Engineering Accreditation in Latin America and the Caribbean

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LACCEI
Latin American and Caribbean Consortium of Engineering Institutions

Accreditation

- International-recognized accreditation of engineering programs is essential for
  - faculty, student and professional mobility and competitiveness,
  - research and academic collaborations, and
  - to attract high technology jobs to the region
- In 2002 the Engineer's Mobility Forum and Engineering Technologists' Mobility Forum created International Registry of Engineers IRoPE
  1. Licensed for independent practice within their own economy
  2. Have academic qualification equivalent to **accredited degree**
  3. Have seven years post-graduation experience
  4. Have spent at lest two years in significant engineering practice
  5. Maintain relevant continuing professional development

What accords provide international engineering program recognition?

- Washington Accord – 1989
  for professional engineering programs (~4 years duration)
  Original Signatories: Australia, Canada, Hong Kong, Ireland, New Zealand, South Africa, UK, USA (provisionary signers: Germany, Malaysia, Singapore)
- Sydney Accord – 2001
  for engineering technology programs (~3 years duration)
  Original Signatories: Australia, Canada, Hong Kong, Ireland, New Zealand, South Africa, UK
- Dublin Accord – 2001
  for technician engineering programs (~2 years duration)
  Original Signatories: Canada, Ireland, South Africa, UK

(www.washingtonaccord.org lists all internationally-recognized accredited programs)

Recognized National Accrediting Bodies for Engineering Programs

Australia	The Institution of Engineers, Australia
Bangladesh	Institution of Engineers Bangladesh
Canada	The Canadian Council of Professional Engineers The Canadian Council of Technicians and Technologists
China	China Association for Science and Technology
Chinese Tapei	Institute for Engineering Education Taiwan
Hong Kong China	The Hong Kong Institution of Engineers
India	National Board of Accreditation Institution of Engineers of India
Ireland	The Institution of Engineers of Ireland
Japan	Japan Accreditation Board for Engineering Education Institution of Professional Engineers Japan
Korea	Korean Professional Engineers Association

Malaysia	Board of Engineers Malaysia Institution of Engineers Malaysia
New Zealand	The Institution of Professional Engineers, New Zealand
Pakistan	Pakistan Engineering Council
Philippines	Philippines Technological Board
Russia	Russian Association for Engineering Education Accreditation Board
Singapore	Institution of Engineers Singapore Professional Engineers Board
South Africa	Engineering Council of South Africa
Sri Lanka	Institution of Engineers Sri Lanka
Turkey	MUDEK
United Kingdom	Engineering Council of the United Kingdom (ECUK)
USA	Accreditation Board for Engineering & Technology (ABET)

Signatories

Provisional Signatories

No Latin America nor Caribbean countries have signed any of the international engineering recognition accords

Accredited or Substantial Equivalent Eng. Programs in Latin America and the Caribbean

Chile (ABET)

Pontificia Universidad Católica de Chile

Colombia (ABET)

Universidad de los Andes
Universidad EAN
Universidad del Norte

México (ABET)

ITESM - Tec de Monterrey
- Chihuahua Campus
- Ciudad Mex. Campus
- Estado de Mex Campus
- Monterrey Campus
- Querétaro Campus
- San Luis Potosí Campus

Instituto Tecnológico Autónomo de México
Universidad Autónoma de Aguas Calientes
Universidad Autónoma de Nuevo León
Universidad Autónoma de San Luis Potosí

Perú (ABET)

Pontificia Universidad Católica del Perú
TECSUP
- Arequipa Campus
- Lima Campus

Universidad Peruana de Ciencias Aplicadas
Universidad de San Martín de Porres
Universidad Ricardo Palma
Universidad Tecnológica del Perú

Puerto Rico (ABET)

Politecnica Universidad de Puerto Rico
Universidad Interamericana, Bayamon Campus
Universidad de Puerto Rico
- Aguadilla Campus
- Arecibo Campus
- Mayagüez Campus
- Río Piedras

Universidad del Turabo
Universidad Politécnica de Puerto Rico

Accredited or Substantial Equivalent Eng. Programs in Latin America and the Caribbean

- **Costa Rica** (CEAB)
  - Universidad de Costa Rica
  - Instituto Tecnológico de Costa Rica
- **Perú** (CEAB)
  - Pontificia Universidad Católica del Perú *

* Also accredited by ABET

European Network for Accreditation of Engineering Education

ENAEE

ASIIN

European Accreditation of Engineering Programmes

EUR-ACE®

Accredited or Substantial Equivalent Eng. Programs in Latin America and the Caribbean

- **Perú** (ASIIN)
  - TECSUP (Technical Degrees) *
  - Universidad de San Martín de Porres *

* Also accredited by ABET

Accredited or Substantial Equivalent Eng. Programs in Latin America and the Caribbean

- **Jamaica** (UK-EC)
  - University of Technology
- **Trinidad & Tobago** (UK-EC)
  - Trinidad and Tobago Institute
  - University of Trinidad and Tobago
  - University of the West Indies

What is being done to increase the numbers of accredited Engineering programs in Latin America and the Caribbean?

