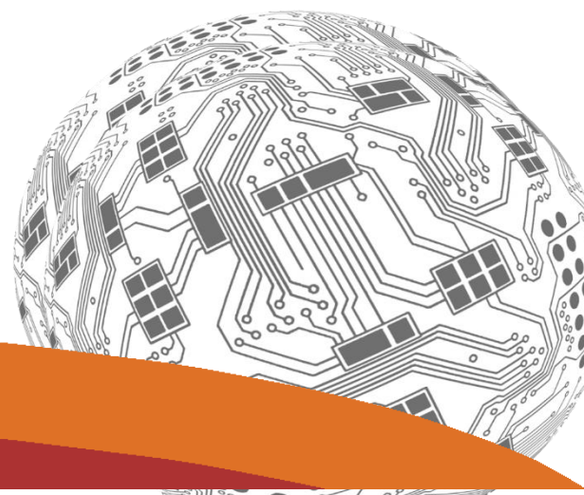
POLYTECHNIC UNIVERSITY OF THE PHILIPPINES
COLLEGE OF ENGINEERING
COMPUTER ENGINEERING DEPARTMENT

AREA V
RESEARCH

PARAMETER A: PRIORITIES AND RELEVANCE



POLYTECHNIC UNIVERSITY OF THE PHILIPPINES
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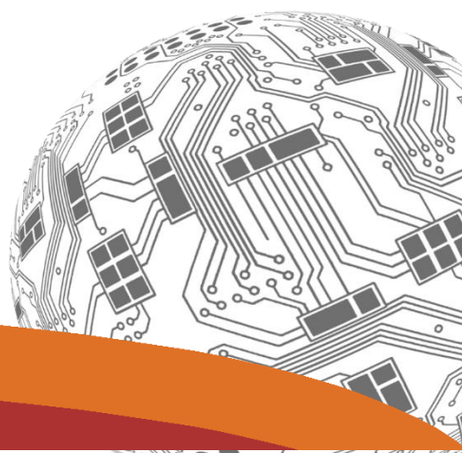
SYSTEM – INPUTS AND PROCESSES



POLYTECHNIC UNIVERSITY OF THE PHILIPPINES
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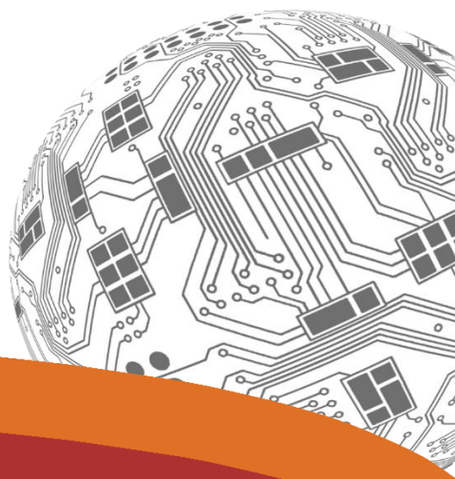
S.1. The institution's research agenda is in consonance with institutional, regional and national priorities concerned such as DOST, CHED- National Higher Education Research Agenda, NEDA, etc.



Evidence Presented:

1. Matrix of University's Agenda & the College Goals & Program Objectives
2. Matrix of congruence of the Institutional Research Agenda with Regional and National priorities especially with concerned Government Agencies
3. Board Approval of the Institutional Development Plan 2020 - 2024 & Updated List of Board of Regents
4. Board Approval of the Institutional Development Plan 2012 - 2016
5. Matrix of the National Research Agenda in congruence to University's Research Agenda, College Goals & Computer Engineering Research Agenda
6. Excerpts from PUP Research and Development Manual
7. Excerpts from Computer Engineering Design Project Guidelines

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The University's Research Agenda	The College Research Goals & Program Objectives
The University adopts a clear, practical and realizable University Research Agenda (URA) meant rand calculated to: 1. Unify the direction and framework of the research activities of the University; 2. Align the research efforts of the University with the thrust and priorities of the national government agencies, such as the Department of Science and Technology (DOST), the National Economic and Development Agency (NEDA), Commission on Higher Education (CHED) and other; and 3. Generate researches, scientific innovations, speculative and theoretical paradigms which are expected to drive economic, technological development. The University Research Agenda is categorized into five general themes, to wit: 1. Poverty reduction, peace and security; 2.Accelerating infrastructure development through science and technology; 3. Competitive industry and entrepreneurship; 4. Social and cultural development; and 5. Conservation, protection and rehabilitation of the environment towards sustainable development. From the University Research and Development Manual, page 3	**Goals** 1. Provide Quality education through Instruction, advance research, and extensions services. 2. Produce world class professional as potential industry leaders and job providers. 3. Develop and produce facilities through the use of adapted technology and indigenous materials. 4. Maintain, upgrade or improved facilities through the application of engineering technology. **Objectives** 1. Strengthen the Engineering program consistent with global trends. 2. Develop faculty as competent mentors and quality researchers, through advanced study and other facets of continuing professional education. 3. Develop critical thinking and communication skills of students, giving emphasis to research and extension services. 4. Equip graduates with appropriate knowledge and technical skills, imbued with desirable work attitude and moral values through enhanced teaching/learning process by using multi-media facilities on top of traditional methods. 5. Create a conducive teaching and learning atmosphere with emphasis to faculty and students' growth and academic freedom. 6. Establish network with educational institution industry, GO's and NGO's, local and international which could serve as: a. funding sources and/or partners of research. b. sources of new techniques c. centers for faculty and student exchange program and On-the-Job Training, and. d. grantees of scholarship/additional facilities, and 7. Continuously conduct action research on the needs of laboratory and other facilities that could be locally produce or innovated using. local materials and adapted technology.

