

Study Guide
Development-relevant Education
TU/e

Academic Year 2009-2010

Technische Universiteit Eindhoven
Bestuurscommissie Techniek voor Ontwikkeling
University Committee Technology for Development
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Table of contents

Preface.....	5
Bestuurscommissie Techniek voor Ontwikkeling (TvO)	6
University Committee Technology for Development.....	6
Core Courses on Development	9
0CT01 - Technology, Poverty, and the Global Environment	9
0EM71 - Technology and development: an introduction.....	11
0EM91 - Technology and globalization.....	13
0L972 - Special project Urban Challenge	15
0N400 - Capita selecta technology and development studies	16
0N420 - Development economics	18
0N421 - Development theory, strategy and policy	20
0N451 - Project course certificate technology & development globalisation.....	22
0NN10 - Preparation & implementation of technical projects in DC	24
1ZM45 - International negotiation	26
7T850 - Building and information systems in developing countries	28
7T910 - Structural design and engineering for tropical countries.....	29
Other Development Related Courses:.....	30
0C205 - Background of sustainable development.....	30
0C706 - Multidisciplinary project sustainable development.....	31
0C900 - Technology for sustainable development.....	32
0C944 - Development patterns of energy systems.....	33
0CT00 - Minor project TIDO	34
0P410 - Environment and behaviour.....	35
3P250 - Energy and sustainability.....	36
4P510 - Renewable energy sources.....	37
5N480 - Technology for Sustainable Development.....	39
6BO01 - DBL sustainable energy	40
7S815 - Design of sustainable energy systems for the built environment	41
7T644 - Sustainable building technology design	42
DG409 - Design for the Environment.....	43
Certificate Programme in Technology, Development and Globalisation.....	45
Target Group	45
cTDG Programme:	46
Orientating on your own cTDG project	47
cTDG Colloquium	47
cTDG Project Examples.....	48
How to Enroll in the cTDG Programme	50
How to Obtain the TDG certificate	50
cTDG Staff.....	50
cTDG Registration form.....	51
Evaluation Form cTDG	52

Preface

Dear Student,

It is with great pleasure that we present the seventh edition of the Study Guide for Development-related Education at the Eindhoven University of Technology. This Study Guide provides an overview of courses at the TU/e that are directly or indirectly relevant for the problems of development and developing countries. The Study Guide is compiled for all students who take an interest in development issues and who would like to take optional courses in the field of development studies alongside their main curriculum. The courses listed in this guide are of interest to three categories of students:

- students who, after graduating from this university, will be given short-term or long-term assignments in developing countries, as part of their jobs as engineers or scientists in private firms or non-profit organisations;
- students who explicitly want to concentrate on the subject of development;
- students who wish to enhance their knowledge about development issues as part of their broader personal development.

We have done our utmost to identify and include as many development-relevant courses as possible. In addition to a number of core courses with direct development relevance we have included some courses focussing on closely related fields such as sustainability and globalisation. The Study Guide is updated and republished before the beginning of every academic year. Please contact us if you are aware of any relevant courses that are not yet listed in this Guide, or if you are interested in developing such courses.

In addition to taking separate courses in development-related subjects, there is also a possibility to obtain a Certificate in Technology, Development and Globalisation (cTDG), 24 ECTS. More information about the Certificate Programme can be found in this Study Guide, where contact details are also provided.

In addition to course information, this Study Guide also includes some information about the University Committee Technology for Development (Bestuurscommissie Techniek voor Ontwikkeling, TvO). We hope this Study Guide will meet a need.

Dr. Ir. Peter Erkelens
University Committee Technology for Development

Bestuurscommissie Techniek voor Ontwikkeling (TvO)

University Committee Technology for Development

WHAT IS TVO?

TvO stands for Technology for Development. It is a University-wide forum supported by the TU/e Board of Directors to promote awareness in the TU/e community about how its students and staff can contribute effectively to the design and implementation of innovative technological solutions for major global problems, with a special focus on the developing countries.

The inspiration for setting up TvO came from a group of students at the TU/e who were concerned about the declining interest in development issues, both in the Netherlands as a whole and at our university in particular. In 2001, an action committee was formed, which drew up a manifest entitled "Technology for Development". This manifest states that technological improvement holds out great potential for improving poor people's living and working conditions in developing countries. Technological universities are uniquely equipped to contribute to the realisation of such potential. The manifest was well received by the TU/e community. It was signed by no less than fifteen hundred students and staff members. The Board of the University then instituted TvO as a University Committee.

TVO'S FOCUS

Many of us are concerned with the global problems of today, such as climate change, armed conflicts and terrorism, scarcity of energy, water and food, lack of education, poverty and social exclusion, and deadly diseases and inadequate health systems. In developed countries these issues receive much attention, including the important role that scientists and engineers can play in addressing such problems through smart technological innovations using the latest advances in technological knowledge.

However, in developing countries, forming the largest part of the world, there is a dire lack of local technological capacity and resources to develop locally appropriate solutions to these problems. In these cases, combining local knowledge and technologies with western knowledge and resources can be very fruitful. Western inputs can range from relatively simple, low-tech solutions to high-tech innovations developed by scientists and engineers who operate at the global technological frontier. Varied as these inputs may be, what they all share is the requirement of effective support based on knowledge of local circumstances and needs, and close cooperation between local and foreign stakeholders.

HOW DOES TVO WORK?

Being a university of technology, we stimulate students and staff to participate in activities that are especially targeted towards engineers and scientists. TvO believes that it is our ethical obligation, as a community of technical specialists, to help find modern and innovative technical solutions for global problems that contribute to social justice and sustainability, especially for the benefit of under-privileged in developing countries, while using sound principles of academic research.

The role of TvO is stimulation of awareness and critical discussions, and pointing people to interesting study projects, courses, lectures, collaborations etc.

Each year TvO organizes a range of interesting activities:

Liaisons between staff and students who are involved in development related activities and projects for exchange of experiences and expertise.

Lectures together with Studium Generale about the latest innovative trends and insights in specific fields relevant to international development, by specialists from the field: biofuels, solar cells, mass shelter construction, hydro – and waste water treatment, project management in difficult environments, etc.

Movies (with discussions with the makers or a panel) on these topics, in the 'Zwarte Doos'.

Participation in specific inter-university activities such as ICT for developing countries, I4D, World Energy Day, Oikos workshops, etc.

Support and stimulation of development-related student projects & activities in developing countries (facilitation of internships abroad, international programmes, study tours, student/department symposia and fora, etc.).

Given the present debates about the Millennium Development Goals, we feel that these activities are more relevant than ever.

TvO supports the certificate programme in Technology, Development and Globalisation (cTDG) which is run by staff members of the School of Innovation Sciences within the Faculty of Industrial Engineering and Innovation Sciences. All students of the TU/e can enroll in this programme (see www.tue.nl/ctdg).

WHO RUNS TVO?

TvO is an awareness-promoting organization. The core activities are developed by an enthusiastic team of students (the Activity Committee), which organises lectures, seminars and public events. It is also responsible for the website and information activities. The Activity Committee receives support from experienced staff. Students and staff hail from all TU/e faculties, financial support is provided by the TU/e Board of Directors.

TvO has a General Board, which meets twice a year. The General Board consists of staff and students representing all the TU/e departments. Presently there are 13 members in the General Board. The day-to-day work of TvO is the responsibility of the Daily Board of 5 members.

TvO publishes a newsletter about development related events and activities at the TU/e, which appears four to six times a year. If you would like to receive this newsletter on a regular basis, please send an email to the TvO secretariat: tvo@tue.nl.

Students play a prominent role in TvO. Many of the ideas and suggestions for new TVO activities originate with our student members. If you are interested in participating in TvO, please send an email to the TvO secretariat: tvo@tue.nl. There is always both place and need for new active student members.

TvO maintains a website with information about development related activities, teaching and research: www.tue.nl/tvo.

For more information about TvO you can also contact the TvO secretariat:
Mrs Saskia Repelaer van Driel, IPO 2.20, tel.: 247 2242, email: tvo@tue.nl

Core Courses on Development

OCT01 - Technology, Poverty, and the Global Environment

GENERAL INFORMATION	
academic year	2009/2010
class planning / target audience	<ul style="list-style-type: none"> Semester A Quartile 2 Certif.pr.Technology,Development for all Compulsory, English and Globalisation courses Minor Energy Technology Bachelor's degree program (year 3) Compulsory, English Minor Technology and International Sustainable Dev Bachelor's degree program (year 3) Compulsory, English
ECTS credits BaMa	3
provided by	<ul style="list-style-type: none"> Department: Industrial Engineering & Innovation Sciences (responsible) Subdepartment: Technology and Policy Section: Technology and development studies
prior knowledge	None
lecturers	<ul style="list-style-type: none"> dr.ir. A.J. Balkema (responsible lecturer) dr. H.A. Romijn (co-lecturer) dr. S. Arora (co-lecturer)
information	<ul style="list-style-type: none"> Secr. cTDG / SvdT - IPO 2.20 - tds@tue.nl - tel. 2246
course web page	http://w3.ieis.tue.nl/en/education/certificate_programs/ctdg
studyweb	http://studyweb.tue.nl
EDUCATION AND EXAMINATION	
type of education	<ul style="list-style-type: none"> 7 weeks lecture, 2 hours
type of examination / planning	<ul style="list-style-type: none"> Written, Semester A Quartile 2 (3 hours), Semester B Quartile 3 (3 hours) Essay & Discussion
course material	<ul style="list-style-type: none"> Lecture Notes (Sheets) (recommended) Additional literature (book and reports as well as articles and assignments) (recommended)
CONTENTS	
learning objectives	<p>Based on the exploration of the whole field of Technology, Poverty and the Global Environment, the students are supposed:</p> <ul style="list-style-type: none"> to gain basic knowledge of and insight in three main topics (1) coexistence of poverty and wealth in different regions of the world and the causes behind this, (2) development and the increasing pressure on the global environment and, (3) the vulnerability of the poor with respect to environmental pollution and climate change; to gain understanding the how these topics are interrelated and what role technology plays in current developments; apply gained knowledge and insights in writing an essay and discussing possibilities to come to a more just and sustainable

	development.
contents	<p>The current development path does not sustain the world population. About 1.4 billion people live in extreme poverty, local pollution of water and air is sickening in many urban areas and the pressure on the global environment is increasing. It is uncertain how climate change and loss of biodiversity will influence our lives and that of future generations. The poorest people are most vulnerable to environmental pollution and are often living in regions that are hit hardest by climate change. What is the effect of environmental pollution and climate change in different parts of the world and on different groups of the population? How will this affect the poor? How are the poor going to cope with this? What policies instruments are available to governments to support the poor and to prevent environmental degradation? How do international organizations approach poverty, environmental degradation and climate change? What changes can we make in the current development path to try and solve the global problems we are facing?</p> <p>In this lecture series an overview of facts and mechanisms is given to explain current developments with respect to poverty and degradation of the global environment and the role of technology. Based on global assessments, an outlook to possible future scenarios is presented. After which, students are required to write an essay on a relevant topic of their choice and to participate in the two final interactive lectures discussing the possibilities to come to a more just and sustainable development.</p>

