

**Master**

**Communication Engineering**

# RWTHAACHEN UNIVERSITY MASTER

## Certificate of Graduation

Die Fakultät für Elektrotechnik und Informationstechnik

The Faculty of Electrical Engineering and Information  
Technology

verleiht  
awards Frau / Ms. Masoumeh Ghanbarpour Mamaghani

geboren am  
born on 13. September 1983  
in Teheran

nach Abschluss des  
Studiengangs  
on completion of the  
course Kommunikationstechnik  
Communications Engineering

den akademischen Grad  
the academic degree Master of Science RWTH Aachen University  
(M.Sc. RWTH)

Aachen, 10. Juli 2015

Der Dekan der Fakultät  
für Elektrotechnik und  
Informationstechnik  
Dean of the Faculty of  
Electrical Engineering and  
Information Technology



Univ.-Prof. Dr.rer.nat. Wilfried Mokwa

Der Vorsitzende des  
Prüfungsausschusses  
Chair of the  
Examination Board



Univ.-Prof. Dr.-Ing. Jürgen Roßmann



# RWTH AACHEN UNIVERSITY CERTIFICATE

Masoumeh Ghanbarpour Mamaghani

geboren am 13. September 1983  
born on

in Teheran

hat die Prüfung zum Master of Science  
has passed the

nach der Masterprüfungsordnung  
für den Studiengang Kommunikationstechnik

according to the course in Communications Engineering

abgelegt und die Gesamtnote sehr gut  
erhalten

and has obtained the  
overall mark very good (1,5)

# RWTH AACHEN UNIVERSITY CERTIFICATE

Masoumeh  
Ghanbarpour Mamaghani

hat an folgenden Lehrveranstaltungen mit  
Erfolg teilgenommen

has successfully completed the  
following subjects

Prüfer

Datum

examiner

date

CAD-Praktikum: Rechnergestütztes Entwerfen  
von Bauelementen und Schaltungen

Jansen

24.07.2009

CAD-Lab Course: Computer Aided Analysis  
and Design of Components and Circuits

Praktikum: Mobilfunknetze

Walke

01.09.2009

Laboratory: Mobile Radio Networks

Seminar: Kommunikationstechnik

Vary

08.03.2010

Seminar: Communications Engineering

Deutscher Sprachkurs

27.08.2009

German Language Course

Industriepraktikum

10.07.2015

Industrial Internship

Zusatzfächer

additional subjects

Entrepreneurial Marketing

Brettel

31.03.2010

gut

Entrepreneurial Marketing

good

Optimization in Engineering

Mathar

27.07.2012

sehr gut

Optimization in Engineering

very good

Praktikum Kommunikationstechnik

Vary

18.02.2010

bestanden

Laboratory on Communications Engineering

passed

Praktikum: Netzwerkprogrammierung für

Mähönen

14.07.2011

bestanden

eingebettete Systeme

passed

Laboratory on Network Programming for

Embedded Systems

Fachnoten: marks for specific

subjects:

sehr gut

very good

gut

good

befriedigend

satisfactory

ausreichend

sufficient

Gesamtnote:

mit Auszeichnung bestanden

sehr gut

gut

befriedigend

ausreichend

overall mark:

excellent

very good

good

satisfactory

sufficient



# Masoumeh Ghanbarpour Mamaghani

hat folgende Fachprüfungen abgelegt has passed the following exams	Prüfer examiner	Datum date	Note mark
Informationstheorie und -codierung Information Theory and Source Coding	Vary	11.02.2009	sehr gut very good
Systemtheorie und Signalverarbeitung Signals and Systems	Ohm	20.02.2009	sehr gut very good
Kommunikationsprotokolle Communications Protocols	Mähönen	25.02.2009	gut good
Signalschätzung und -erkennung Estimation and Detection Theory	Ascheid	20.03.2009	gut good
Algorithmen für digitale Empfänger Algorithm Design of Digital Receivers	Ascheid	22.10.2009	gut good
Aktuelle Themen der Kommunikations Technik Advanced Topics in Communications	Negra	24.09.2009	gut good
Mobilfunksysteme I Mobile Radio Systems I	Mähönen	27.07.2009	sehr gut very good
Kanalcodierung und Modulation Advanced Channel Coding and Modulation	Vary	01.10.2009	sehr gut very good
Mikrowellensystemtechnik Microwave Circuits	Jansen	13.10.2009	befriedigend satisfactory
Antennentechnik und -dimensionierung Antenna Engineering	Rembold	10.03.2009	befriedigend satisfactory
Acoustic Virtual Reality Acoustic Virtual Reality	Vorländer	20.09.2010	sehr gut very good
Signalverarbeitung in Mehrantennensystemen (MIMO) Signal Processing in Multi-Antenna (MIMO) Communication Systems	Ascheid	04.03.2010	sehr gut very good
Multimediakommunikation I Multimedia Communication Systems I	Ohm	19.09.2011	sehr gut very good
Kryptographie I Cryptography I	Mathar	24.08.2010	sehr gut very good
Mobilfunksysteme II Mobile Radio Systems II	Mähönen	02.02.2011	gut good
Masterarbeit Master Thesis	Mathar	24.01.2014	sehr gut very good
Thema der Masterarbeit Title of the Master Thesis	Entwicklung einer Modellbasierten Prädiktiven Regelung zur kollisionsfreien Pfadplanung von Fahrzeugen Development of a Model Predictive Control Concept for Vehicle Collision Avoidance		

Aachen, 10. Juli 2015

Der Vorsitzende  
des Prüfungsausschusses  
Chair of the Examination Board

Univ.-Prof. Dr.-Ing. Jürgen Roßmann



Family Name: Ghanbarpour Mamaghan

First Name: Masoumeh

Student-ID: 286046

Born On: 09/13/1983

in: Teheran

Degree: Master

Field of Study: Communications Engineering

Courses	MA	AN	Ex	Sub	Ac	Cr	hpw	Sem
Cryptography I	1,30		FP	P	N	5,5	0,0	20101
Multimedia Communication Systems I	1,30		FP	P	N	5,5	0,0	20111
Information Theory and Source Coding	1,30		FP	P	N	4,0	3,0	20082
Signals and Systems	1,30		FP	P	N	4,0	3,0	20082
Communications Protocols	2,00		FP	P	N	5,5	3,0	20082
Estimation and Detection Theory	2,00		FP	P	N	5,5	3,0	20082
Algorithm Design of Digital Receivers	1,70		FP	P	N	5,5	3,0	20091
Advanced Topics in Communications	1,70		FP	P	N	5,5	3,0	20091
Mobile Radio Systems I	1,00		FP	P	N	5,5	3,0	20091
Advanced Channel Coding and Modulation	1,30		FP	P	N	5,5	3,0	20092
Microwave Circuits	2,70		FP	P	N	5,5	3,0	20091
Antenna Engineering	3,00		FP	P	N	5,5	3,0	20082
Entrepreneurial Marketing	2,30		FP	P	N	5,5	3,0	20092
CAD-lab Course: Computer Aided Analysis and Design of Components and Circuits	++	++	VL	WA	N		0,0	20091
Laboratory on Communications Engineering	++	++	VL	WA	N		0,0	20092
Laboratory: Mobile Radio Networks	++	++	SL	WA	N		0,0	20091
Laboratory on Network Programming for Embedded Systems	++	++	SL	WA	N		0,0	20111
Seminar: Communications Engineering	++	++	VL	WA	N	4,5	0,0	20092
German Language Course	++	++	VL	P	N	12,0	0,0	20122
Industrial Internship	++	++	VL	P	N	6,0	0,0	20151
Acoustic Virtual Reality	1,00		FP	P	N	5,5	0,0	20101
Development of a Model Predictive Control Concept for Vehicle Collision Avoidance	1,00		FP	DI	N	30,0	0,0	20132
Master examination overall mark	1,50		MS	GN	N	109,5	33,0	20151
Signal Processing in Multi-Antenna (MIMO)	1,00		FP	P	N	5,5	0,0	20092
Communication Systems								
Mobile Radio Systems II	2,30		FP	P	N	5,5	3,0	20102

**The final examination is successfully completed.**

Ma = Marks: 1,0-1,5 = very good (A) / 1,6-2,5 = good (B) / 2,6-3,5 = satisfactory (C) / 3,6-4,0 = sufficient (D) / 4,1-5,0 = failed (E) / ++ = passed (no mark)