SYSTEM-INPUTS AND PROCESSES

Congruence of the Institutional Research Agenda with Regional and National priorities especially with concerned Government Agencies.

Philippine Development Plan 2017-2022	CHED Research Agenda 2009-2018	DOST RDE Agenda and Programs 2016-2022	DA RDE Agenda and Programs 2016-2022	PUP
Promoting Phil Culture and Values, Expanding Economic Opportunities in Agriculture, Forestry and Fisheries Accelerating Human Capital Development Reducing Vulnerability of Individuals and Families Building Safe and Secure Communities Vigorously Advancing Science, Technology, and Innovation Ensuring Ecological Integrity, Clean and Healthy Environment	Improving Research Capability of HEIs towards International Competitiveness Enhancing Research Productivity of HEIs Generating New Knowledge Needed for the Advancement of Higher Education as well as for National Development Promoting and Facilitating Dissemination and Utilization of Research Output	Water Security, Food and Nutrition Security, Health Natural Products Development Vulnerable Ecosystems Documentation of Indigenous Knowledge Drug Discovery and Development DPR and Health Climate Change Adaptation and Health Varietal Improvement and Selection Cultural Management and Crop Production Systems Vaccine, Biologics and Diagnostics Product Development and Processing Nutrition, Feeds and Feeding Systems Development and Sustainable Management of Tree Plantations Biodiversity Watershed Management and Utilization Climate Change Strategies and Decision Support Tools Resource Assessment and Monitoring Socio-economics and Policy Capacity Building Modeling and Simulation for Improvement of Monitoring and Forecasting Hazards, Vulnerability and Risk Assessment Technology Development and Application for Climate Change Mitigation and Application for Disaster Risk Management	Productivity, Market Access and Opportunities and Value Chain Food Staples, Feed Resources and Other Alternatives Commercial Crops Poultry and Livestock Fisheries and aquaculture to Help Improve the Competitiveness of Philippine Crops, Livestock and Poultry, and Fisheries by Providing Solutions to Specific Problems on Competitiveness for each Stage in the Value Chain	Poverty Reduction Studies Peace and Security Studies Competitive Industry and Entrepreneurship Social and Cultural Development Environmental Conservation, Protection and Rehabilitation towards Sustainable Development

SYSTEM-INPUTS AND PROCESSES

PUP Research Agenda	Congruency with International and National Agency				Description
	UN Sustainable Development Goals	DOST Harmonized National Research and Development Agenda	CHED National Higher Education Research Agenda – 2	NEDA Regional Development Plan	
Agenda 1: Poverty Reduction, Peace and Security	√	√	√	√	This research theme addresses three important national and global issues that mankind is squarely faced; poverty, peace and security. The University is in the belief that these issues are interrelated—solving one means of solving others. The University works with the paradigm that the poverty issue is multi-dimensional and is driven by multifarious causes. Poverty studies therefore should cover the many facets of the causes and effects of poverty as well as the ways of addressing them. They should also be linked with peace and security concerns of localities, regions and countries. The studies should reveal the relationships of poverty to security, human rights, governance, lack of education, and limited access to social services
Agenda 2: Accelerating Infrastructure Development through Science and Technology	√	√	√	√	Consistent with National Government's thrust, the University is determined to effect significant economic growth, human development and social protection through

					acceleration of infrastructure development. The University, in support to the government's effort, provides the country with research-based studies and scientific and engineering innovations that will enable both the government and private sectors to hasten infrastructure development which can be both hard and soft infrastructures.
Agenda 3: Competitive Industry and Entrepreneurship	√	√	√	√	The University recognizes the country's need to strengthen the competitiveness of its industries, particularly those which are driving the nation forward in terms of economic growth such as tourism, agriculture, skilled manpower in ICT and language proficiency, retail, exports, investments, banking and entrepreneurship.
Agenda 4: Social and Cultural Development	√	√	√	√	Culture and society are linked to each other. Generally, culture is an important element of social development. The University, with its strong academic/research centers and institutes pertaining to cultural and social studies, is bent to support the National Government in the (1) creation of intellectual potential; (2) building of human capital; (3) popularization of culture, arts and heritage; (4) forging social integration; (5) promotion of national identity through local and national historiography; (6) prevention