OEM71 - Technology and development: an introduction subject information

GENERAL INFORMATION	
academic year	2009/2010
class planning / target audience	<ul style="list-style-type: none"> Semester A Quartile 1 Certif.pr.Technology,Development and Globalisation for all courses Compulsory, English Technology and Policy (cluster Innovation & sustainability) Master's degree program (year 1) Optional, English
ECTS credits BaMa	3
provided by	<ul style="list-style-type: none"> Department: Industrial Engineering & Innovation Sciences (responsible) Subdepartment: Technology and Policy Section: Technology and development studies
follow-up subjects	<ul style="list-style-type: none"> OEM91 - Technology and globalization ON420 - Development economics ON421 - Development theory, strategy and policy ON451 - Project course certificate programme technology & development globalisation
lecturers	<ul style="list-style-type: none"> dr. S. Arora (responsible lecturer)
information	<ul style="list-style-type: none"> Secr. cTDG / SvdT - IPO 2.20 - tds@tue.nl - tel. 2246 dr. S. Arora - IPO 2.39 - tel: 4577 - s.arora@tue.nl
course web page	http://w3.ieis.tue.nl/en/education/certificate_programs/ctdg
studyweb	http://studyweb.tue.nl
EDUCATION AND EXAMINATION	
type of education	<ul style="list-style-type: none"> 7 weeks lecture, 2 hours
type of examination / planning	<ul style="list-style-type: none"> Written, Semester A Quartile 1 (3 hours), Semester A Quartile 2 (3 hours) Written exam (50% of the overall course grade) A short (approx. 1000 words) critical summary of one of the assigned papers(25%) Group discussion and class participation (25%).
course material	<ul style="list-style-type: none"> Szirmai, A., The Dynamics of Socio-Economic Development. An Introduction, Cambridge University Press, 2005. (Chapters 1, 4, 8, 9, 10, 11, 12, 13, 14). (Available at Intermate). (compulsory) Additional readings will be posted on the studyweb. (compulsory)
CONTENTS	
learning objectives	<p>This course is part of the Innovation Sciences MSc cluster on Innovation and Sustainability, and it is also the compulsory opening course of the certificate programme Technology, Development and Globalisation (cTDG, for more information on this programme please see: http://w3.ieis.tue.nl/en/education/certificate_programs/ctdg)). The course is also offered as an elective in the Innovation Sciences MSc for students not doing the Innovation and Sustainability specialization. The course introduces students to the aims, outcomes and the nature of the international development process and the role of technological change. In addition, students learn to appreciate issues of environmental and socio-economic sustainability in the Global South.</p>
contents	<p>The course offers an introduction to two views on socio-economic development and the role of technology therein. The first view, which may be termed the modernization view, holds that development, if designed and executed properly, will bring prosperity to poor masses toiling away in most developing countries. Modern science and</p>

	<p>technology, according to this view, are the vehicles through which developing countries build up their agricultural, industrial and services sectors. Socioeconomic and environmental risks produced through this process, primarily those faced by the poor, are left out of the picture or depoliticized. Furthermore, the modernization view has a rather naïve understanding of culture: depending on the modernizer's ideological bent, cultural traits are either believed to mono-causally determine economic behaviour, or cultural modernization follows politico-economic development.</p> <p>The second view, rooted in ethnography, criticizes the modernization view for adopting a simplistic concept of culture and neglecting the embedded agency of local development organizations and beneficiaries. The latter actors often reframe the meaning and practice of development to match their needs and institutions. This allows us to understand how intended beneficiaries succeed or fail to cope with new vulnerabilities and the diversity of their responses to development projects, ranging from wholehearted acceptance to outright rejection. This understanding can assist in designing and implementing development projects (in the long- and short-run) that confront local and global power/knowledge divides and guide the future development process toward greater social inclusion and environmental sustainability.</p> <p>Three lectures are devoted to the first view, and three to the second. A first lecture introduces the course. The following topics will be covered in the lectures: The role of technological change in industrial, agricultural and rural development; institutions and governance in international development aid; conceptualising culture and human agency; the politics of (scientific and technological) knowledge; policy and practice of development projects.</p>
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GENERAL INFORMATION	
academic year	2009/2010
class planning / target audience	<ul style="list-style-type: none"> Semester B Quartile 4 Certif.pr.Technology,Development and Globalisation for all Optional, English courses Technology and Policy (cluster Technology, globalization & europeanization) Master's degree program (year 1) Compulsory, English
ECTS credits BaMa	3
provided by	<ul style="list-style-type: none"> Department: Industrial Engineering & Innovation Sciences (responsible) Subdepartment: Technology and Policy Section: Technology and development studies
prior knowledge	Entrance requirements to Msc programme
lecturers	<ul style="list-style-type: none"> dr.ir. A.J. Balkema (responsible lecturer) mr.dr.s. E.F. Clarkson (co-lecturer) dr. S. Arora (co-lecturer)
information	<ul style="list-style-type: none"> Secr. cTDG / SvdT - IPO 2.20 - tds@tue.nl - tel. 2246
course web page	http://w3.ieis.tue.nl/en/education/certificate_programs/ctdg/
studyweb	http://studyweb.tue.nl
EDUCATION AND EXAMINATION	
type of education	<ul style="list-style-type: none"> 8 weeks lecture, 2 hours
type of examination / planning	<ul style="list-style-type: none"> (Final) examination, Semester B Quartile 4 (3 hours) grouppresentation and discussion
course material	<ul style="list-style-type: none"> Lecture Notes (Sheets + Chapters from the book 'Global Shift' by Peter Dicken) (recommended) Additional literature (various articles + assignments) (recommended)
CONTENTS	
learning objectives	<p>Based on the exploration of the whole field of technology and globalization students are supposed to:</p> <ul style="list-style-type: none"> acquire basic knowledge of and insight in the role of technology in development and the social and environmental effects of globalization; understand what is driving the current trends in globalization and the role governments and transnational corporations; acquire knowledge on mechanisms for technology transfer; acquire knowledge of knowledge flows, movement of technical and scientific employees and international collaborations; acquire knowledge of legislation , policies and business strategies that can be applied and understanding the effect on both national and international level.
contents	<p>This course gives insight in the role of technology and globalization in development, with a main focus on international transfer of technology and knowledge. The lectures cover a general introduction of globalization addressing the current trends, technological absorptive capacity, mechanisms for technology transfer, developments on and the international labor market and in international knowledge networks, the</p>

	role of governments and transnational corporations, the social and environmental impacts of globalization, and (inter)national legislation, policies , technology contracts and business strategies.
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GENERAL INFORMATION	
academic year	2009/2010
ECTS credits reduction	2.9
provided by	<ul style="list-style-type: none"> • Department: Industrial Engineering & Innovation Sciences (responsible) • Subdepartment: History, Philosophy and Technology Studies • Subdepartment: Human- Technology Interaction • Subdepartment: Technology and Policy • Instance: Center for communication, language and technology
EDUCATION AND EXAMINATION	
notes	<p>Information: onderwijsadministratie TEMA, Paviljoen A-41, tst. 4898</p> <p>FIRST ANNOUNCEMENT URBAN CHALLENGE 2010: Small Entrepreneurship in Kisumu te Kenya see: http://www.cordaidurbanmatters.com/about/urban_challenge In 2010 the Urban Challenge will be taught as a special project for the certificate programme TDG. If you are interested to participate in "Urban Challenge 2010" please contact the coordinating assistant professor of cTDG (a.j.balkema@tue.nl).</p>

ON400 - Capita selecta technology and development studies

GENERAL INFORMATION	
academic year	2009/2010
class planning / target audience	<ul style="list-style-type: none"> Semester A Quartile 1 thru Semester A Quartile 2, Semester B Quartile 3 thru Semester B Quartile 4 Certif.pr.Technology,Development and Globalisation for all courses Optional, English
ECTS credits BaMa	3
provided by	<ul style="list-style-type: none"> Department: Industrial Engineering & Innovation Sciences (responsible) Subdepartment: Technology and Policy Section: Technology and development studies
prior knowledge	<ul style="list-style-type: none"> ON440 - Technology and development: an introduction (recommended) Other (depending on subject, see contents).
lecturers	<ul style="list-style-type: none"> dr. S. Arora (co-lecturer) mr.drs. E.F. Clarkson (co-lecturer) dr.ir. A.J. Balkema (co-lecturer) dr. H.A. Romijn (co-lecturer)
information	<ul style="list-style-type: none"> Secr. cTDG / SvdT - IPO 2.20 - tds@tue.nl - tel. 2246
course web page	http://w3.ieis.tue.nl/en/education/certificate_programs/ctdg/
studyweb	http://studyweb.tue.nl
EDUCATION AND EXAMINATION	
type of education	<ul style="list-style-type: none"> independent learning and discussion with lecturers
type of examination / planning	<ul style="list-style-type: none"> Project paper
course material	<ul style="list-style-type: none"> relevant articles and books, depending on the subject, see content (compulsory)
notes	<p>Course is intended for students in the Certificate Programme of Technology, Development and Globalisation (http://w3.ieis.tue.nl/en/education/certificate_programs/ctdg/).</p> <p>Students will have to contact the respective lecturers to follow the course, see content.</p>
CONTENTS	
learning objectives	Capita Selecta which allows students in the Certificate programme of Technology, Development and Globalisation to deepen their knowledge on a number of preselected topics.
contents	<p>Students can choose to deepen their knowledge on one of the following topics:</p> <ul style="list-style-type: none"> Climate change and development (A.J. Balkema; A.J.Balkema@tue.nl) Achieving Sustainability in Technical Development Projects: Review of Recent Approaches (H. Romijn; S. Arora; H.A.Romijn@tue.nl ; S.Arora@tue.nl) Technology, Culture and Politics of Development (S. Arora; S.Arora@tue.nl) Policy and Practice of Development Aid Projects & Programmes (S. Arora; S.Arora@tue.nl) Technological Capability Building & Innovation Systems in

Developing Countries (H. Romijn; H.A.Romijn@tue.nl)

- Technology Transfer to Developing Countries: Legal Aspects (Block A-B, Ted Clarkson, E.F.Clarkson@tue.nl)
- Teaching project in a secondary school about living and working in developing countries, in collaboration with Cross Your Borders, www.crossyourborders.nl (for students who have completed an internship in a developing country).