AN = Annotation: ++ = with success / AT = cancelled because of sickness / NE = absent = failed / NMP = oral part of examination still open / NZ = not licensed / RU/RT = cancelled / Z2 = interdisciplinary examination / mAb = passed with distinction / pa = examination annulled / PMG = registration cancelled / GLL = deleted exam / PRA = exam aborted / NG = deleted grade

EX = type of examination: BC = Bachelor degree / FP = Major examination / HA = State teaching examination / HD = Diplom degree / HM = Magister degree / HS = State examination / MK = Module / MS = Master degree / MZ = Magister interim examination / TL = part of examination / TN = confirmation of attendance / VA = interim teaching examination / VD = interim diplom examination / VL = assessment / VS = interim state examination

Sub = subject; DI = final thesis / GN = overall mark / P = compulsory subject / PW = compulsory optional subject / W1-W4, WA, WM = optional subject / ZU = additional subject (not included in overall mark)

Ac = accepted subject from other studies: J/N = yes/no

Cr = Credits/ECTS-points

hpw = hours per week

Sem = Semester: \_\_ 1 = Sommersemester / \_\_ 2 = Wintersemester

**RWTH AACHEN  
UNIVERSITY**  
Abteilung 1.3  
Zentrales Prüfungsamt  
52056 Aachen, GERMANY

---

Signature and Stamp

**Bachelor**

**Applied Mathematics**



شهرزاد شهری

مترجم رسمی زبان انگلیسی قوه قضائیه و عضو جامعه مترجمان رسمی ایران  
تهران- میدان فاطمی- خ چهلستون ساختمان چهلستون- واحد ۱۰۰  
تلفن: ۸۸۹۶۱۱۸۷



جمهوری اسلامی ایران

توقه قضائیه - اداره مترجمین رسمی

**SHAHRAZAD SHAHRI**

The Official English Translator to The Judiciary  
And Member of Iranian Association of Official Translators  
Fatemi Sq. Chelsooton, Tehran/Tel No.:88961187



IN THE NAME OF GOD  
EMBLEM  
ISLAMIC REPUBLIC OF IRAN  
MINISTRY OF SCIENCE, RESEARCH AND TECHNOLOGY  
IRAN UNIVERSITY OF SCIENCE AND TECHNOLOGY

Sealed photo of holder

No.: 604/85/17

Date: Apr.30,2007

*Pursuant to the Statutes approved by Central Councils of Universities  
Whereas,*

**Ms. Masoumeh Ghanbarpour Mamaghani**

Daughter of Majid, ID.Card No.10120, issued at Tehran, born in 1983, successfully completed her course of studies at Faculty of Mathematics in March.2007, thus this Diploma of Bachelor's Degree in **Applied Mathematics** is conferred upon her.

We wish her success in combining, learning and actions with piety, devoting her service to the cause of people in the name of Almighty God.

Dean of Faculty : signed

Chancellor : Signed and sealed.

Ministry of Science, Research and Technology

Signed and Sealed.

TRUE TRANSLATION IS CERTIFIED.

6/16/2014



In The Name Of God

**Iran University Of Science and Technology (IUST)**

**B.Sc Transcript  
Applied Mathematics**

**StudentNo: 80511809**

**Name : Masoumeh , Ghanbarpourmamaghani**

**Birth Date: 1983, Sep**

**Graduation Date: 2007, Feb**

**ID NO: 10120**

LessonNo	Lesson Name	Credit	Mark	Eval .
308210	General Physics I	4	14	56
312204	foundations of Mathematics	4	12	48
481201	General Mathematics I	4	14.5	58
481243	Physical Education I	1	11	11
481296	Islamic Manners	2	13	26
308212	General Physics II	4	17.5	70
409123	Computer Fundamentals And Programming	4	11.5	46
481202	General Mathematics II	4	14.5	58
481232	History of Islam	2	17.5	35
312203	General Mathematics III	4	13	52
312219	Linear Algebra I	4	16	64
312255	Discrete Mathematics	4	9	36
481308	General Physics Lab. I	1	16.5	16.5
312210	Probability and Statistics I	4	13.5	54
312215	Mathematical Analysis I	4	16	64
312217	Abstract Algebra I	4	12.5	50
312211	Probability and Statistics II	4	16.5	66
312216	Mathematical Analysis II	4	20	80
312235	Abstract Algebra II	4	17.5	70
310233	Mathematical Analysis III	4	15.5	62
312220	Complex Variables	4	10.5	42
431252	Operation Research I	4	16.75	67
481264	Islamic Theology I	2	19.5	39
312237	Advanced Programming	4	14	56
312255	Discrete Mathematics	4	20	80
312256	Numerical Analysis I	4	16.5	66
431286	Operations Research II	4	15.5	62
481272	Islamic Revolution and Its Roots	2	20	40
481309	General Physics Lab. II	1	17.5	17.5
312273	Random Processes	4	20	80
409120	Data Structures and Algorithms	3	16.25	48.75
481203	Differential Equations	3	20	60
481285	Life Skills & Family Planning	2	19.75	39.5
409274	Database Design	3	12	36
432252	Principle of Management & Theory of Organization		16	32
481231	Persian Literature	3	20	60
481240	English Language	3	16	48
481332	Islamic Theology II	2	17.5	35
312234	Graph Theory	4	14	56
312274	Numerical Analysis II	4	17.5	70