					of social pathologies; (7) initiation and establishment of cooperation; (8) advancement and promotion of national solidarity and patrimony; and (9) reduction of disproportions of personal development of citizens as a form of social advancement.
Agenda 5: Environmental Conservation, Protection, and Rehabilitation towards Sustainable Development	√	√	√	√	Conservation, protection, and rehabilitation of the environment is a significant factor in the maintenance of community's sustainability. It includes use and management of the natural resources such as water, natural energy, air, wildlife and minerals. The University recognizes this as a very important element of national development.

Prepared by:

Engr. Pedrito M. Tenerife Jr.
Accreditation Task Force

Noted by:

Engr. Julius S. Cansino
Chairperson

Approved by:

Dr. Remedios G. Ado
Dean

SYSTEM-INPUTS AND PROCESSES

PHILIPPINE DEVELOPMENT PLAN 2017-2022 LINK
http://pdp.neda.gov.ph/wp-content/uploads/2021/06/Updated-PDP-2017-2022-as-of-06_25.pdf

NHERA2 - CHED LINK
https://ched.gov.ph/wp-content/uploads/2017/11/NHERA-2.pdf

HNRDA 2017-22 – DOST LINK
https://www.dost.gov.ph/phocadownload/Downloads/Journals/Approved%20Harmonized%20National%20RD%20Agenda%20%202017-2022.pdf

UNDP SUSTAINABLE GOALS AND DEVELOPMENT
https://www.un.org/sustainabledevelopment/wp-content/uploads/2019/01/SDG_Guidelines_AUG_2019_Final.pdf

SYSTEM-INPUTS AND PROCESSES

Republic of the Philippines
POLYTECHNIC UNIVERSITY OF THE PHILIPPINES

CERTIFICATION

This is to certify that during the 171st Regular Board of Regents (BOR) Meeting held on 10th day of December 2020 via Zoom Video Conferencing, the Board **approved** the University's Institutional Development Plan 2020-2024, including the University's Vision, Mission Goals and Ten Pillars, as per Board Resolution No. 2390, Series of 2020.

WITNESS MY HAND and dry seal this 10th day of December 2020 at the City of Manila, Philippines.

ASSOC. PROF. ROLANDO M. COVERO, JR.
University/Board Secretary

OFFICEOF THE UNIVERSITY/BOARD SECRETARY
2nd Floor South Wing PUP A. Mabini Campus Anonas Street, Sta. Mesa, Manila Phone: (Direct Line) 716-65-08
(Trunk Line) 716-78-52 (Local) 265; website: www.pup.edu.ph; e-mail: boardsec@pupedu.ph

ISO 9001:2015 CERTIFIED

SYSTEM-INPUTS AND PROCESSES

Republic of the Philippines
POLYTECHNIC UNIVERSITY OF THE PHILIPPINES

UPDATED LIST OF BOARD OF REGENTS
As of August 24, 2020

1. HON. RONALD L. ADAMAT	**CHAIRMAN** Commissioner, Commission on Higher Education
2. HON. MANUEL M. MUHI	**VICE-CHAIRMAN** President, Polytechnic University of the Philippines
3. HON. JOEL VILLANUEVA	**MEMBER** Chair, Senate Committee on Higher Education and Technical & Vocational Education
4. HON. MARK O. GO Represented by: **HON. RON P. SALO** (Kabayan Party List)	**MEMBER** Chair, House Committee on Higher and Technical Education
5. Hon. ERNESTO M. PERNIA Represented by: **Hon. ROWEENA M. DALUSONG** Director IV, NEDA	**MEMBER** Director General National Economic and Development Authority (NEDA)
6. HON. JOSE B. PATALINJUG III	**MEMBER** Regional Director, Department of Science and Technology NCR
7. HON. DANILO L. BELO	**MEMBER** Private Sector Representative Head, Relationship Management Division-Corporate Philippine Security Bank
8. HON. ANTONIO C. MONCUPA JR.	**MEMBER** Private Sector Representative Vice Chair/CEO, East West Bank
9. HON. RAMIR M. CRUZ	**MEMBER**

OFFICE OF THE UNIVERSITY/BOARD SECRETARY
PUP A. Mabini Campus, Anonas Street, Sta. Mesa, Manila 1016
Direct Line: 335-1730 | Trunk Line: 335-1787 or 335-1777 local 365
Website: www.pup.edu.ph | Email: boardsec@pup.edu.ph
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CERTIFICATE NUMBER: SCP0004130