GENERAL INFORMATION	
academic year	2009/2010
class planning / target audience	<ul style="list-style-type: none"> • Semester A Quartile 2 Certif.pr.Technology,Development and Globalisation (Meant for all course programmes) for all courses Optional, English • Technology and Policy (Cluster Technology, globalization & Europeanization) Master's degree program (year 1) Optional, English
ECTS credits BaMa	3
provided by	<ul style="list-style-type: none"> • Department: Industrial Engineering & Innovation Sciences (responsible) • Subdepartment: Technology and Policy • Section: Technology and development studies
prior knowledge	<ul style="list-style-type: none"> • OA410 - ETI 1: introduction and macro economics of technology and innovation (recommended) • OA660 - ETI 2: interventions and technological development (recommended) • ON440 - Technology and development: an introduction (recommended)
follow-up subjects	<ul style="list-style-type: none"> • ON451 - Project course certificate programme technology & development globalisation • ONN10 - Preparation & implementation of technical projects in developing countries
lecturers	<ul style="list-style-type: none"> • dr. S. Arora (responsible lecturer) • dr. H.A. Romijn (co-lecturer)
information	<ul style="list-style-type: none"> • Secr. cTDG / SvdT - IPO 2.20 - tds@tue.nl - tel. 2246 • dr. S. Arora - IPO 2.39 - tel: 4577 - s.arora@tue.nl
course web page	http://w3.ieis.tue.nl/en/education/certificate_programs/ctdg
studyweb	http://studyweb.tue.nl
EDUCATION AND EXAMINATION	
type of education	<ul style="list-style-type: none"> • 1 week lecture, 2 hours • 6 weeks discussion according to problem-based learning (PBL), 12 hours
type of examination / planning	<ul style="list-style-type: none"> • Written, Semester A Quartile 2 (3 hours), Semester B Quartile 3 (3 hours) • Written (80% of the overall grade) Class Participation (20%)
course material	<ul style="list-style-type: none"> • A.P. Thirlwall, Growth and Development, with special reference to developing economies, eighth edition, Palgrave MacMillan, 2006 (compulsory) • Additional reading material (to be decided) will be supplied at the start of the course or posted on Study web. (compulsory)
CONTENTS	
learning objectives	Additional reading material (to be decided) will be supplied at the start of the course or posted on Study web.
contents	This course provides an introduction to Development Economics. It focuses on empirical and theoretical analyses of determinants of economic growth and stagnation in developing countries and the continuing importance of national and international development

	<p>policies. Particular attention is paid to the role of technological innovation and technological capability building in catch-up and leapfrogging. Developing economies are viewed as parts of an international political economy in which they are integrated through trade in goods and services, financial flows, and migration. The integration process is shaped by pressures from global markets and international financial and regulatory institutions such as the World Bank, IMF and WTO. While leading to greater inequality in rapidly growing economies such as India and China, these pressures can have an adverse impact on welfare and livelihoods in many small, resource-poor developing countries and curtail the latter's autonomous capacity to frame (and implement) effective development policies. Under these circumstances, can developing country states and civil society actors devise policies and actions to meet the objectives of promoting local development and reducing regional and national inequalities? If yes, how?</p> <p>An introductory lecture provides a brief history of thought in development economics. PBL discussion sessions focus on the following topics: measurement and analysis of economic growth and poverty, technological learning, capability building, catch-up and stagnation, choice of technology and direction of technological change, industrialisation strategies, changing nature of global competition, structural adjustment policies and other influences from international institutions, finance for development, and international trade.</p>
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GENERAL INFORMATION	
academic year	2009/2010
class planning / target audience	<ul style="list-style-type: none"> Semester B Quartile 3 thru Semester B Quartile 4 Certif.pr.Technology,Development and Globalisation for all Optional, English courses Technology and Policy Master's degree program (year 1) Optional, English
ECTS credits BaMa	3
provided by	<ul style="list-style-type: none"> Department: Industrial Engineering & Innovation Sciences (responsible) Subdepartment: Technology and Policy Section: Technology and development studies
prior knowledge	<ul style="list-style-type: none"> 0N440 - Technology and development: an introduction (recommended)
lecturers	<ul style="list-style-type: none"> dr. H.A. Romijn (responsible lecturer)
information	<ul style="list-style-type: none"> Secr. cTDG / SvdT - IPO 2.20 - tds@tue.nl - tel. 2246 dr. H.A. Romijn - IPO 2.17 - tel: 4754 - h.a.romijn@tue.nl
course web page	http://w3.ieis.tue.nl/en/education/certificate_programs/ctdg/
studyweb	http://studyweb.tue.nl
EDUCATION AND EXAMINATION	
type of education	<ul style="list-style-type: none"> 1 week lecture, 2 hours 6 weeks group discussion (12 h.) 2 weeks paper presentation by students (4 h.)
type of examination / planning	<ul style="list-style-type: none"> (Final) presentation and (Final) report Written taken-home exam
course material	<ul style="list-style-type: none"> Rapley, J. (2007) Understanding Development. Theory and Practice in the Third World, 3rd edition, Lynne Rienner Publ., Boulder and London. (recommended)
CONTENTS	
learning objectives	In this course students learn to recognise the interaction between development theory and the practice of development policy making from 1945 to the present. Particular attention is paid to how the design and implementation of industrial- technical projects and programmes has been influenced by 'fashions' in development thinking and theorising.
contents	The course provides an chronological overview of development theories that have been dominant at some point between 1945 to the present day. These are, mainly, modernisation, structuralism, neo-Marxism and dependencia, basic needs/human development, neo-liberalism, neo-structuralism, theories about the state, and 'post-development' theories. Students then prepare papers and give presentations, in which they explore how the basic principles from these development theories have been reflected in the national development strategies adopted by governments, aid donors, and other parties. Moreover, students identify the ways in which theorizing about development has influenced the way in which specific technical projects and programmes have been set up and implemented in the context of these development strategies. This often includes impact on the actual technological characteristics of these projects and programmes. Project examples are drawn from a range of developing countries and cover cases from sustainable energy, building and construction, telecom, and production technology.

Additional technological fields can be accommodated depending on the interests and backgrounds of the students.

ON451 - Project course certificate programme technology & developer globalisation

GENERAL INFORMATION	
academic year	2009/2010
class planning / target audience	<ul style="list-style-type: none"> • Semester B Quartile 3 Certif.pr.Technology,Development for all Compulsory, English and Globalisation courses
ECTS credits BaMa	12
provided by	<ul style="list-style-type: none"> • Department: Industrial Engineering & Innovation Sciences (responsible) • Subdepartment: Technology and Policy • Section: Technology and development studies
prior knowledge	<ul style="list-style-type: none"> • ON440 - Technology and development: an introduction (recommended) <p>2 courses from the following list: 0EE50 Technology & Globalisation 0N420 Development Economics 0N421 Development Theory, Strategy and Policy 0N400 Capita selecta in technology and Development studies (one topic)</p>
lecturers	<ul style="list-style-type: none"> • dr. H.A. Romijn (responsible lecturer) • dr.ir. A.J. Balkema (co-lecturer) • dr. S. Arora (co-lecturer)
information	<ul style="list-style-type: none"> • Secr. cTDG / SvdT - IPO 2.20 - tds@tue.nl - tel. 2246 • dr. H.A. Romijn - IPO 2.17 - tel: 4754 - h.a.romijn@tue.nl
course web page	http://w3.ieis.tue.nl/en/education/certificate_programs/ctdg
studyweb	http://studyweb.tue.nl
EDUCATION AND EXAMINATION	
type of education	<ul style="list-style-type: none"> • lecture • internship project
type of examination / planning	<ul style="list-style-type: none"> • Assignment(s) • Internship project in a developing country, and project internship report
course material	<ul style="list-style-type: none"> • Syllabus with chapters and articles about the project cycle (compulsory)
notes	Students need to register for this course in advance on Studyweb. The lectures for this course will be given together with the lectures for ONN10 'Appraisal, planning & implementation of technical projects in developing countries'.
CONTENTS	
learning objectives	Acquisition of analytical toolkit needed for preparation, planning, ex-ante appraisal and implementation of industrial-technical projects specifically in a developing country context. Getting a good feel for the broad range of problems that may occur in that process, and how one can avoid some of these problems through good project preparation and intelligent planning. In addition, attention is paid to practical and cultural problems of working and living in developing countries.
contents	Good project appraisal, preparation and planning are important conditions for successful project implementation, especially in developing countries where there are manifold uncertainties in the environment of the project. Many problems that arise during the implementation phase arise from bad preparation and inadequate planning. In this course, which will be offered as a workshop that takes

	<p>place during two full days in a weekend in April or May, students will acquire the basic awareness, knowledge and analytical methods concerning project management in developing countries, and how the different phases of project management together form a project cycle. In addition there will be attention to aspects of living and working in developing countries. After the weekend workshop students are asked to undertake a practical assignment. The assignment, which will have to be executed in a developing country or in a development aid organisation in the Netherlands (only for students who have already completed an internship in a developing country as part of another study programme), consists of studying one or more project phases for one particular development project, and writing a report in which the findings are discussed in relation to the literature and methods treated in the workshop and the course syllabus. Students are also asked to present their work in a meeting with other certificate students and the staff which is teaching the certificate core course.</p>
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ONN10 - Preparation & implementation of technical projects in developing countries

GENERAL INFORMATION	
academic year	2009/2010
class planning / target audience	<ul style="list-style-type: none"> Semester B Quartile 3 Certif.pr.Technology,Development and Globalisation for all courses Optional, English Technology and Policy Master's degree program (year 1) Optional, English
ECTS credits BaMa	4
provided by	<ul style="list-style-type: none"> Department: Industrial Engineering & Innovation Sciences (responsible) Subdepartment: Technology and Policy Section: Technology and development studies
prior knowledge	<ul style="list-style-type: none"> ON421 - Development theory, strategy and policy (compulsory) ON440 - Technology and development: an introduction (compulsory) or
lecturers	<ul style="list-style-type: none"> dr. H.A. Romijn (responsible lecturer) dr.ir. A.J. Balkema (co-lecturer) Visiting lecturer(s) (co-lecturer)
information	<ul style="list-style-type: none"> Secr. cTDG / SvdT - IPO 2.20 - tds@tue.nl - tel. 2246
course web page	http://w3.ieis.tue.nl/en/education/certificate_programs/ctdg
studyweb	http://studyweb.tue.nl
EDUCATION AND EXAMINATION	
type of education	<ul style="list-style-type: none"> lecture Introductory lectures will be offered in the form of an intensive seminar/workshop that takes place during two full days in a weekend
type of examination / planning	<ul style="list-style-type: none"> Written, Semester B Quartile 3 (3 hours), Semester B Quartile 4 (3 hours)
course material	<ul style="list-style-type: none"> Syllabus with chapters and articles about the project cycle (compulsory)
notes	The lectures for this course will be given together with the lectures for ON451 - the project course in the certificate programme Technology, Development and Globalisation. In contrast with ON451, ONN10 does not involve an internship in a developing country. Instead, students have to pass a written exam.
CONTENTS	
learning objectives	Acquisition of analytical toolkit needed for preparation, ex-ante appraisal, planning, implementation, monitoring and evaluation of industrial-technical projects in a developing country context. Getting a good feel for the broad range of problems that may occur in that process, and how one can avoid some of these problems through good project preparation and intelligent planning. In addition, attention is paid to problems of working and living in developing countries.
contents	Good project appraisal, preparation and planning are important conditions for successful project implementation, especially in developing countries where there are manifold uncertainties in the project environment. Many problems that arise during the implementation phase arise from bad preparation and inadequate planning. In this course (which is offered as a weekend workshop),