In The Name Of God

Iran University Of Science and Technology (IUST)

B.Sc Transcript  
Applied Mathematics

StudentNo: 80511809

Name : Masoumeh , Ghanbarpourmamaghani

Birth Date: 1983, Sep

Graduation Date: 2007, Feb

ID NO: 10120

LessonNo	Lesson Name	Credit	Mark	Eval .
431249	Project Control	3	18.25	54.75
481270	Physical Education II	1	20	20
481345	thematic comment Of Ghoran	2	16.5	33
481326	B.Sc. Project	3	17.75	53.25

Credit Taken : 141 Credit Passed 137 Total Eval. : 2218.25 Total Average : 15.73

Note :

This transcript is not valid without being signed and sealed by Register's Office  
The scores are valid at the range between 0(min) to 20(max)

Signature and Seal of the Dean

of  
Office Registerer

**Bachelor**

**Electrical Engineering**



غلامحسین رهبری

مترجم رسمی زبان انگلیسی دادگستری جمهوری اسلامی ایران  
میدان دکتر فاطمی بزرگراه شهید گمنام پلاک ۳۳ طبقه ۷ واحد ۳۹  
تلفن ۸۸۹۷۹۶۲۴ - ۸۸۹۵۲۲۸۲ - ۸۸۹۵۶۷۷۳

G.H. RAHBARI

Authorized Translator to the Justice Administration of I.R.I  
No. 33 Shahid Gonnam Exp. Way, Dr. Fatemi Sq, Tehran  
Tel: 88956773 - 88952282 - 88979624



جمهوری اسلامی ایران

توقه قضائیه - اداره مترجمین رسمی

Official Translation from Persian

Hologram

Islamic Azad University

## Certificate of Completion of Bachelor's Degree Course

Sealed Photo of the Holder

Serial No.: 0410075

Central Organization Certificate No. & Date: 168610102323 - April 22, 2008

By virtue of the Articles of Association of the University approved by the High Council of Cultural Revolution approved on November 3, 1987 and Single Article approved by the Islamic Consultative Assembly (the Parliament) on May 4, 1988, whereas;

MS. MASOUMEH GHANBARPOUR MAMAGHANI, daughter of Majid, holder of ID Certificate No. 10120 issued at Tehran, born in 1983 in Tehran completed the part-time educational program of Central Tehran Branch in the field of Electrical Engineering - Electronics, passing 144 credits with the grade point average of 16.67 (sixteen point sixty seven) out of twenty on July 21, 2007, this certificate is awarded to her.

Signed & Sealed:

Dean of the University Branch

For, Chancellor of the University



True translation is certified.

Tehran - May 31, 2008



Only the authenticity of the seal and signature of the Official Translator is certified. This certification does not include confirmation of the accuracy of the translation and the authenticity of the translated document. Department of Official Translators' Affairs of the Judiciary of the Islamic Republic of Iran





شماره دفتر مترجم

جمهوری اسلامی ایران

قوه قضائیه - اداره مترجمین رسمی

غلامحسین رهبری

مترجم رسمی زبان انگلیسی دادگستری جمهوری اسلامی ایران  
میدان دکتر فاطمی بزرگراه شهید گمنام پلاک ۳۳ طبقه ۷ واحد ۳۹

تلفن ۸۸۹۷۹۶۲۴ - ۸۸۹۵۲۲۸۲ - ۸۸۹۵۶۷۷۳

G.H. RAHBARI

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Official Translation from Persian