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	President, PUP Federated Faculty Association, Inc. PUP Faculty Representative
10. HON. JERRILYNN L. PILAR Department Manager III, Pag-ibig Fund (HDMF), Shaw Boulevard, Mandaluyong City	**MEMBER** PUP Alumni Representative President, Federation of Alumni Association in PUP, Inc.
11. HON. ELLENOR JOYCE G. BARTOLOME	**MEMBER** PUP Student Representative President, Alyansa ng Nagkakaisang Konseho ng PUP (ANAK-PUP)

Polytechnic University of the Philippines
OFFICE OF THE UNIVERSITY/BOARD SECRETARY
CERTIFIED TRUE COPY
ROLANDO M. COVERO JR., MPA
University/Board Secretary

P a r G
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Republic of the Philippines
POLYTECHNIC UNIVERSITY OF THE PHILIPPINES

CERTIFICATION

This is to certify that during the Special Board of Regents (BOR) Meeting held on 05 April 2013 at CHED Conference Room, 4th Floor, HEDC Building, C.P. Garcia Avenue, UP Campus, Diliman, Quezon City, the Board ***gave an initial approval*** of the PUP Institutional Plan from 2012 – 2016 subject to revisions to find the core/niches which PUP can explore that will make it more relevant and responsive to the changing time as per Board Resolution No. 944, Series of 2013.

WITNESS MY HAND and dry seal this 30th day of July 2018 at the City of Manila, Philippines.

ROLANDO M. COVERO JR., MPA
University/Board Secretary

OFFICE OF THE UNIVERSITY/BOARD SECRETARY
2ND Floor South Wing PUP A. Mabini Campus Anonas Street, Sta. Mesa, Manila Phone: (Direct Line) 716-63-08
(Trunk Line) 716-78-32 (Local) 265; website: www.pup.edu.ph; e-mail: boardsec@pup.edu.ph

SYSTEM-INPUTS AND PROCESSES

Matrix of the National Research Agenda in congruence to University's Research Agenda, College Goals & Computer Engineering Research Agenda

National Higher Education Research Agenda – 2 2009 - 2018	University Research Agenda	College Research Goals	Computer Engineering Research Agenda
Basic research to generate new knowledge and advance the frontiers in the various disciplines;	Agenda 4: Social and Cultural Development	1. Provide quality education through instruction, advance research and extension services.	3. Socio-economic projects related to computer engineering fields
	Agenda 1: Poverty Reduction, Peace and Security		1. Applications of the different fields of specialization: a. Information Technology b. Software Engineering / Software Development c. System and Network Administration d. Microelectronics e. Embedded Systems
Research in aid of policy/plan formulation and implementation particularly in education	Agenda 1: Poverty Reduction, Peace and Security	3. Develop and produce facilities through the use of adapted technology and indigenous materials.	1. Applications of the different fields of specialization: a. Information Technology b. Software Engineering / Software Development c. System and Network Administration d. Microelectronics e. Embedded Systems
	Agenda 4: Social and Cultural Development		3. Socio-economic projects related to computer engineering fields
Research aimed at producing/adapting education technologies and developing education programs in cutting edge fields such as nanotechnology, biotechnology, ICT, materials science, etc.	Agenda 3: Competitive Industry and Entrepreneurship	4. Maintain, upgrade or improve facilities through the applications of engineering technology.	3. Socio-economic projects related to computer engineering fields
	Agenda 5: Environmental Conservation, Protection, and Rehabilitation towards Sustainable Development		1. Applications of the different fields of specialization: a. Information Technology b. Software Engineering / Software Development c. System and Network Administration d. Microelectronics e. Embedded Systems

R & D in aid of national/regional development	Agenda 2: Accelerating Infrastructure Development through Science and Technology	2. Produce world-class professionals as potential industry leaders and job providers.	2. Industry-based projects related to computer engineering fields