	<p>students acquire the basic awareness, knowledge and analytical methods concerning project management in developing countries. In addition there is attention for aspects of living and working in developing countries. The written exam covers aspects related to all main phases of the project cycle, and is based on the syllabus and lecture notes.</p>
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GENERAL INFORMATION																															
academic year	2009/2010																														
class planning / target audience	<ul style="list-style-type: none"> Semester A Quartile 1 thru Semester A Quartile 2 <table border="0"> <tr> <td>Business Information Systems</td> <td>Master's degree program (year 1)</td> <td>Optional, English</td> </tr> <tr> <td>Certificate Technology Entrepreneurship</td> <td>for all masterstudents</td> <td>Optional, English</td> </tr> <tr> <td>Healthcare</td> <td>Master's degree program (year 1)</td> <td>Optional, English</td> </tr> <tr> <td>Innovation Management</td> <td>Master's degree program (year 1)</td> <td>Optional, English</td> </tr> <tr> <td>Operations Management & Logistics</td> <td>Master's degree program (year 1)</td> <td>Optional, English</td> </tr> </table> Semester B Quartile 3 thru Semester B Quartile 4 <table border="0"> <tr> <td>Business Information Systems</td> <td>Master's degree program (year 1)</td> <td>Optional, English</td> </tr> <tr> <td>Certificate Technology Entrepreneurship</td> <td>for all masterstudents</td> <td>Optional, English</td> </tr> <tr> <td>Healthcare</td> <td>Master's degree program (year 1)</td> <td>Optional, English</td> </tr> <tr> <td>Innovation Management</td> <td>Master's degree program (year 1)</td> <td>Optional, English</td> </tr> <tr> <td>Operations Management & Logistics</td> <td>Master's degree program (year 1)</td> <td>Optional, English</td> </tr> </table> 	Business Information Systems	Master's degree program (year 1)	Optional, English	Certificate Technology Entrepreneurship	for all masterstudents	Optional, English	Healthcare	Master's degree program (year 1)	Optional, English	Innovation Management	Master's degree program (year 1)	Optional, English	Operations Management & Logistics	Master's degree program (year 1)	Optional, English	Business Information Systems	Master's degree program (year 1)	Optional, English	Certificate Technology Entrepreneurship	for all masterstudents	Optional, English	Healthcare	Master's degree program (year 1)	Optional, English	Innovation Management	Master's degree program (year 1)	Optional, English	Operations Management & Logistics	Master's degree program (year 1)	Optional, English
Business Information Systems	Master's degree program (year 1)	Optional, English																													
Certificate Technology Entrepreneurship	for all masterstudents	Optional, English																													
Healthcare	Master's degree program (year 1)	Optional, English																													
Innovation Management	Master's degree program (year 1)	Optional, English																													
Operations Management & Logistics	Master's degree program (year 1)	Optional, English																													
Business Information Systems	Master's degree program (year 1)	Optional, English																													
Certificate Technology Entrepreneurship	for all masterstudents	Optional, English																													
Healthcare	Master's degree program (year 1)	Optional, English																													
Innovation Management	Master's degree program (year 1)	Optional, English																													
Operations Management & Logistics	Master's degree program (year 1)	Optional, English																													
ECTS credits BaMa	3																														
provided by	<ul style="list-style-type: none"> Department: Industrial Engineering & Innovation Sciences (responsible) Instance: Center for communication, language and technology 																														
prior knowledge	Basic knowledge of intercultural communication, foreign languages, international experiences																														
lecturers	<ul style="list-style-type: none"> V.J.B.A. Merk MA (responsible lecturer) Visiting lecturer(s) (co-lecturer) 																														
information	<ul style="list-style-type: none"> Secr. CTT - HAL 1.39 - ctt@tue.nl - tel. 2912 V.J.B.A. Merk MA - HAL 1.35 - tel: 2319 - v.merk@tue.nl 																														
studyweb	http://studyweb.tue.nl																														
EDUCATION AND EXAMINATION																															
type of education	<ul style="list-style-type: none"> lecture 24 uur college, in 6 half-day day sessions homework 2 hrs/wk group work during lectures 																														
type of examination / planning	<ul style="list-style-type: none"> Written, Semester A Quartile 2 (3 hours), Semester B Quartile 4 (3 hours) and Assignment(s) Individual written exam counts for 60% of the final grade and aims at testing the general knowledge students have of the international negotiation theory and various processes involved. Interim assessment test counts for 40% of the final grade and aims at testing individual knowledge of international negotiation context. 																														
course material	<ul style="list-style-type: none"> The Essence of Negotiation by Hiltrop & Udall (recommended) Other course materials by instructors (recommended) 																														
notes	Students generation 2001 and earlier and VKO-ers 2003 and earlier: choose: 1Z291 or 1ZM45. Both is not allowed!																														
CONTENTS																															

learning objectives	Developing intercultural competence and gaining insights into the business negotiation process on the national and international scene, with a special focus on China. Acquiring some practice through various exercises. This course prepares well for developing international management skills in an academic international trimester or company internship.
contents	A mix of theory (presentations and discussions) and practice (simulations, exercises, etc.) on developing intercultural competence and gaining insights into the business negotiation process. Acquiring specific negotiation skills through practical activities. Special focus on China. The theory deals with strategic, communicative and intercultural aspects, with a focus on building trust to negotiate or resolve conflicts in an international business context. The practice is about applying these aspects into the current and future business context of the international engineer.

7T850 - Building and information systems in developing countries

GENERAL INFORMATION	
academic year	2009/2010
class planning / target audience	<ul style="list-style-type: none"> Semester A Quartile 2 Architecture, Building and Planning Master Master's degree program (year 1) Optional, Dutch Building Technology (Lifespan) Master's degree program (year 1) Optional, Dutch
ECTS credits reduction	3
ECTS credits BaMa	3
provided by	<ul style="list-style-type: none"> Department: Architecture, Building and Planning (responsible) Subdepartment: Building Technology
lecturers	<ul style="list-style-type: none"> dr.ir. P.A. Erkelens (responsible lecturer) dr. G.G. van der Meulen (co-lecturer) Visiting lecturer(s) (co-lecturer)
information	<ul style="list-style-type: none"> dr.ir. P.A. Erkelens - VRT 7.12 - tel: 3308 - p.a.erkelens@bwk.tue.nl dr. G.G. van der Meulen - VRT 8.08 - tel: 3315 - g.g.v.d.meulen@bwk.tue.nl
studyweb	http://studyweb.tue.nl
EDUCATION AND EXAMINATION	
type of education	<ul style="list-style-type: none"> 8 weeks tutorial, 2 hours N.A.
type of examination / planning	<ul style="list-style-type: none"> Project Preparation of a report on a specific building technology in a foreign country.
course material	<ul style="list-style-type: none"> online study materials (recommended)
CONTENTS	
learning objectives	<p>After completion of this course the student:</p> <p>Will have knowledge of:</p> <ul style="list-style-type: none"> - building technologies in other countries - general local circumstances <p>will understand:</p> <ul style="list-style-type: none"> - The fact that another context leads to different building techniques. - Dependency of building techniques from local availability of raw materials, materials, knowledge, economy etc. <p>Is able to:</p> <ul style="list-style-type: none"> - To study in a consistent way a topic on building technology of a foreign country - and to report critically in writing about it.
contents	In this series of lectures foreign building technologies are dealt with. The lectures are given by guest lecturers, mostly from foreign countries.

7T910 - Structural design and engineering for tropical countries

GENERAL INFORMATION										
academic year	2009/2010									
class planning / target audience	<ul style="list-style-type: none"> Semester A Quartile 2 <table border="0"> <tr> <td>Architecture, Building and Planning Master</td> <td>Master's degree program (year 1)</td> <td>Optional, Dutch</td> </tr> <tr> <td>Building Technology (Lifespan)</td> <td>Master's degree program (year 1)</td> <td>Compulsory, Dutch</td> </tr> <tr> <td>Certif.pr.Technology,Development and Globalisation</td> <td>for all courses</td> <td>Optional, Dutch</td> </tr> </table>	Architecture, Building and Planning Master	Master's degree program (year 1)	Optional, Dutch	Building Technology (Lifespan)	Master's degree program (year 1)	Compulsory, Dutch	Certif.pr.Technology,Development and Globalisation	for all courses	Optional, Dutch
Architecture, Building and Planning Master	Master's degree program (year 1)	Optional, Dutch								
Building Technology (Lifespan)	Master's degree program (year 1)	Compulsory, Dutch								
Certif.pr.Technology,Development and Globalisation	for all courses	Optional, Dutch								
ECTS credits reduction	3									
ECTS credits BaMa	3									
provided by	<ul style="list-style-type: none"> Department: Architecture, Building and Planning (responsible) Subdepartment: Building Technology 									
lecturers	<ul style="list-style-type: none"> dr.ir. E.L.C. van Egmond de Wilde De Ligny (responsible lecturer) dr.ir. P.A. Erkelens (co-lecturer) dr.ir. S.P.G. Moonen (co-lecturer) 									
information	<ul style="list-style-type: none"> dr.ir. E.L.C. van Egmond de Wilde De Ligny - VRT 7.24 - tel: 2439 - e.v.egmond@bwk.tue.nl dr.ir. P.A. Erkelens - VRT 7.12 - tel: 3308 - p.a.erkelens@bwk.tue.nl 									
studyweb	http://studyweb.tue.nl									
EDUCATION AND EXAMINATION										
type of education	<ul style="list-style-type: none"> lecture 									
type of examination / planning	<ul style="list-style-type: none"> Written, Semester A Quartile 2 (3 hours), Semester B Quartile 3 (3 hours) 									
course material	<ul style="list-style-type: none"> online study materials (recommended) 									
CONTENTS										
learning objectives	The student will be able to a select and evaluate particular building materials, buildings systems and ways of execution of building projects in tropical countries.									
contents	<p>In this course the following topics will be discussed:</p> <ul style="list-style-type: none"> - Socio- economic and socio-cultural aspects of building in tropical countries. - Building materials: earth, pozzolane, timber, bamboo, etc. - Building systems and details of buildings. - Climatological aspects. <p>Introduction to civil works in tropical countries and building project execution in the tropics.</p>									

Other Development Related Courses:

0C205 - Background of sustainable development		subject information
GENERAL INFORMATION		
academic year	2009/2010	
class planning / target audience	<ul style="list-style-type: none"> Semester A Quartile 1 General subject for all educations Optional, Dutch 	
ECTS credits BaMa	3	
provided by	<ul style="list-style-type: none"> Department: Industrial Engineering & Innovation Sciences (responsible) Subdepartment: History, Philosophy and Technology Studies Section: Technology and Sustainability Studies 	
prior knowledge	<ul style="list-style-type: none"> 0C600 - Technology and sustainability (recommended) 0C900 - Technology for sustainable development (recommended) 5N480 - Technology for Sustainable Development (recommended) 7Z100 - Technology for sustainable development (recommended) One of the courses mentioned above.	
lecturers	<ul style="list-style-type: none"> ir. A.F. Kirkels (co-lecturer) 	
information	<ul style="list-style-type: none"> Secr. TSS - IPO 2.35 - M.E.H.A.Rossou@tue.nl - tel. 3408 ir. A.F. Kirkels - IPO 2.26 - tel: 5761 - a.f.kirkels@tue.nl 	
studyweb	http://studyweb.tue.nl	
EDUCATION AND EXAMINATION		
type of education	<ul style="list-style-type: none"> project 	
type of examination / planning	<ul style="list-style-type: none"> (Final) presentation and (Final) report Assessment based on report and presentation. 	
course material	<ul style="list-style-type: none"> List with choice of literature. (recommended) 	
notes	This course will only be provided with a minimum of 5 students attending. Students should contact the lecturer at least one week before the first lecture week. Scheduling in consultation with the students.	
CONTENTS		
learning objectives	Sustainable development is a broad and diffuse concept, which is still in development. Getting acquainted with the background of the concept of sustainable development, the different dimensions of the concept and the operationalisation of it are the objectives of this course.	
contents	The concept of sustainable development will be treated by examining several well known and influential studies. Each student chooses one of these studies from a reading list and writes a review. The results are presented by the students during the discussion lectures.	