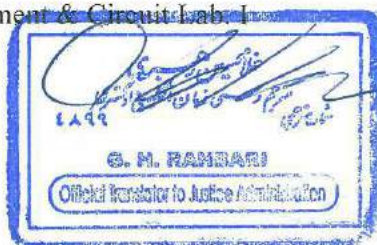
**Islamic Azad University**  
Central Tehran Branch

**TRANSCRIPT OF GRADES**

Name & Surname: MS. MASOUMEH GHANBARPOUR MAMAGHANI Father's Name: Majid  
ID Certificate No. & Place of Issue: 10120 - Tehran Date of Birth: 1983  
Academic Level: Part-time Continuous Bachelor's Degree Course Student No.: 80410840000  
Admission Date: 2001 Graduation Date: July 21, 2007  
Name of Faculty: Faculty of Engineering  
Field: Electrical Engineering - Electronics

Course Title	Credit		Grade	Credit Point	Sem./Year
	Theo.	Pract.			
Physical Education I, Practical	0	1	14.00	14.00	1 <sup>st</sup> 2001
Persian	3	0	18.50	55.50	"
English	3	0	11.00	33.00	"
Physics I	3	0	20.00	60.00	"
Industrial Drawing	0	1	11.50	11.50	"
Mathematics I	3	0	12.00	36.00	"
History of Islam	2	0	19.50	39.00	2 <sup>nd</sup> 2001
Differential Equations	3	0	17.25	51.75	"
Engineering Statistics & Probabilities	3	0	16.50	49.50	"
Physics II	3	0	19.00	57.00	"
Islamic Texts	2	0	19.50	39.00	1 <sup>st</sup> 2002
Electric Circuits I	3	0	12.50	37.50	"
Heat & Mechanics Physics Lab. I	0	1	17.50	17.50	"
Mathematics II	3	0	16.00	48.00	"
Islamic Revolutions & its Origins	2	0	13.25	26.50	2 <sup>nd</sup> 2002
Computer Programming	3	0	20.00	60.00	"
Engineering Mathematics	3	0	17.00	51.00	"
Electrical Circuits II	3	0	12.75	38.25	"
Islamic Education I	2	0	12.00	24.00	1 <sup>st</sup> 2003
General Workshop	0	1	18.50	18.50	"
Electrical Measurement	3	0	16.50	49.50	"
Electronics I	3	0	19.50	58.50	"
Systems Analysis	3	0	20.00	60.00	"
Islamic Education II	2	0	20.00	40.00	2 <sup>nd</sup> 2003
Modern Physics	3	0	14.00	42.00	"
Electricity Workshop	0	1	16.00	16.00	"
Electromagnetism	3	0	19.50	58.50	"
Electronics II	3	0	18.50	55.50	"
Logic Circuits	3	0	12.50	37.50	"
Measurement & Circuit Lab. I	0	1	16.50	16.50	"

Contd.../2





جمهوری اسلامی ایران

۱۶۲۵۲۶

شماره دفتر مترجم

قوة قضائية - اداره مترجمين رسمی

(2)