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National Higher Education Research Agenda – 2 2009 – 2018 *in support of R & D initiatives of other agencies/sectors*	**University Research Agenda**	**College Research Goals & Objectives**	**Computer Engineering Research Agenda**
National Science and Technology Plan (NSTP) 2002-2020	Agenda 1: Poverty Reduction, Peace and Security	1. Provide quality education through instruction, advance research and extension services.	1. Applications of the different fields of specialization: a. Information Technology b. Software Engineering / Software Development c. System and Network Administration d. Microelectronics e. Embedded Systems
	Agenda 2: Accelerating Infrastructure Development through Science and Technology		2. Industry-based projects related to computer engineering fields
	Agenda 3: Competitive Industry and Entrepreneurship		
	Agenda 5: Environmental Conservation, Protection, and Rehabilitation towards Sustainable Development		
National Integrated Basic Research Agenda	Agenda 4: Social and Cultural Development	3. Develop and produce facilities through the use of adapted technology and indigenous materials.	2. Industry-based projects related to computer engineering fields
		4. Maintain, upgrade or improve facilities through the applications of engineering technology.	3. Socio-economic projects related to computer engineering fields
National Unified Health Research Agenda 2008-2010	Agenda 1: Poverty Reduction, Peace and Security	3. Develop and produce facilities through the use of adapted technology and indigenous materials.	3. Socio-economic projects related to computer engineering fields
	Agenda 5: Environmental Conservation, Protection, and Rehabilitation towards Sustainable Development		1. Applications of the different fields of specialization: a. Information Technology b. Software Engineering / Software Development

			c. System and Network Administration d. Microelectronics e. Embedded Systems
Recommendations of the Congressional Commission on Science and Technology and Engineering	Agenda 1: Poverty Reduction, Peace and Security		1. Applications of the different fields of specialization: a. Information Technology b. Software Engineering / Software Development c. System and Network Administration d. Microelectronics e. Embedded Systems
	Agenda 2: Accelerating Infrastructure Development through Science and Technology	1. Provide quality education through instruction, advance research and extension services. 2. Produce world-class professionals as potential industry leaders and job providers. 3. Develop and produce facilities through the use of adapted technology and indigenous materials. 4. Maintain, upgrade or improve facilities through the applications of engineering technology.	
	Agenda 3: Competitive Industry and Entrepreneurship		2. Industry-based projects related to computer engineering fields
	Agenda 4: Social and Cultural Development		3. Socio-economic projects related to computer engineering fields
	Agenda 5: Environmental Conservation, Protection, and Rehabilitation towards Sustainable Development		

SYSTEM-INPUTS AND PROCESSES

National Higher Education Research Agenda – 2 2009 – 2018 ***Priority themes for multidisciplinary/multisectoral research***	**PUP Research Agenda**	**College Research Goals & Objectives**	**Computer Engineering Research Agenda**
Food safety and security	Agenda 1: Poverty Reduction, Peace and Security	1. Provide quality education through instruction, advance research and extension services. 2. Produce world-class professionals as potential industry leaders and job providers. 3. Develop and produce facilities through the use of adapted technology and indigenous materials. 4. Maintain, upgrade or improve facilities through the applications of engineering technology.	1. Applications of the different fields of specialization: a. Information Technology b. Software Engineering / Software Development c. System and Network Administration d. Microelectronics e. Embedded Systems
Enhancing indigenous renewable energy source in the domestic energy mix	Agenda 4: Social and Cultural Development	1. Provide quality education through instruction, advance research and extension services. 3. Develop and produce facilities through the use of adapted technology and indigenous materials. 4. Maintain, upgrade or improve facilities through the applications of engineering technology.	3. Socio-economic projects related to computer engineering fields
Development of vaccines and diagnostic kits using indigenous materials	Agenda 3: Competitive Industry and Entrepreneurship		3. Socio-economic projects related to computer engineering fields
	Agenda 1: Poverty Reduction, Peace and Security	1. Provide quality education through instruction, advance research and extension services. 3. Develop and produce facilities through the use of adapted technology and indigenous materials.	1. Applications of the different fields of specialization: a. Information Technology b. Software Engineering / Software Development c. System and Network Administration d. Microelectronics

		4. Maintain, upgrade or improve facilities through the applications of engineering technology.	e. Embedded Systems
Disaster risk management	Agenda 5: Environmental Conservation, Protection, and Rehabilitation towards Sustainable Development	1. Provide quality education through instruction, advance research and extension services. 3. Develop and produce facilities through the use of adapted technology and indigenous materials. 4. Maintain, upgrade or improve facilities through the applications of engineering technology.	1. Applications of the different fields of specialization: a. Information Technology b. Software Engineering / Software Development c. System and Network Administration d. Microelectronics e. Embedded Systems
			2. Industry-based projects related to computer engineering fields
Pollution control	Agenda 5: Environmental Conservation, Protection, and Rehabilitation towards Sustainable Development	3. Develop and produce facilities through the use of adapted technology and indigenous materials. 4. Maintain, upgrade or improve facilities through the applications of engineering technology.	1. Applications of the different fields of specialization: a. Information Technology b. Software Engineering / Software Development c. System and Network Administration d. Microelectronics e. Embedded Systems
			2. Industry-based projects related to computer engineering fields
Climate change specifically on the issue of global warming	Agenda 5: Environmental Conservation, Protection, and Rehabilitation towards Sustainable Development	1. Provide quality education through instruction, advance research and extension services. 3. Develop and produce facilities through the use of adapted technology and indigenous materials. 4. Maintain, upgrade or improve facilities through the applications of engineering technology.	1. Applications of the different fields of specialization: a. Information Technology b. Software Engineering / Software Development c. System and Network Administration d. Microelectronics e. Embedded Systems
			2. Industry-based projects related to computer engineering fields
Future ASEAN	Agenda 1: Poverty Reduction, Peace and Security	1. Provide quality education through instruction, advance research and extension services. 2. Produce world-class professionals as potential industry leaders and job providers.	1. Applications of the different fields of specialization: a. Information Technology b. Software Engineering / Software Development c. System and Network Administration d. Microelectronics