0C706 - Multidisciplinary project sustainable development

GENERAL INFORMATION	
academic year	2009/2010
class planning / target audience	<ul style="list-style-type: none"> Semester A Quartile 1 thru Semester A Quartile 2, Semester B Quartile 3 thru Semester B Quartile 4 General master subject Master's degree program (year 1) Optional, English
ECTS credits BaMa	8
provided by	<ul style="list-style-type: none"> Department: Industrial Engineering & Innovation Sciences (responsible) Subdepartment: History, Philosophy and Technology Studies Section: Technology and Sustainability Studies
prior knowledge	<ul style="list-style-type: none"> 0C600 - Technology and sustainability (recommended) 0C900 - Technology for sustainable development (recommended) 5N480 - Technology for Sustainable Development (recommended) 7Z100 - Technology for sustainable development (recommended) Recommended: one of the courses mentioned above.
lecturers	<ul style="list-style-type: none"> dr.ir. F.C.A. Veraart (responsible lecturer) Various lecturers (co-lecturer)
information	<ul style="list-style-type: none"> Secr. TSS - IPO 2.35 - M.E.H.A.Rossou@tue.nl - tel. 3408 dr.ir. F.C.A. Veraart - IPO 2.24 - tel: 5070 - f.c.a.veraart@tue.nl
course web page	http://www.ifp.tue.nl
EDUCATION AND EXAMINATION	
type of education	<ul style="list-style-type: none"> project Interfaculty project
type of examination / planning	<ul style="list-style-type: none"> Term paper/Essay and (Final) presentation Individual oral assessment
course material	<ul style="list-style-type: none"> Will be distributed at course.
notes	For more information contact the lecturer.
CONTENTS	
learning objectives	Sustainable development is pre-eminently an area in which several disciplines come together. Sustainable development problems can not be solved with one discipline. Main objectives of this course are project based and interdisciplinary working within a group.
contents	6 to 8 students from different faculties from a group and work together on an assignment from government or industry based on sustainable development. Examples are sustainable energy use, sustainable building and re use. In interfaculty projects there is collaboration between students from different faculties. The project planning can vary. Projects normally last for 12 weeks. It is an optional course for students from all faculties. For students who want to obtain the TDO-certificate doing a TDO-relevant interfaculty project is obligatory. Assignments via www.ifp.tue.nl

0C900 - Technology for sustainable development**subject information**

GENERAL INFORMATION	
academic year	2009/2010
class planning / target audience	<ul style="list-style-type: none"> Semester A Quartile 1 General subject for all educations Optional, English Sustainable Energy Master's degree program (year 1) Compulsory, English Technology
ECTS credits BaMa	3
provided by	<ul style="list-style-type: none"> Department: Industrial Engineering & Innovation Sciences (responsible) Subdepartment: History, Philosophy and Technology Studies Section: Technology and Sustainability Studies
prior knowledge	none
follow-up subjects	<ul style="list-style-type: none"> 0C910 - System integration project 1
lecturers	<ul style="list-style-type: none"> ir. A.F. Kirkels (responsible lecturer)
information	<ul style="list-style-type: none"> Secr. TSS - IPO 2.35 - M.E.H.A.Rossou@tue.nl - tel. 3408 ir. A.F. Kirkels - IPO 2.26 - tel: 5761 - a.f.kirkels@tue.nl
studyweb	http://studyweb.tue.nl
EDUCATION AND EXAMINATION	
type of education	<ul style="list-style-type: none"> 7 weeks lecture, 4 hours 2 x 2 hours Homework assignment(s)(portfolio) Assignment with report
type of examination / planning	<ul style="list-style-type: none"> Assignment(s) and (Final) report
course material	<ul style="list-style-type: none"> Reader (reader nr. 1710, version 2007, available at Readers sale (compulsory))
notes	<p>The course is in English. This course is part of the sustainability certificate program see www.tue.nl/tdo. Lectures are combined with those for 0C601</p>
CONTENTS	
learning objectives	In this course students will be taught to consider environmental and energy issues and to come to an assessment, also considering economical, technological and social issues. By providing an introductory to several analysis methods, the students will be able to apply their knowledge to other situations and be able to interpret the results of studies performed by others. Based on scientific literature some of the promising 'sustainable' technologies will be evaluated.
contents	<p>Central themes for this course are sustainability and environmental problems and the role that technology and engineers play as contributor and problem solver. During the lectures several topics and analytical methods are discussed. All are related to sustainability and environmental problems (see also the reader).</p> <p>Each group will assess a technology of choice. The students will have to find supporting literature by themselves. On the assessment a report will be written (in English), which will be discussed afterwards with the teacher.</p>

GENERAL INFORMATION													
academic year	2009/2010												
class planning / target audience	<ul style="list-style-type: none"> Semester A Quartile 1 thru Semester A Quartile 2 <table border="0"> <tr> <td>Sustainable Energy Technology</td> <td>Master's degree program (year 1)</td> <td>Optional, English</td> </tr> <tr> <td>Technology and Policy</td> <td>Master's degree program (year 1)</td> <td>Optional, English</td> </tr> </table> Semester B Quartile 3 thru Semester B Quartile 4 <table border="0"> <tr> <td>Sustainable Energy Technology</td> <td>Master's degree program (year 1)</td> <td>Optional, English</td> </tr> <tr> <td>Technology and Policy</td> <td>Master's degree program (year 1)</td> <td>Optional, English</td> </tr> </table> 	Sustainable Energy Technology	Master's degree program (year 1)	Optional, English	Technology and Policy	Master's degree program (year 1)	Optional, English	Sustainable Energy Technology	Master's degree program (year 1)	Optional, English	Technology and Policy	Master's degree program (year 1)	Optional, English
Sustainable Energy Technology	Master's degree program (year 1)	Optional, English											
Technology and Policy	Master's degree program (year 1)	Optional, English											
Sustainable Energy Technology	Master's degree program (year 1)	Optional, English											
Technology and Policy	Master's degree program (year 1)	Optional, English											
ECTS credits BaMa	4												
provided by	<ul style="list-style-type: none"> Department: Industrial Engineering & Innovation Sciences (responsible) Subdepartment: History, Philosophy and Technology Studies Section: Technology and Sustainability Studies 												
prior knowledge	<ul style="list-style-type: none"> 0C940 - System innovations and strategic niche management (recommended) 												
lecturers	<ul style="list-style-type: none"> dr.ir. G.P.J. Verbong (responsible lecturer) dr.ir. E.B.A. van der Vleuten (co-lecturer) 												
information	<ul style="list-style-type: none"> Secr. TSS - IPO 2.35 - M.E.H.A.Rossou@tue.nl - tel. 3408 dr.ir. G.P.J. Verbong - IPO 2.22 - tel: 2698 - g.p.j.verbong@tue.nl 												
studyweb	http://studyweb.tue.nl												
EDUCATION AND EXAMINATION													
type of education	<ul style="list-style-type: none"> literature search 												
type of examination / planning	<ul style="list-style-type: none"> (Final) report The students have to write a report on the long term development of an energy system, e.g. in a specific country or region. 												
course material	<ul style="list-style-type: none"> In consultation with teaching staff (recommended) 												
CONTENTS													
learning objectives	The aim of the course is to give the students the opportunity to expand their knowledge on the long-term shaping of an energy system of their interest. In a long-term perspective they discover patterns in interactions between institutional, regulatory and technological developments.												
contents	<p>The students first read a few basic texts on analysing technical change in a long-term perspective. The argument is that current opportunities and problems of energy systems (technological, regulatory or ideological) are shaped in long-term, historical processes of system development. Moreover, changing existing systems is difficult because of a historically shaped path dependency.</p> <p>Then students write an essay on a subject of their choice, relating to the long-term development of energy systems.</p>												

GENERAL INFORMATION	
academic year	2009/2010
class planning / target audience	<ul style="list-style-type: none"> Semester A Quartile 2 Minor Technology and International Sustainable Dev Bachelor's degree program (year 3) Compulsory, Dutch
ECTS credits BaMa	6
provided by	<ul style="list-style-type: none"> Department: Industrial Engineering & Innovation Sciences (responsible) Subdepartment: History, Philosophy and Technology Studies Section: Technology and Sustainability Studies
prior knowledge	<ul style="list-style-type: none"> 0A631 - Technological innovation: learn to innovate (compulsory) 0C601 - Technology and sustainability (compulsory) or similar course
lecturers	<ul style="list-style-type: none"> dr.ir. G.P.J. Verbong (co-lecturer) dr.ir. F.C.A. Veraart (co-ordinator) dr. H.A. Romijn (co-lecturer) dr.ir. A.J. Balkema (co-lecturer)
information	<ul style="list-style-type: none"> Secr. TSS - IPO 2.35 - M.E.H.A.Rossou@tue.nl - tel. 3408 dr.ir. G.P.J. Verbong - IPO 2.22 - tel: 2698 - g.p.j.verbong@tue.nl
studyweb	http://studyweb.tue.nl
EDUCATION AND EXAMINATION	
type of education	<ul style="list-style-type: none"> design oriented learning 8 weeks tutorial, 2 hours
type of examination / planning	<ul style="list-style-type: none"> (Final) report
course material	<ul style="list-style-type: none"> will be hand over (recommended)
CONTENTS	
learning objectives	<ul style="list-style-type: none"> Students are able to set up and execute research on an actual innovation project in the field of sustainable technologies in an international context Students elaborate their knowledge of a specific sustainable technology Students learn to transform research results in a new design, with preconditions set by results and societal boundaries distracted from OGO project 0A632 - Innovative Learning.
contents	The minor TIDO project focuses on an actual innovation project in the field of sustainable technologies. Groups of 4 to 6 students work on specific assignments set by industries or governmental organizations. The assignments are aimed at the introduction of sustainable technologies.

GENERAL INFORMATION										
academic year	2009/2010									
class planning / target audience	<ul style="list-style-type: none"> Semester B Quartile 3 <table border="0" style="width: 100%;"> <tr> <td style="width: 33%;">General subject</td> <td style="width: 33%;">for all educations</td> <td style="width: 33%;">Optional, English</td> </tr> <tr> <td>Healthcare</td> <td>Master's degree program (year 1)</td> <td>Compulsory, English</td> </tr> <tr> <td>Human-Technology Interaction</td> <td>Master's degree program (year 1)</td> <td>Compulsory, English</td> </tr> </table>	General subject	for all educations	Optional, English	Healthcare	Master's degree program (year 1)	Compulsory, English	Human-Technology Interaction	Master's degree program (year 1)	Compulsory, English
General subject	for all educations	Optional, English								
Healthcare	Master's degree program (year 1)	Compulsory, English								
Human-Technology Interaction	Master's degree program (year 1)	Compulsory, English								
ECTS credits BaMa	3									
provided by	<ul style="list-style-type: none"> Department: Industrial Engineering & Innovation Sciences (responsible) Subdepartment: Human- Technology Interaction 									
follow-up subjects	<ul style="list-style-type: none"> OP431 - Programming and evaluating the environment OP500 - Capita selecta of environment and behavior 									
lecturers	<ul style="list-style-type: none"> ir. A. Haans (responsible lecturer) dr. R. Zaalberg (co-lecturer) 									
information	<ul style="list-style-type: none"> HTI - IPO 1.20 - E.J.d.Bree@tue.nl - tel. 2889 ir. A. Haans - IPO 1.26 - tel: 5237 - a.haans@tue.nl 									
studyweb	http://studyweb.tue.nl									
EDUCATION AND EXAMINATION										
type of education	<ul style="list-style-type: none"> 8 weeks lecture, 2 hours, individual assignment 									
type of examination / planning	<ul style="list-style-type: none"> Written, Semester B Quartile 3 (3 hours), Semester B Quartile 4 (3 hours) individual assignments (30% final grade) written exam (70% final grade) 									
course material	<ul style="list-style-type: none"> Bell, P. A., Greene, T. C., Fischer, J. D., & Baum, A. (2001). Environmental Psychology (5th ed.). Orlando: Harcourt College Publishers. (recommended) 									
notes	The course will be given in English. The assignments are two short papers; the average grade for these assignments will contribute to the overall course grade with 30%.									
CONTENTS										
learning objectives	This course aims at introducing students to concepts, theories, and explanations that represent the state-of-the-art knowledge in environmental psychology and in environment-behavior research. Students will become acquainted with the most popular theoretical heuristics in environmental psychology. They will learn about some specific environments, such as homes and cities, and their damaging as well as their advantageous psychological effects. Students will hear about environmental perception, which environments people appreciate, and about the reasons for people's affiliation with places.									
contents	Individual performance is not only a function of what people aspire but also a result of what others want them to do. A third determinant of people's actions, which is often neglected, is the physical environment, in which or in interaction with which people's performance takes place. Environmental psychologists seek to better understand, in particular, the relationship between people's behavior and their physical surrounding. When trying to find explanations, environmental psychologists primarily stress the social and the psychological (i.e., the subjective) significance of an objective environment or some aspects of it. However, people's behavior is generally shaped by both, the subjective and the physical properties of an environment.									