#1: New Accrediting Agencies have been created with the commitment of signing the Washington Accord

- Inter American Development Bank funded creation of:
  - ACAAI: Central American Accrediting Agency for Architecture and Engineering Programs
    - » based on Engineers Canada
  - GCREAS: Greater Caribbean Region Engineering Accreditation Systems
    - » Based on ABET
- IEEE and University of the West Indies created
  - CACET: Caribbean Accreditation Council for Engineering and Technology
    - » based on Engineering Council of the UK

#2: An regional accord has been signed to move toward mutual recognition and mobility within the LAC region

- In 2010, the ALAI Latin American Engineering Accreditation Accord was signed by national and regional accrediting agencies and engineering education associations:
  - Argentina (CONFEDI)
  - Bolivia (CEUB)
  - Brasil (ABENGE and CONFEA
  - Central America (ACAAI
  - Chile (Acredita and CONFEDI)
  - Colombia (ACOFI)
  - Mexico (CACEI)
  - Paraguay (CPI)

#3: Professional societies are assisting accreditation agencies to align their process to comply with Washington Accord

- IEEE (Institute of Electrical and Electronic Engineers)
  - is working with the Peruvian accrediting agency (ICACIT, founded in 2001)
    - » translated the ABET materials into Spanish
    - » trained evaluators
    - » Assisted in ICACIT-ABET simultaneous accreditation visits since 2007, and ICACIT accreditation visits starting in 2009

#4: Bridging the knowledge and experience gap through capacity building

- The Ministers of Science and Technology of the 34 countries in the Organization of American States (OAS) launched Engineering for the Americas initiative and cited engineering program accreditation as one of the 3 priority focus areas.
- LACCEI has been working with the OAS since 2006 on strategies to advance accreditation

#4: Bridging the knowledge and experience gap through capacity building

- LACCEI developed a model to provide a systematic approach for universities to attain an accreditable or substantially equivalent engineering program
- LACCEI developed the Par Amigo "Friendly Peer" or "Peer Mentor" Accreditation Training Program
  - Generic and agency-specific workshops to build capacity and expertise in the accreditation process
  - Database of Par Amigos experts
  - Workshop materials in English and Spanish
- LACCEI offers the Forum for Accrediting Agencies for no charge at their annual conference

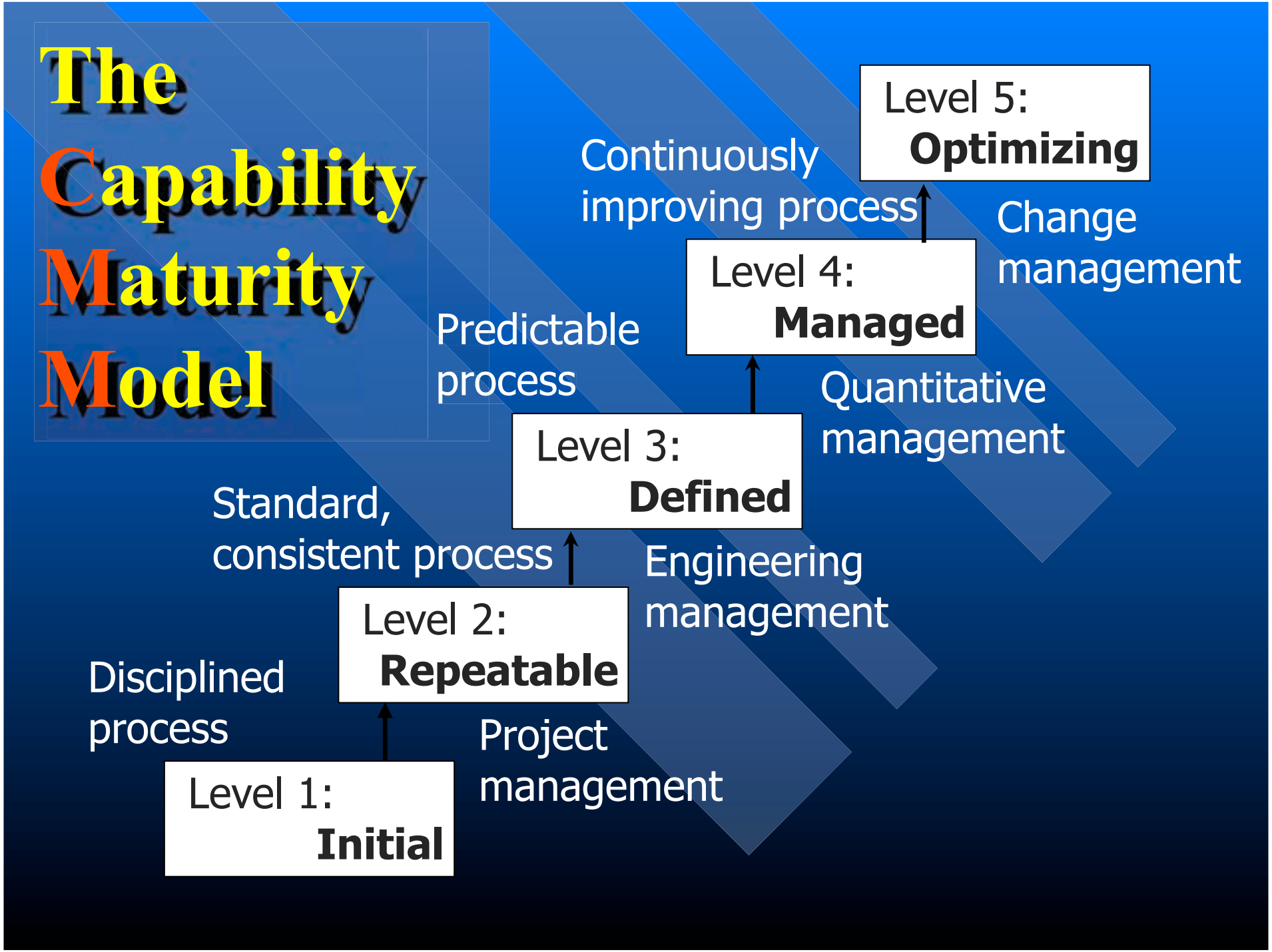
Par Amigo initiative objectives:

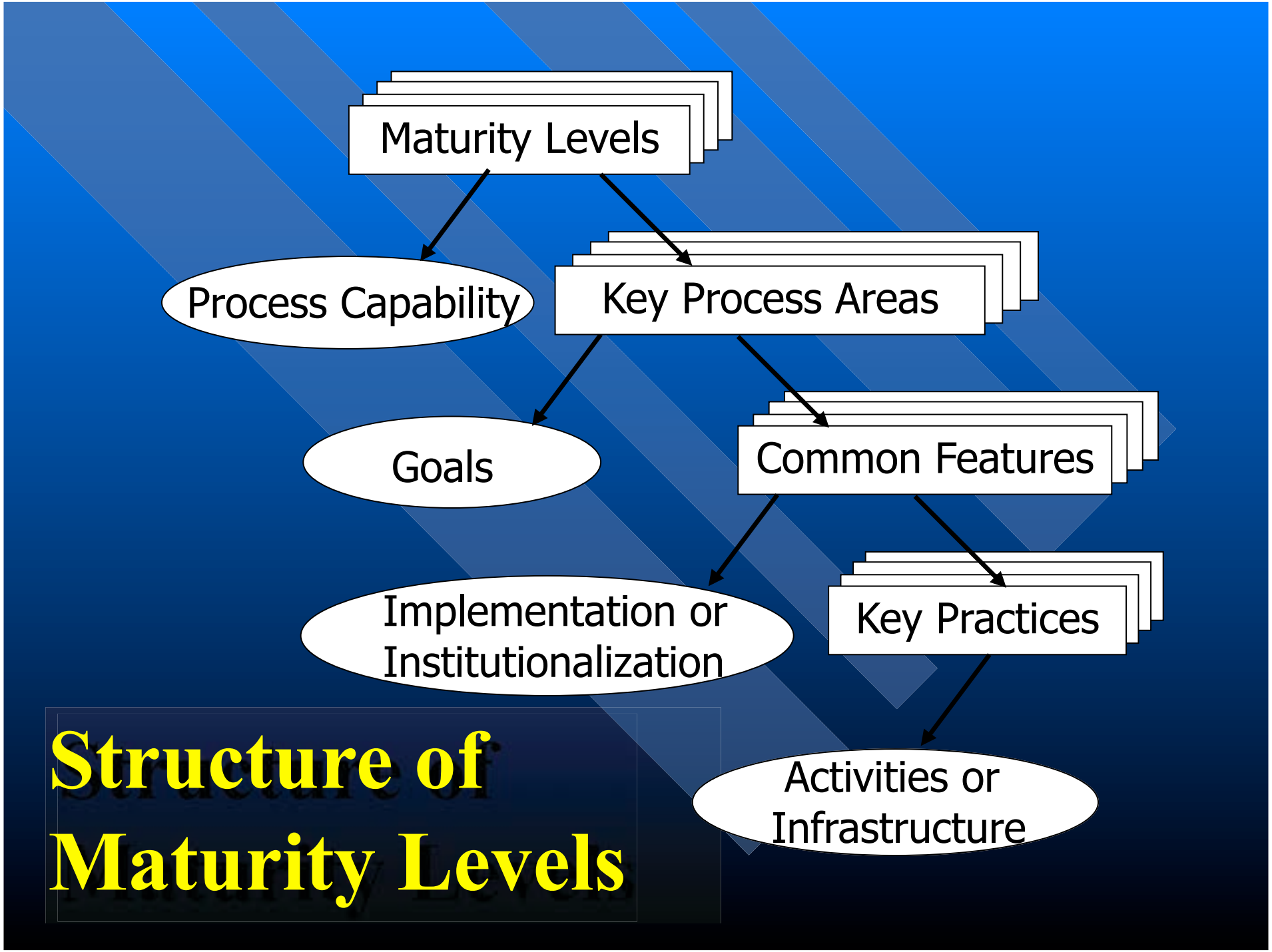
- assisting engineering programs with the selection of accrediting method and agency
- assisting engineering programs through the accreditation process and the preparation of the self-study
- serving as a multilingual and multicultural resource of information, practical assistance and mentors for engineering programs considering or seeking accreditation
- developing faculty leaders in program accreditation and evaluation for accrediting agencies in the Americas
- certifying and maintaining a Par Amigo registry who are familiar with and current in accreditation processes and provide cost effective assistance to engineering programs seeking accreditation. (Require each Par Amigo donate one week a year of free training, consulting and advice.)