		3. Develop and produce facilities through the use of adapted technology and indigenous materials. 4. Maintain, upgrade or improve facilities through the applications of engineering technology.	e. Embedded Systems
	Agenda 3: Competitive Industry and Entrepreneurship		2. Industry-based projects related to computer engineering fields
	Agenda 4: Social and Cultural Development		3. Socio-economic projects related to computer engineering fields
Peace process and conflict resolution	Agenda 1: Poverty Reduction, Peace and Security	1. Provide quality education through instruction, advance research and extension services.	3. Socio-economic projects related to computer engineering fields 1. Applications of the different fields of specialization: a. Information Technology b. Software Engineering / Software Development c. System and Network Administration d. Microelectronics e. Embedded Systems

SYSTEM-INPUTS AND PROCESSES

Regional Development Policy Research Agenda 2017 - 2022	PUP Research Agenda	College Research Goals & Objectives	Program Research Agenda
Macro Development Sector	Agenda 1: Poverty Reduction, Peace and Security	1. Provide quality education through instruction, advance research and extension services. 2. Produce world-class professionals as potential industry leaders and job providers. 3. Develop and produce facilities through the use of adapted technology and indigenous materials. 4. Maintain, upgrade or improve facilities through the applications of engineering technology.	1. Applications of the different fields of specialization: a. Information Technology b. Software Engineering / Software Development c. System and Network Administration d. Microelectronics e. Embedded Systems
Infrastructure Development Sector	Agenda 2: Accelerating Infrastructure Development through Science and Technology	1. Provide quality education through instruction, advance research and extension services. 3. Develop and produce facilities through the use of adapted technology and indigenous materials. 4. Maintain, upgrade or improve facilities through the applications of engineering technology.	2. Industry-based projects related to computer engineering fields
Economic Development Sector	Agenda 3: Competitive Industry and Entrepreneurship	1. Provide quality education through instruction, advance research and extension services. 2. Produce world-class professionals as potential industry leaders and job providers. 3. Develop and produce facilities through the use of adapted technology and indigenous materials. 4. Maintain, upgrade or improve facilities through the applications of engineering technology.	1. Applications of the different fields of specialization: a. Information Technology b. Software Engineering / Software Development c. System and Network Administration d. Microelectronics e. Embedded Systems
	Agenda 5: Environmental Conservation, Protection, and Rehabilitation towards Sustainable Development		3. Socio-economic projects related to computer engineering fields
Social Development Sector	Agenda 4: Social and Cultural Development	1. Provide quality education through instruction, advance research and extension services.	3. Socio-economic projects related to computer engineering fields

		2. Produce world-class professionals as potential industry leaders and job providers. 3. Develop and produce facilities through the use of adapted technology and indigenous materials. 4. Maintain, upgrade or improve facilities through the applications of engineering technology.	

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Engr. Pedrito M. Tenerife Jr.
Accreditation Task Force

Noted by:

Engr. Julius S. Cansino
Chairperson

Approved by:

Dr. Remedios G. Ado
Dean

SYSTEM-INPUTS AND PROCESSES

(Lifted from PUP Research and Development Manual)

PUP RESEARCH AGENDA

As a state university with the largest number of enrollees belonging to the marginalized sector of society, the research program of the Polytechnic University of the Philippines (PUP) is directed at social capital and innovation towards inclusive growth for national development. Research in the university, being the primary source of new knowledge and a laboratory of highly competent and skilled human capital, is an incubator of innovations and technologies with the end goal of economic growth of the country and the community.

The focus of the research program of the University is multi-, inter-and trans-disciplinary and collaborative in nature, with emphasis on sustainable development, answering especially questions “what kind of research is done?", "what are the objectives?", and "what impact will the research have?" The University's research program is complimentary to research and development (R&D), technology transfer, innovation and commercialization activities.

Research Policy Statement

Research is one of the major functions of higher education. Thus, the University encourages its faculty members, non-teaching personnel and students to be actively engaged in research undertakings to ensure the continued growth and development of PUP as a higher education institution.