GENERAL INFORMATION	
academic year	2009/2010
class planning / target audience	<ul style="list-style-type: none"> Semester A Quartile 1 thru Semester B Quartile 4 Applied Physics Bachelor Bachelor's degree program Optional, English (year 3) Applied Physics Master Master's degree program Optional, English (year 1)
ECTS credits reduction	2.9
ECTS credits BaMa	3
provided by	<ul style="list-style-type: none"> Department: Applied Physics (responsible) Subdepartment: Elementary processes in gass discharges
lecturers	<ul style="list-style-type: none"> dr.ir. E.M. van Veldhuizen (responsible lecturer)
information	<ul style="list-style-type: none"> dr.ir. E.M. van Veldhuizen - NLc 2.06 - tel: 3455 - e.m.v.veldhuizen@tue.nl
studyweb	http://studyweb.tue.nl
EDUCATION AND EXAMINATION	
type of education	<ul style="list-style-type: none"> literature search
type of examination / planning	<ul style="list-style-type: none"> Term paper/Essay
notes	N.A.
CONTENTS	
learning objectives	<ul style="list-style-type: none"> determine the present state of a part of the energy provision in our society make a scenariostudy on this subject based up on self chosen boundary conditions write a report that treats these two subjects
contents	This course gives students the opportunity to analyse in detail a subject related to energy and sustainability. The student is free to choose because this enhances the motivation. The report to be written must contain a future outlook on the chosen subject based on recent literature. Besides technical matters other relevant aspects must be taken into account, e.g. economic feasibility and social acceptability. Examples of possible subject are: wind mills, solar cells, nuclear fusion, fuel cells, biomass, consequences of running out of fossil fuel, free electricity market, etc.

GENERAL INFORMATION										
academic year	2009/2010									
class planning / target audience	<ul style="list-style-type: none"> Semester A Quartile 1 <table border="0" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 33%;">Mechanical Engineering Master</td> <td style="width: 33%;">Master's degree program (year 1)</td> <td style="width: 33%;">Optional, English</td> </tr> <tr> <td>Minor Climatic Design</td> <td>Bachelor's degree program (year 2)</td> <td>Compulsory, English</td> </tr> <tr> <td>Sustainable Energy Technology</td> <td>Master's degree program (year 1)</td> <td>Compulsory, English</td> </tr> </table> 	Mechanical Engineering Master	Master's degree program (year 1)	Optional, English	Minor Climatic Design	Bachelor's degree program (year 2)	Compulsory, English	Sustainable Energy Technology	Master's degree program (year 1)	Compulsory, English
Mechanical Engineering Master	Master's degree program (year 1)	Optional, English								
Minor Climatic Design	Bachelor's degree program (year 2)	Compulsory, English								
Sustainable Energy Technology	Master's degree program (year 1)	Compulsory, English								
ECTS credits BaMa	3									
provided by	<ul style="list-style-type: none"> Department: Mechanical Engineering Section: Energy Technology (responsible) 									
prior knowledge	Basic knowledge of physics, chemistry and mechanics									
follow-up subjects	<ul style="list-style-type: none"> 3Y280 - Solar cells 4P720 - Wind energy 4S610 - Energy from biomass 6SE15 - Hydrogen technology 									
lecturers	<ul style="list-style-type: none"> ir.ing. D.A.A. van Noort (responsible lecturer) prof.dr. G.J. Kramer (co-lecturer) prof.dr.ir. M.C.M. van de Sanden (co-lecturer) dr. M. Creatore (co-lecturer) Visiting lecturer(s) (co-lecturer) 									
information	<ul style="list-style-type: none"> Secr. Energy Technology - WH 2.131 - I.j.m.v.gils@tue.nl - tel. 3517 ir.ing. D.A.A. van Noort - Pav R 1.16 - tel: 2595 - d.a.a.v.noort@tm.tue.nl 									
studyweb	http://studyweb.tue.nl									
EDUCATION AND EXAMINATION										
type of education	<ul style="list-style-type: none"> 7 weeks video lecture A minimum of 18 contact-hours will be scheduled 									
type of examination / planning	<ul style="list-style-type: none"> Written, Semester A Quartile 1 (3 hours), Semester A Quartile 2 (3 hours) Permitted tools: simple calculator 									
course material	<ul style="list-style-type: none"> Reader 4645 Renewable Energy Sources (4P510), available at Secr. Energy Technology (recommended) 									
CONTENTS										
learning objectives	<p>Obtaining a good overview of the various renewable energy sources that exist.</p> <p>Obtaining of unstanding of the basic principles of the various renewable energy sources.</p> <p>Obtaining of insight in the actual status of the various renewable energy sources.</p>									
contents	<p>Renewable energy sources.</p> <p>This course treats the scientific and technological fundamentals of renewable energy sources and the techniques for their conversion and storage. It is given by lecturers from various disciplines, both from the university and from outside university. The following renewable energy sources are treated: hydropower, energy from biomass, photovoltaic energy conversion, wind energy, passive use of solar energy for space heating and solar collectors.</p>									

- General Introduction (2 hours)
Energy need, energy sources, renewable energy sources, energy systems, energy scenarios
- Hydro power (2 hours)
History of hydro power engines, fluid mechanics, types of turbines, calculation of power delivered, estimation of hydro potential, new developments.
- Energy from biomass (2 hours)
What is biomass, formation of biomass by photosynthesis, conversion by combustion, gasification and fermentation, efficiencies, examples of installations.
- Photovoltaic energy conversion (2 hours)
Physics of light, semiconductors and diodes, principle of operation of solar cells, various types of solar cells, autonomous and grid connected photovoltaic systems, estimation of cost.
- Wind energy (2 hours)
Wind speed, wind speed distribution, conversion systems, power calculations, economical considerations, applications.
- Solar collectors (2 hours)
Principle of operation of solar collectors, interaction between collector and storage vessel, estimation of energy yield and conversion efficiencies, various technical executions, concentrating collectors, determination of daily yield.
- Renewable energy in the built environment (4 hours)
Energy flows, passive solar energy, storage of heat and heat pumps.
- Hydrogen technology and fuel cells (2 hours)

GENERAL INFORMATION	
academic year	2009/2010
target audience	<ul style="list-style-type: none"> Electrical Engineering Master Master's degree program (year 1) Optional, English
ECTS credits BaMa	3
provided by	<ul style="list-style-type: none"> Department: Electrical Engineering Department: Industrial Engineering & Innovation Sciences Subdepartment: Electrical Power Systems (responsible) Section: Technology and Sustainability Studies
prior knowledge	n.a.
lecturers	<ul style="list-style-type: none"> dr. J.L. Duarte (co-lecturer) dr.ing. A.J.M. Pemen (co-lecturer) ir. A.F. Kirkels (responsible lecturer)
information	<ul style="list-style-type: none"> Secr. TSS - IPO 2.35 - M.E.H.A.Rossou@tue.nl - tel. 3408 ir. A.F. Kirkels - IPO 2.26 - tel: 5761 - a.f.kirkels@tue.nl
EDUCATION AND EXAMINATION	
type of education	<ul style="list-style-type: none"> independent learning Course exists of reader and two cases Independent learning by studying multi media content in reader and CD rom. The student can prepare the course in his own time, at his own speed. If desired you can attend the lectures for the course 0C900 (in block A). Your understanding of the content of the standard work is checked by oral examination. The two cases are both on the CD rom that comes with the reader and on the internet. For each case the student has to write a report (individually) and discuss it with the relevant lecturer. Contact with the case lecturers by email.
type of examination / planning	<ul style="list-style-type: none"> Oral and (Final) report
course material	<ul style="list-style-type: none"> Reader standard work with CD-rom (version 2007, nr. 1710, available at dictaatverkoop). Material can also be accessed by internet: http://tdo.content-e.nl (click on publicaties)(recommended) (compulsory)
notes	E elective that can be studied in each block
CONTENTS	
learning objectives	Students learn basic knowledge in the field of environmental problems and sustainable development in its social context and about (technical) solutions. Students are able to apply this knowledge of analyses and solutions within their own field of expertise.
contents	The course deals with the basics in the field of sustainability and environmental problems and technical solutions. Starting from case studies based on practical examples within the own technical specialisation (e.g. energy saving by induction motor control; biogas cleaning by means of corona) the basics on sustainability (e.g. CO ₂ -production, climate change) are introduced. In this way students experience the direct connection between sustainability issues and their own expertise. For background knowledge on different topics the cases refer to the reader that contains information on environmental and sustainability issues. The reader deals with points of departure of sustainability, environmental problems, social framework, analysis methods and technological solutions.

GENERAL INFORMATION	
academic year	2009/2010
class planning / target audience	<ul style="list-style-type: none"> Semester A Quartile 1 thru Semester A Quartile 2 Chemical Engineering Bachelor's degree Compulsory, Dutch Bachelor program (year 1)
ECTS credits BaMa	4
provided by	<ul style="list-style-type: none"> Department: Chemical Engineering and Chemistry (responsible) Subdepartment: Inorganic Chemistry and Catalysis
prior knowledge	Mass and energy balances-primary thermodynamic concepts as heat, work, energy-structure of the chemical process
lecturers	<ul style="list-style-type: none"> dr. H.T.J.M. Hintzen (responsible lecturer)
information	<ul style="list-style-type: none"> Secr. SCR - STW 1.35 - SCRsecr.ST@tue.nl - tel. 2850
course web page	http://edu.chem.tue.nl/6B001
EDUCATION AND EXAMINATION	
type of education	<ul style="list-style-type: none"> design oriented learning Introductory Lecture, Project work
type of examination / planning	<ul style="list-style-type: none"> Written, Semester A Quartile 2 (1.5 hours), Semester B Quartile 3 (1.5 hours) and Oral written report and oral presentation, peer review, final test
course material	<ul style="list-style-type: none"> Course outline, Powerpointfile (recommended)
notes	Registration for participation of this course is obligated. Registration via : http://edu.chem.tue.nl/vakken/aanmeldingen/
CONTENTS	
learning objectives	<p>Course knowledge:</p> <ul style="list-style-type: none"> - the student possesses the following concepts: sustainable development, interaction society, technology, ecology, sustainable design, industrial ecology - instruct the student about energy technology, particularly using sustainable energy resources - teach the student to think critically and find solutions of energy problems (short and long period, different scale levels and application areas) - study skills and coaching <p>General knowledge</p> <ul style="list-style-type: none"> - to find new knowledge and to adapt it - work in a team - communication skills and presentation and discussion techniques - literature search
contents	<ul style="list-style-type: none"> - mass and energy balances - primary thermodynamic concepts as heat, work, energy - structure of the chemical process