Course Title	Credit		Grade	Credit Point	Sem./Year
	Theo.	Pract.			
Population & Family Planning	2	0	17.50	35.00	Sum.2003
Holy Koran Reading	0.5	0	19.00	09.50	"
Holy Koran Education	0.5	0	20.00	10.00	"
Electrical Machines I	3	0	14.25	42.75	"
Electromagnetism Physics Lab. II	0	1	20.00	20.00	"
Electronics Lab. I	0	1	19.00	19.00	1 <sup>st</sup> 2004
Logic Circuits Lab.	0	1	19.00	19.00	"
Telecommunications I	3	0	18.75	56.25	"
Computer Architecture	3	0	12.00	36.00	"
Imam's Testament	1	0	18.50	18.50	"
Numerical Computations	2	0	17.00	34.00	2 <sup>nd</sup> 2004
Electrical Machines II	3	0	20.00	60.00	"
Microprocessors	3	0	15.00	45.00	"
Linear Control Systems	3	0	14.60	43.80	"
Electric Machines Lab. I	0	1	17.00	17.00	Sum. 2004
Electronics Lab. II	0	1	17.75	17.75	"
Technical Report Writing	2	0	20.00	40.00	"
Linear Control Systems Lab.	0	1	18.75	18.75	1 <sup>st</sup> 2005
Electronics III	3	0	13.00	39.00	"
Circuit Filter & Kinetics	3	0	20.00	60.00	"
Specialized English	2	0	16.50	33.00	"
Telecommunications II	3	0	20.00	60.00	"
Computer Architecture Lab.	0	1	17.00	17.00	"
Telecommunications Circuits	3	0	19.50	58.50	2 <sup>nd</sup> 2005
Switching & Telephone Systems	3	0	12.50	37.50	"
Microprocessors Lab.	0	1	17.00	17.00	"
Physical Education II, Practical	0	1	14.00	14.00	Sum. 2005
Practical Training	0	2	18.75	37.50	"
Islamic Ethics & Education	2	0	15.50	31.00	1 <sup>st</sup> 2006
Study of Power Systems I	3	0	17.00	51.00	"
Electronics Physics	3	0	15.00	45.00	"
Electronics Lab. III	0	1	17.00	17.00	"
Pulse Technique	3	0	14.50	43.50	"
Pulse Technique Lab.	0	1	17.50	17.50	"
Telecommunications Circuits Lab.	0	1	18.50	18.50	"
Bachelor's Degree Course Project	0	3	19.80	59.40	2 <sup>nd</sup> 2006

Total Credits Passed: 144

Total Credits Taken: 144

Grade Point Average: 16.67

Contd../3





غلامحسین رهبری

مترجم رسمی زبان انگلیسی دادگستری جمهوری اسلامی ایران  
میدان دکتر فاطمی بزرگراه شهید گمنام پلاک ۳۳ طبقه ۷ واحد ۳۹  
تلفن ۸۸۹۷۹۶۲۴ - ۸۸۹۵۲۲۸۲ - ۸۸۹۵۶۷۷۳

G.H. RAHBARI

Authorized Translator to the Justice Administration of I.R.I  
No. 33 Shahid Gomonam Exp. Way, Dr. Fatemi Sq. Tehran  
Tel: 88956773 - 88952282 - 88979624



جمهوری اسلامی ایران

۱۶۲۵۲۶

شماره دفتر مترجم

قوة قضائیه - اداره مترجمین رسمی

(3)

The above transcript of grades which is registered under No. 8700141 dated April 22, 2008 is valid without correction/overwriting.

In the educational system of the university, the following educational hours are offered in any semester:

One Theoretical Credit: 16 Hours, One Practical Credit: 32 Hours & Operation & Workshop: 48 Hours

Educational evaluations are on 0 to 20 basis.

The minimum pass grades at different levels are as follows: Associate's & Bachelor's Degree Levels: 10, Master's Degree Level: 12 & Specialized Doctorate's Degree Level: 14

Signed & sealed by:

In-charge of Graduates Affairs of the University Branch

Supervisor of Department of Students Affairs

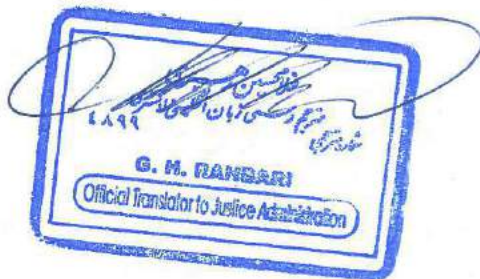
Dean of the University Branch

Director General of Graduates Office of the Islamic Azad University

-B Ghanbarpour Mamaghani Masoumeh-

True translation is certified.

Tehran - February 16, 2008



1 - JUN 2008

۵-۱۲۵۳

## Letter of recommendation

For Ms. Ghanbarpour Mamghani

To whom it may concern,

I am delighted to hereby support the application of Ms. **Masoumeh Ghanbarpour Mamghani** by this letter of recommendation. As the head of the institute of Automatic control, I personally came to know Ms. Ghanbarpour when she started working as student assistant in one of our research groups. Later, she accomplished her master thesis in our institute.