Research Principles

Research undertakings in the University shall be guided by the following general principles set by the Higher Education Research Agenda-2 (NHERA-2) of the Commission on Higher Education (CHED):

1. Research is the ultimate expression of an individual's innovative and creative powers. PUP shall ensure that the academic environment nurtures and supports research talents.
2. Research thrives in an environment characterized by free flow of information, honest and analytical exchange of ideas, and supportive policy and administrative structures. PUP policies shall enhance the institution's and the individual's capacity to conduct independent, collaborative and productive research.
3. Research is one of the functions of higher education sector. PUP is expected to lead the conduct of discipline-based, policy-based, technology-directed and innovative/creative researches that are locally responsive and globally competitive

'University Research' Defined

Research is defined as a "structured inquiry that utilizes acceptable scientific methodology to solve problems and creates knowledge that is generally applicable" (Grinnell, 1993).

University research must advance the University's Research Agenda of bridging the gaps in the programmed body of knowledge that the University is building up. Researchers can be initiated and conducted by the following:

- an individual faculty member;
- an individual non-teaching personnel;
- a group of faculty members belonging to one department/college/branch;
- a group of non-teaching personnel belonging to the same office;
- a group of faculty members and/or non-teaching personnel from different departments/colleges/branches/campuses/offices;
- an academic department;
- a college/branch/campus;
- a student or a group of students belonging to one department, college or branch/campus.

Only those researches that fit the definition of university research and approved by the University Research Evaluation Committee (UREC) can avail of material, technical and/or financial support from the University.

The University Research Vision, Mission and Objectives

Vision

The University envisions itself as a premier center of research in social capital and innovation towards inclusive growth for national development.

Mission

Research and development in PUP shall contribute to the transformation of the University as an epistemic community and a research-intensive polytechnic university, and in advancing knowledge across multidisciplinary areas to address the immediate and long-range needs of society. The R & D in the University shall endeavor to produce research and innovation that promote educational, technological, economic, political, ecological, social, and cultural understanding toward the alleviation of the plight of the poor, the development of the citizenry, and the enhancement of nation-building and global competitiveness.

In particular, the research sector shall play a significant role in the realization of the University's 'envisioned society' of (1) sustainable human development; (2) democratic and good governance; (3) respect for cultural diversity and strengthened national identity: (4) technology human touch; and (5) ecological harmony.

Objectives

To fulfill this mission, the Office of the Vice President for Research, Extension, and Planning Development (OVPREPD) shall endeavour to achieve the following objectives:

1. To contribute to the country's national development through a focused-university research program;
2. To promote synergy and a sound research capability program through collaboration of the research and academic sectors of the University;

3. To pursue excellence in production and publication of research and creative works among faculty and students;
4. To develop strong research linkages and partnerships with other national and international institutions and organizations;
5. To pursue excellence in innovation, technology transfer and commercialization research outputs with the end goal of economic, environmental and social growth.

The University Research Agenda

The University adopts a clear, practical, and realizable University Research meant to (1) be aligned with the strategic plan of the University; (2) unify the direction and framework of the research activities of the University; (3) align the research efforts of the University with the thrust and priorities of national government agencies e.g. Department of Science and Technology (DOST), National Economic and Development Authority (NEDA), Commission on Higher(CHED), among others; and (4) generate researches, scientific innovations, speculative and the paradigms which are expected to propel economic, scientific, social, cultural and technological development.

The University Research Agenda is categorized into five general themes, to wit: (1) poverty reduction, peace and security; (2) accelerating infrastructure development through science and technology; (3) competitive industry and entrepreneurship; (4) social and cultural development and (5) conservation, protection and rehabilitation of the environment towards sustainable development.

Agenda 1: Poverty Reduction, Peace and Security

This research theme addresses three important national and global issues that mankind is squarely faced: poverty, peace and security. The University is in the belief that these issues are interrelated-solving one means solving others.

A. Poverty Reduction Studies

The University works with the paradigm that the poverty issue is multi-dimensional and is driven by multifarious causes. Poverty studies therefore should cover the many facets of the causes and effects of poverty as well as the ways of addressing them. They should also be linked with peace and security concerns of localities, regions and countries. The studies should reveal the relationships of poverty to security, human rights, governance, lack of education, and limited access to social services for according to Kofi Annan, "development cannot be enjoyed without security and security cannot be enjoyed without development."

Roles and models on local resource and local actors' mobilization, increasing productivity and creativity, community-driven development, and development partnerships between public and private sector should likewise be included among the focus of poverty studies.

