYSAL	6	38	KARABÜK	2
3	ADIYAMAN	2	39	KARADENİZ TEKNİK	1
4	AĞRI İBRAHİM ÇEÇEN	3	40	KARAMANOĞLU MEHMETBEY	9
5	AHİ EVRAN	12	41	KASTAMONU	7
6	AKDENİZ	24	42	KIRKLARELİ	2
7	AKSARAY	8	43	KİLİS 7 ARALIK	4
8	AMASYA	2	44	KONYA	5
9	ARDAHAN	5	45	KOCAELİ	26
10	ARTVİN ÇORUH	8	46	MARDİN ARTUKLU	3
11	ATATÜRK	43	47	MEHMET AKİF ERSOY	5
12	BARTIN	3	48	MERSİN	13
13	BATMAN	4	49	MUĞLA	6
14	BAYBURT	1	50	MUSTAFA KEMAL	3
15	BİLECİK	6	51	MUŞ ALPARSLAN	1
16	BİNGÖL	3	52	NAMIK KEMAL	4
17	BOZOK	12	53	NEVŞEHİR	7
18	CUMHURİYET	1	54	NİĞDE	1
19	ÇANAKKALE 18 MART	10	55	ONDOKUZ MAYIS	11
20	ÇANKIRI KARATEKİN	5	56	OSMANİYE KORKUTATA	9
21	ÇUKUROVA	1	57	PAMUKKALE	7
22	DUMLUPINAR	2	58	RİZE	3
23	DÜZCE	4	59	SELÇUK	27
24	ERCİYES	10	60	SİİRT	1
25	ERZİNCAN	5	61	SİNOP	7
26	FIRAT	2	62	SÜLEYMAN DEMİREL	12
27	GAZİANTEP	13	63	ŞIRNAK	1
28	GAZİOSMANPAŞA	9	64	TRAKYA	4
29	GİRESUN	9	65	TUNCELİ	4
30	GÜMÜŞHANE	1	66	ULUDAĞ	6
31	HAKKARİ	4	67	UŞAK	5
32	HARRAN	3	68	YALOVA	2
33	HİTİT	1	69	YÜZÜNCÜ YIL	61
34	İNÖNÜ	5	70	ZONGULDAK B.ECEVİT	23
35	İSTANBUL MEDENİYET	5	**TOTAL**		**527**
36	KAFKAS	4			

Table C-2 Enrollment of ÖYP Students at METU for the International Target Universities.

NO	Target University	Number of Students
1	EAST MEDITERRANEAN	2
2	GİRNE AMERICAN	5
3	LEFKE EUROPE	9
4	INTERNATIONAL CYPRUS	5
5	BAKU STATE	3
6	CASPIAN	1
7	KIRGIZ TURKISH MANAS	10
TOTAL		**35**