### Profile of applicant

Ms. Ghanbarpour's master thesis included designing a *Model predictive Controller* in Matlab/Simulink, which enables vehicles to engage automatic cooperative evasion manoeuvres and at the same time avoiding collision. Her tasks were:

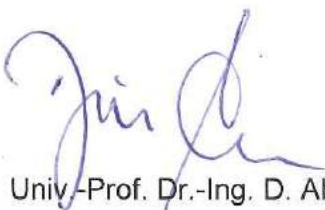
- Implementation of a suitable method in MATLAB/Simulink;
- Definition of a quality criterion for validation of the concept;

Ms. Ghanbarpour is a dedicated student with a great scientific record. During her work in our institute, she revealed self-reliance and dependability as well as dedication. She showed strong ability to quickly grasp new concepts, independently find solutions for the problems she was given, and finally fulfill her supervisor's expectations.

### Final recommendation

Accordingly, I consider Ms. Ghanbarpour as an outstanding student and recommend her with confidence for any support regarding her future career. I will be pleased to answer additional questions.

Sincerely,



Univ.-Prof. Dr.-Ing. D. Abel

Director, Institute of Automatic Control

RWTH Aachen University

PEM Aachen GmbH | Karl-Friedrich-Straße 60 | 52072 Aachen

Masoumeh Ghanbarpour

Kai D. Kreisköther  
+49 178 1328855  
k.kreiskoether@pem-aachen.de

Datum  
07.07.2017

### Confirmation of work

To whom it may concern:

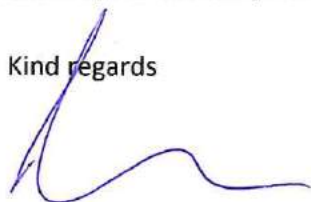
We hereby confirm that Ms. Masoumeh Ghanbarpour has worked for our company as freelance contractor in the timeframe Nov 2016 – May 2017. She supported our project of indoor drone logistics by developing an indoor positioning system (IPS) based on ultra wide band and ultrasonic technology. She especially worked in the following topics:

- Research on available technologies and research approaches
- Implementation of a coordinate transformation algorithm between local x/y/z and global GPS coordinate system
- Programming in C
- Setup and test of installation in facility

I can give her a good recommendation to any future employer.

Should you wish to speak to me personally about her, please feel free to contact me.

Kind regards



Kai D. Kreisköther  
PEM Aachen GmbH



غلامحسین رهبری

مترجم رسمی زبان انگلیسی دادگستری جمهوری اسلامی ایران  
میدان دکتر فاطمی بزرگراه شهید گمنام پلاک ۳۳ طبقه ۷ واحد ۳۹  
تلفن ۸۸۹۷۹۶۲۴ - ۸۸۹۵۲۲۸۲ - ۸۸۹۵۶۷۷۳

G.H. RAHBARI

Authorized Translator to the Justice Administration of I.R.  
No. 33 Shahid Gonnam Exp. Way, Dr. Fatemi Sq. Tehran  
Tel: 88956773 - 88952282 - 88979624



جمهوری اسلامی ایران

تأهتیه - اداره مترجمین رسمی

شماره دفتر مترجم

۲۱۰۲۱۳

شماره

Official Translation from Persian

National Emblem  
Islamic Republic of Iran

Ministry of Communications & Information Technology  
Mobile Communications Company

### EDUCATIONAL CERTIFICATE

Date: August 7, 2006

No.: 345/1019

It is hereby certified that Ms. Masoumeh Ghanbarpour Mamaghani successfully completed the 30-hour course on "Basic Principles of Mobile", held through Plan for Communication with the Universities of the Country from July 29, 2006 to August 2, 2006 obtaining grade 87.5 out of 100.

Signed & sealed by:

Director General of Education

Managing Director

B GhanbarpourMamaghaniMasoumeh

True translation is certified.

Tehran - December 31, 2007

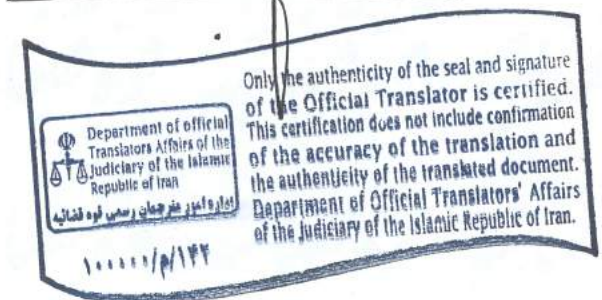


مهر و امضاء:  
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شماره: P/6364

تاریخ: 10 5 JAN 2008



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of the Judiciary of the Islamic Republic of Iran.