7S815 - Design of sustainable energy systems for the built environment

GENERAL INFORMATION										
academic year	2009/2010									
class planning / target audience	<ul style="list-style-type: none"> Semester A Quartile 2 <table border="0"> <tr> <td>Architecture, Building and Planning Master</td> <td>Master's degree program (year 1)</td> <td>Optional, English</td> </tr> <tr> <td>Physics of the Built Environment</td> <td>Master's degree program (year 1)</td> <td>Compulsory, English</td> </tr> <tr> <td>Sustainable Energy Technology</td> <td>Master's degree program (year 1)</td> <td>Compulsory, English</td> </tr> </table>	Architecture, Building and Planning Master	Master's degree program (year 1)	Optional, English	Physics of the Built Environment	Master's degree program (year 1)	Compulsory, English	Sustainable Energy Technology	Master's degree program (year 1)	Compulsory, English
Architecture, Building and Planning Master	Master's degree program (year 1)	Optional, English								
Physics of the Built Environment	Master's degree program (year 1)	Compulsory, English								
Sustainable Energy Technology	Master's degree program (year 1)	Compulsory, English								
ECTS credits reduction	3									
ECTS credits BaMa	3									
provided by	<ul style="list-style-type: none"> Department: Architecture, Building and Planning Subdepartment: Building physics and systems (responsible) 									
prior knowledge	<ul style="list-style-type: none"> 7S320 - The integrated design of building and building services (recommended) 									
lecturers	<ul style="list-style-type: none"> prof.ir. P.G.S. Rutten (responsible lecturer) dr.ir. M.G.L.C. Loomans (co-lecturer) 									
information	<ul style="list-style-type: none"> prof.ir. P.G.S. Rutten - VRT 6.17 - tel: 3222 - p.g.s.rutten@bwk.tue.nl dr.ir. M.G.L.C. Loomans - VRT 6.23 - tel: 4651 - m.g.l.c.loomans@bwk.tue.nl 									
studyweb	http://studyweb.tue.nl									
EDUCATION AND EXAMINATION										
type of education	<ul style="list-style-type: none"> 8 weeks lecture, 2 hours 									
type of examination / planning	<ul style="list-style-type: none"> Written, Semester A Quartile 2 (3 hours), Semester B Quartile 3 (3 hours) and Project 									
CONTENTS										
learning objectives	(Overall) to be able to design a low energy (sustainable) building concept for a given situation with a given statement of requirements following the integral design methodology (through course information and evaluation tools) To be able to relate choices for specific low energy design solutions with the effect for the user in terms of indoor environment (thermal comfort, air quality) To be able to make considered choices for specific (sustainable) low energy solutions, based on known characteristics of these solutions (passive/active)									
contents	<p>Content (preliminary):</p> <ol style="list-style-type: none"> 1) course lay-out; energy status; external speaker (example case); importance indoor environment. 2) update Integral Design of Building and Systems; introduction evaluation techniques. 3) Low Energy - Ecological value - Building (passive: form, orientation, lay-out) 4) Low Energy - Ecological value - Room (passive: facade) 5) Basic value - Workplace (Thermal comfort, air quality, [acoustics, lighting]) 6) Room/building level (active: supply systems) 7) Building (active: generation systems [Low energy]) 8) Integral Low Energy systems 									

GENERAL INFORMATION	
academic year	2009/2010
class planning / target audience	<ul style="list-style-type: none"> Semester B Quartile 3 Architecture, Building and Planning Bachelor Bachelor's degree program (year 3) Compulsory, Dutch Innovation Sciences (BOUW) Bachelor's degree program (year 2) Compulsory, Dutch Pre-master prg. Architecture Building and Planning (Building technology) Bachelor's degree program (year 3) Compulsory, Dutch
ECTS credits reduction	3
ECTS credits BaMa	3
provided by	<ul style="list-style-type: none"> Department: Architecture, Building and Planning (responsible) Subdepartment: Building Technology
lecturers	<ul style="list-style-type: none"> dr.ir. P.A. Erkelens (co-lecturer) dr.ir. E.L.C. van Egmond de Wilde De Ligny (responsible lecturer)
information	<ul style="list-style-type: none"> dr.ir. P.A. Erkelens - VRT 7.12 - tel: 3308 - p.a.erkelens@bwk.tue.nl dr.ir. E.L.C. van Egmond de Wilde De Ligny - VRT 7.24 - tel: 2439 - e.v.egmond@bwk.tue.nl
studyweb	http://studyweb.tue.nl
EDUCATION AND EXAMINATION	
type of education	<ul style="list-style-type: none"> 8 weeks lecture, 2 hours N.A.
type of examination / planning	<ul style="list-style-type: none"> Project N.A.
CONTENTS	
learning objectives	<p>After this series of lectures, students will have knowledge of:</p> <ul style="list-style-type: none"> The aspects related to sustainable building: material, energy, water, indoor climate and environment. <p>Furthermore, they will have insight in:</p> <ul style="list-style-type: none"> The meaning of sustainable building in relation to the aforementioned aspects. <p>Finally, they are capable of:</p> <ul style="list-style-type: none"> Giving more meaning to the sustainable building in projects Applying the principles of sustainable building on the levels: quarter, building and component in an own design. Developing an own vision on the field of sustainable design.
contents	<p>The course gives an introduction of sustainable building. Teachers and host-lecturers will give lectures to introduce the theme.</p> <p>Analyzing and (partially) redesigning 'exemplary' projects are central in the practical exercise.</p> <p>Firstly, you will make an inventarization of ten sustainable building projects. Next, you will select three projects. These will be intensively analyzed, following a nine-step plan. You will also write an essay on a specific theme w.r.t. sustainable building, that has been explained in the lectures.</p>

GENERAL INFORMATION										
academic year	2009/2010									
class planning / target audience	<ul style="list-style-type: none"> • Semester A Quartile 2 <table border="0" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">Industrial Design Bachelor</td> <td style="width: 30%;">Bachelor's degree program (year 1+2+3)</td> <td style="width: 40%;">Optional, English</td> </tr> <tr> <td>Minor Industrial Design</td> <td>Bachelor's degree program (year 3)</td> <td>Optional, English</td> </tr> </table> • Semester B Quartile 4 <table border="0" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">Industrial Design Bachelor</td> <td style="width: 30%;">Bachelor's degree program (year 1+2+3)</td> <td style="width: 40%;">Optional, English</td> </tr> </table> 	Industrial Design Bachelor	Bachelor's degree program (year 1+2+3)	Optional, English	Minor Industrial Design	Bachelor's degree program (year 3)	Optional, English	Industrial Design Bachelor	Bachelor's degree program (year 1+2+3)	Optional, English
Industrial Design Bachelor	Bachelor's degree program (year 1+2+3)	Optional, English								
Minor Industrial Design	Bachelor's degree program (year 3)	Optional, English								
Industrial Design Bachelor	Bachelor's degree program (year 1+2+3)	Optional, English								
ECTS credits BaMa	0									
provided by	• Department: Industrial Design (responsible)									
prior knowledge	No prior knowledge required.									
lecturers	<ul style="list-style-type: none"> • ing. V.O. Winthagen (responsible lecturer) • ir. M. Verkuijl (co-lecturer) 									
information	• ing. V.O. Winthagen - HG - tel: - - v.o.winthagen@tue.nl									
studyweb	http://studyweb.tue.nl									
EDUCATION AND EXAMINATION										
type of education	• assignment									
type of examination / planning	• (Final) examination									
CONTENTS										
learning objectives	Number of students: 15 (?) Size (in hours): 56 Target competency area(s) Socio-Cultural Awareness Introduction Since industrial designers operate at the beginning of the value chain, they potentially have great influence on the possible impacts of products/services on society. This assignment should encourage and give basic design tools to students to both deal with their influence on People Planet Profit – three ingredients of sustainable solutions.									
contents	Learning objectives Overall learning goal: explore, analyse and apply the People Planet Profit- possibilities for designers in the value chain. Learning activities Week 1: Introduction to sustainability (PPP) and historical perspective (history of sustainable design). Introduction workshop: e.g. experience impact of products/electronic waste by dismantling workshop; Week 2: Possible strategies for designer (related to Planet part). Workshop: apply several design strategies in a (re-) design case. Week 3: Role of (or: possibilities for) designers in People part (social aspects). `People` aspects of materials. Trace back materials and explore their impacts on working conditions etc.									

	<p>Week 4: Market and sustainability. How can you market sustainability? Workshop: tba</p> <p>Week 5: Relate to the value chain: implications and possibilities in the value chain (e.g. product-service-systems, <i>ì</i>). Workshop: apply value chain specific tools in a design case (e.g. roadmapping, partnership tools, <i>ì</i>)</p> <p>Week 6: design cases (tba).</p> <p>Deliverables Presentation and reporting on workshop results</p>
week content	<p>List of available reference and or background materials tba</p> <p>Information lecturer (assignor) Martijn Verkuijl (1976) graduated in 2001 and has a Master of Science degree in Industrial Design Engineering at Delft University of Technology. Since 2002 he worked for econcept (Cologne, Germany) as a scientific assistant and consultant in the field of sustainable design. His activities include the design of sustainable products and services, consulting companies on sustainable design and marketing issues, carrying out research projects, conducting training and education, and organising networks and workshops. Since 2006 Martijn coaches at TU/e ID.</p> <p>Vera Winthagen (1977) works in the design office Ideal&Co, where abstract ideals are matched with solid business. In the past years she has been designing with and for very different target groups: from creating a game with 1st generation immigrants for the inhabitants of Amsterdam, to ceramics with messages from Vietnam, the products always communicate where they come from and for whom they are.</p>

Certificate Programme in Technology, Development and Globalisation

TARGET GROUP:

The **certificate programme in “Technology, Development and Globalisation (cTDG)”** is open to all students at the TU/e (including non-Dutch speakers), and even to students of other universities.

The certificate programme aims at students that want to contribute to a just and sustainable development worldwide. The cTDG will help students to prepare for work in international technical projects for instance as consultants or scientists. As globalisation continues to push back borders, the work field of Dutch engineers working for multinationals, non-governmental organisations, engineering consultancy companies or international institutions will keep expanding, embracing newly industrialising countries in Asia, Latin America and the former Soviet Union, as well as less industrialised economies in Africa. Thus creating an increasing demand for scientists and engineers who have knowledge of different cultures and social-economic systems, and who have the skills to work effectively in these different settings and perform well in multinational project teams.