Engineering Education Capability Maturity Model

- Extension of an integrated process improvement model, the **Capability Maturity Model (CMM)**
- **Goal:** To increase capability of an institution's educational processes.
- ***Process capability*** - the inherent ability of a process to produce **planned results**.

The Capability Maturity Model




Maturity Levels
Process Capability
Key Process Areas
Goals
Common Features
Implementation or Institutionalization
Key Practices
Activities or Infrastructure
Structure of Maturity Levels

EE-CMM Level 1 - Initial

- Few processes are defined.
- Processes are adhoc and mostly reactive.
- Productivity and quality vary.
- Success depends on individual effort.
- Current levels of quality and productivity of peer programs/institutions are not known.

To advance to the next level – Level 2:

- identify and analyze peer programs,
- define its mission, goals, and objectives,
- impose more structure and control on educational process to enable more meaningful measurement.

EE-CMM Level 2 - Repeatable

- Have policies for managing educational programs and procedures to implement these policies.
- Have established disciplined processes to identify
  - inputs and outputs of the process,
  - constraints and resources used to produce the final product.
- Basic project management practices are used to track cost, retention and productivity and compare them with peer institutions.
- Faculty document course syllabi, goals, objectives, learning outcomes, results and feedback, so successful course delivery can be repeated.
- A strong curriculum for each degree program includes engineering sciences, humanities, social sciences, communication skills & an appropriate professional component.

To advance to Level 2 from Level 1:

- Use policies to guide degree programs in establishing management processes.
- Stabilized program planning and tracking produce repeatable earlier successes.
- Effectively control process using a program management system, following realistic plans based on performance in previous terms.

EE-CMM Level 3 - Defined

- Educational process for management & educational activities is documented, standardized, and integrated into a standard process for the institution.
- Mission, goals & objectives are published in the catalog and posted.
- All programs use approved, tailored version of institution's standard process for developing and maintaining degree programs/courses.
- This level includes all in Level 2.

To advance to Level 3 from Level 2:

- Publish learning outcomes in syllabi
- Document strategies to achieve outcomes
- Publish University & College mission statements
- Publish educational objectives for each program in the catalog
- Involve constituencies in reviewing and updating educational objectives
- Peer review proposed programs & courses
- Integrated program management
- Faculty development program

EE-CMM Level 4 – Managed

- Collect/use detailed measures of educational program/ courses to quantitatively understand & control both the process & the programs.
- This level includes all in Level 3.

To advance to Level 4 from Level 3:

- Document & implement feedback & assessment processes to determine if intended outcomes are being achieved
- Quality management
- Quantitative process management
- Comparison with peer institutions
- Document sufficient staff allocation and compensation
- Document good facilities and strong institutional support
- Involve constituencies in evaluating program outcomes

EE-CMM Level 5 - Optimizing

- Continuous process improvement thru quantitative feedback from process and from testing innovative ideas & technologies.
- This level includes all in Level 4.

To advance to Level 5 from Level 4:

- Manage changes in the educational process
- Manage changes in technology
- Manage student retention and rate of graduation
- Involvement by all faculty
- Feedback results in changes in educational program

- Par Amigo Workshops will be presented at the next LACCEI conference

  22-24 July 2014 in Guayaquil, Ecuador

  (for more information:

  www.LACCEI.org