More specifically the programme is open for:

- *Students who are taking the MSc programme "Technology and Policy" (T&P), the cTDG constitutes an opportunity to deepen their knowledge about technology policies and projects in developing countries. The MSc in Technology and Policy offers an Optional Cluster in Technology, Development en Globalisation (14 ECTS), which overlaps substantially with the contents of the cTDG. Students who choose for that Optional Cluster can obtain the cTDG with minimal extra effort: Only 3 ECTS worth of extra courses related to technology & development on top of the regular MSc course load are needed to satisfy the cTDG requirements.*
- *In the new Master "Innovation Sciences" there is overlap with the specializations "Innovation & Sustainability" and "Technology, Globalisation & Europeanization". Furthermore, there is the possibility for students to select courses of their interest in a free cluster, creating their own specialisation.*
- *Students who are taking other study programmes at the TU/e, the cTDG presents an opportunity to apply development-related knowledge and skills to a practical project case in their own technical domain. The project assignment that is part of the cTDG is embedded as much as possible within the regular study programmes of the students. We try as much as possible to ensure that students can obtain some study credits for their Certificate while at the same time satisfying their course requirements of their regular study programme.*

cTDG PROGRAMME:

The Certificate Programme offers a broad introduction to development issues as well as more specialised courses on science & technology issues in a development context. These more specialised courses cover issues associated with international technology transfer; technological catch up and growth; design of technology policies, best practices in technical programmes and projects in less developed countries, and so on. In addition, the programme includes a project course, in which students acquire more hands-on practical knowledge and skills related to the design, planning, implementation, and evaluation of technical projects in developing countries. **The total course load of 24 ECTS can be spread out flexibly over several academic years. The starting requirement is the P diploma.**

The programme starts with a broad focus on development, and then zooms in on increasingly specialised topics. All students have to start by taking the course “*Technology and Development; an Introduction*”. The knowledge acquired during this course provides the necessary background for the more specialised courses that make up the remainder of the programme. The final activity in the cTDG programme consists of internship to gain working experience in a technical project in a developing country.

There is a large enough range of English language courses in the cTDG for non-Dutch speakers to be able to complete the programme. The cTDG programme can be divided into four parts (Note: if you read the electronic version of this text you can obtain detailed information on the courses by clicking on them!). Block I, the introductory course, and block IV, the project in a developing country, are obligatory. In Block II students chose two out of the four cTDG core courses and in Block III students chose cTDG related courses.

Tabel: cTDG course planning 2009-2010.

Block	SA		SB		Course
	Q1	Q2	Q3	Q4	
I					OEM71 - Technology and Development; an Introduction (3 ECTS)
II		▨			0N420 - Development economics (3 ECTS)
<i>min 6 ECTS</i>			▨		0EM91 - Technology and Globalization (3 ECTS)
			▨		0N421 - Development Theory, Strategy and Policy (3 ECTS)
	▨	▨	▨	▨	0N400 - Capita Selecta in Technology and Development (3 ECTS)
III					0CT01 - Technology, Poverty, the Global Environment (3 ECTS)
<i>min 3 ECTS</i>					0L972 - Special Project: Urban Challenge (3 ECTS)
					0C900 - Technology and Sustainability (3 ECTS)
					1ZM45 - International Negotiation (3 ECTS)
					4P510 - Renewable Energy Sources (3 ECTS)
					7T850 - Building Housing and Information Systems for DC (2 ECTS)
					7T910 – Building Techniques for the Tropics (3 ECTS)
					<i>Courses block II or other courses approved by cTDG staff</i>
IV	▨	▨	▨	▨	0N451 - Project course cTDS (12 ECTS)
			▨		0NN10 - Appraisal, Plan. and Implementation of Projects (4 ECTS)

Note: In exceptional circumstances students are permitted to substitute one of the courses in Block II for another suitable Block III course. *Advance permission for this has to be obtained from the coordinator!*

ORIENTATING ON YOUR OWN cTDG PROJECT

When you did all your cTDG theory courses you will go for an internship **in a developing country (0N451)** (Note: instead of an internship you can also do your MSc project in a developing country, than take the 0NN10 course instead of 0N451, the requirements for 0NN10 are participation in the project weekend and passing the written exam).

The project course 0N451 consists of **the cTDG project weekend** followed with an internship in a developing country of 6 to 8 weeks. You can choose a project to match your interest and expertise in agreement with one of the cTDG staff members. Before leaving to the developing country you write a short **project proposal**. Afterwards you present your experiences and finding in the **colloquium** and in a written **report**. And please return the **student evaluation form** to us with feed back on your internship and the certificate programme as a whole.

Internship opportunities send to us are stored in the folder on Studyweb (see Studyweb Folders / Jaaronafhankelijk / TM / TM-TIB_D_Graduation Project Information TIB / Topical information) and posted on the board next to IPO 2.20. You may also mail [Saskia Repelaer](#) to request this information.

See also the following websites: **[One World](#)** , **[Ministerie van Buitenlandse zaken](#)** , **[Move Your World](#)** , **[Noord Zuid](#)** , **[Stagelopen in het buitenland](#)** .

For financial support see websites such as: [Studiepunten Buitenland van STU \(TUe\)](#) , [Beursopener van Nuffic](#) , [Rinny Huizinga Stichting](#) , [Dr Hendrik Muller's Vaderlandsch Fonds](#) .

cTDG COLLOQUIUM:

The TDG Colloquium is a forum for students share their experiences on international projects. Students rounding up their internship (0N451) give their presentation afterwards, while students preparing their MSc project present their research plans before departing for their fieldwork in developing countries and report on their research experiences after returning to the Netherlands. **Attendance of 3 colloquia is a requirement for obtaining the TDG Certificate!**

The TDG Colloquium is held on every 1st Monday of the month (except in July and August) and starts at 12.30 hours. Saskia Repelaer (s.e.repelaer@tue.nl) coordinates this colloquium, please contact her for the planning. Location and programme are always pre-announced by mail to all registered students.

cTDG PROJECT EXAMPLES:

Waste Management in South Africa



In 2008-2009 Rosa Kuipers did an internship on **waste management in “Mamelodi”** a township near Pretoria in South Africa. She did a stakeholder analysis and an inventory of existing projects to identify opportunities for new projects improving waste management. She prolonged her international semester to combine this with her cTDG internship.

Micro hydropower in Bolivia



In 2008 Wouter Drinkwaard did fieldwork for his Master project on bottlenecks to diffusion of **micro-hydro power in Bolivia**. He worked with Energetica, a non-profit organization on sustainable energy and poverty reduction in Cochabamba in Bolivia.

Post-earthquake building in Pakistan



Alexander van Leersum did his cTDG internship in Vietnam with 'the Netherlands Red Cross' (NLRC) in 2007. He undertook a large-scale evaluation of a **post-disaster emergence housing** programme implemented by the implemented by various Red Cross societies. He liked it so much that he did his MSc thesis research on a similar topic, working in the **UN-HABITAT post-earthquake reconstruction programme** in Pakistan.

Urban Services in Peru



In 2008 Robbert Jobse did his MSc project in Peru on **migration and urban infrastructure services**. This was a joint project with the University in Trujillo (Universidad Privada Antenor Orrego). He did an inventory in three unplanned neighbourhoods of Trujillo to analyze the impact of migration on the urban infrastructural services: water, sanitation, electricity, telecommunication and household waste.

ICT in India



In 2007 Maarten Louwerse did his MSc project on the **prospect for ICT service sector growth** in the Indian state of Kerala. He matched the opportunity profiles and region conditions for ICT service development.

Wastewater treatment in Tanzania



In 2009 Ralph de Ruijter graduated for his Masters “Technology and Policy” on the wetlands project that he executed in cooperation with the University of Dar es Salaam in Tanzania. In his project which was titled “Dissemination of Constructed wetlands technology for **improved sanitation in Tanzania**” he combines a Strategic Niche Management approach with a Cost Benefit Analysis.

Solar Lantern in India



Gerben Dekker did his cTDG internship in 2007 in India on the **design of a solar lantern for rural areas**. This project was executed together with the Central Electronic Centre (CEC) of the Indian Institute of Technology in Madras (IITM).

HOW TO ENROLL IN THE cTDG PROGRAMME:

To enroll in the cTDG, please complete the **registration form** and **e-mail** it to the coordinator of the cTDG programme Dr. Ir. Annelies Balkema (A.J.Balkema@tue.nl), or hand it in at the secretariat of Technology, Development en Globalisation (IPO 2.20).

HOW TO OBTAIN THE TDG CERTIFICATE

The certificate is awarded after all the course requirements have been fulfilled. In principle, the certificate is handed over together with the master diploma at the MSc diploma ceremony. When this is not possible, the certificate is sent to the student's address.

In order to receive the certificate at the diploma ceremony, students have to deliver the following documents to the secretariat (**cTDG@tue.nl**) of the staff group Technology, Development en Globalisation (IPO 2.20) *at least two weeks* before their graduation:

1. A fully completed registration form (please send in when starting with the certificate courses!);
2. A print-out from the education administration bureau containing the study results and course credits obtained;
3. Proof of course requirements satisfied at other universities, in so far as they are relevant to obtaining the cTDG.

cTDG STAFF MEMBERS:

More information about the cTDG can be obtained from the programme coordinator, Dr. Ir. A.J. (Annelies) Balkema, IPO 2.40, tel. **NL +31** 402474895, a.j.balkema@tue.nl; or from the Technology, Development en Globalisation secretariat, IPO 2.20, tel. **NL +31** 402472246, cTDG@tue.nl.

- [dr. ir. S. \(Saurabh\) Arora](#) (assistant professor cTDG)
- [dr. ir. A.J. \(Annelies\) Balkema](#) (assistant professor and coordinator cTDG)
- [dr. H.A. \(Henny\) Romijn](#) (associate professor cTDG)
- [S.E. \(Saskia\) Repelaer van Driel](#) (TvO secretary and coordinator MSc-projects)
- [M.F.J. \(Marianne\) Jonker-Verhoeven](#) (secretary cTDG)

cTDG REGISTRATION FORM

Date of registration:



PERSONAL INFORMATION:

Name and initials:

Surname:

S-number:

Postal address:

Postal code and City:

E-mail address:

Telephone:

EDUCATION:

Faculty:

Technical specialisation:

Education Programme (Premaster / BSc / MSc):

1st year of university enrollment:

Did you already do any cTDS courses? If so which?

1.

2.

Do you have an idea on the topic, the region, or period of your **internship or MSc-project**?

Topic of interest:

Region of interest:

Planned period:

Do you want to receive the **TvO Newsletter** (see www.tue.nl/tvo): Yes / No

How did you become **aware of the cTDG programme**?

- cTDS advertisements (AG&DA or posters or website)
- TvO (activities, website or study guide)
- Information provided in the courses
- Other,

Please send this form to the coordinator of the Certificate - Dr. ir. Annelies Balkema,

IPO 2.40, a.j.balkema@tue.nl

EVALUATION FORM cTDG



Dear Student,

We hope you enjoyed following the TDG certificate courses and that your TDG internship or MSc project was a valuable experience. To improve the TDG certificate programme and to ensure interesting student project in the near future we would like to have your feedback, therefore take five minutes to fill this form. If you would rather make an appointment to discuss a possible follow up project or difficulties you encountered during your internship please make an appointment with one of our staff members.

Thank you for your input,

The cTDG staff,

Henny Romijn, Saurabh Arora, Annelies Balkema, Saskia Repelaer and Marianne Jonker.

1. Name:

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2. Courses of the TDG certificate Programme

- Could you easily combine the TDG certificate programme with your regular BSc or MSc study programme? If there were bottlenecks please notify us.

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- Do you like the cTDG programme, the set-up with the 2 obligatory courses and the selection of core courses to choose from? Any suggestions?

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3. cTDG Internship or MSc project

- Where did you do your project (please insert institute/organization and country):

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- During the period: (months and year)

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- Locally supervised by:

.....

- His or her email or telephone number is:

.....

- Was your project well organized and did you get enough support?

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- What could have been improved?

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- Would you advice up to define a follow up project? Is for do you have any suggestions?

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- Did you come across other interesting project or contact persons that could be valuable for cTDG?

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Other suggestions or experiences you want to share with us:

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We might want to contact you on your work if we are doing a follow up project for this we would like to have **your private email address**:

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Furthermore, we are always interested in photos on technology and development. We use these for promotion of cTDG and TvO.

Please send this form and pictures you want to share to cTDG@tue.nl.