The following research topics are herein identified for poverty reduction according to different dimensions:

(1) Economic Dimension

a. Agrarian reform and industrialization
b. Agri-business
c. Corporate social responsibility
d. Employment and industrial relations

e. Growth and equity
f. Local/community and distributive economics
g. Micro-finance/micro lending strategies
h. National and local economic policies
i. SMEs, cooperatives and social enterprise
j. Supply chain management, and
k. Other related topics

(2) Educational Dimension

a. Academe-industry linkages
b. Alternative learning system
c. Curriculum Development
d. Distance education/learning
e. Educational policies and legislation
f. Educational technology and innovation
g. Graduate tracer study
h. Home-School-Community collaboration
i. Institutional Development
j. Outcome-based education
k. Professional development and faculty support
l. Quality assurance
m. Student support services
n. Teacher and student achievements
o. Transformative education
p. Transnational education (ASEAN integration), and
q. Other related topics

(3) Social, Political and Cultural Dimension

a. Good governance
b. Human development and social protection
c. Informal settlers
d. Knowledge and belief systems
e. Local government studies
f. Public personnel management and development
g. Public-private partnership
h. Quality of life
i. Social welfare, and
j. Other related topics

(4) Public Health Dimension

a. Food sufficiency
b. Food productivity
c. Nutrition and dietatics
d. Food sciences, and
e. Other related topics

B. Peace and Security Studies

Peace and security studies and researches are expected (1) to understand the causes of armed conflicts, religious disagreements, cultural clashes, war, terrorism, genocide, human violations and others; (2) to develop ways and devices to prevent and resolve identified peace and security problems; and ultimately (3) to build peaceful and just communities, systems, and societies.

Obviously, these types of studies require interdisciplinary approaches and expertise. Henceforth, researches with the following topics could meet the above expectations:

(1) Understand the causes of armed conflicts, religious disagreements, cultural clashes, war, terrorism, genocide, human rights violations and others with focus or emphasis on:

a. Democratization
b. Ethnographic and ethnicity studies
c. Human growth and development
d. International relations and trans-border issues
e. Internationalization
f. Knowledge and belief systems
g. Macroeconomics and globalization issues
h. Migration
i. National and human security
j. Policy studies
k. Political dynamics
I. Religion and philosophy
m. Social issues
n. Social movements
o. World politics, and
p. Other related topics

(2) Develop ways to prevent and address identified peace and security problems, through conduct of studies on:

a. Behavioral and psychosocial researches
b. Cross-cultural communication
c. Ethno-linguistics
d. Organizational and development communication
e. Peace and conflict resolution
f. Psycho-trauma and crisis intervention
g. Translation studies, and
h. Other related topics

(3) Build peaceful and just communities, systems and societies, exploring:

a. Access, equity and ethics
b. Community empowerment
c. Differently-abled (PWDs)
d. Gender and development studies
e. Globalization of education and cross-cultural aspects
f. Institutional development
g. Lesbian, Gay and Bisexual, Transsexual and Queer (LGBTQ) issues
h. Marriage and family
i. Senior citizens' issues
j. Women and children, and
k. Other related topics

Agenda 2: Accelerating Infrastructure Development through Science and Technology

Consistent with the National Government's thrust, the University is determined to effect significant economic growth, human development and social protection through acceleration of infrastructure development.

Undoubtedly, infrastructure development is one of the major priorities of the national government as it is clearly and concretely outlined in the recent National Economic and Development Authority agenda. The University, in support to the government's efforts, provides the country with research-based studies and scientific and engineering innovations that will enable both the government and private sectors to hasten infrastructure development which can be both hard and soft infrastructures.

The "hard" infrastructure refers to the large physical networks necessary for the functioning of a modern industrial nation; these are meant to support the drivers of economic growth such as tourism, agriculture and industry. On the other hand, "soft" infrastructure refers to all the institutions or systems which are required to maintain

the economic, cultural and social standards of a country; these are meant to provide the necessary services for human development and social protection such as education, health, among others.
The University identified the following areas and topics to concentrate on:

A. Hard Infrastructures

a. Energy-related infrastructure and facilities (e.g. power sources, upgrade of existing power plants, etc.)
b. Flood control and management
c. Irrigation systems
d. Mechatronics
e. Resettlement frameworks
f. Structural engineering
g. Transportation technology
h. Urban and rural housing
i. Urban gardening
j. Water supply and treatment facilities, and
k. Other related topics

B. Soft Infrastructures

a. Bioinformatics
b. Computational and theoretical science
c. Data engineering and ubiquitous computing
d. E-governance
e. Instrumentation research
f. Internet and Web applications development
g. Knowledge management
h. Management information systems/reporting systems
i. Material science research
j. Mathematical and statistical modelling,
k. Mobile computing systems,
l. Natural products,
m. Network security and issues,
n. Pure and applied mathematics research,
o. Software development and applications, and
p. Other related topics.

Agenda 3: Competitive Industry and Entrepreneurship

The university recognizes the country's need to strengthen the competitiveness of its industries particularly those which are driving the nation forward in terms of economic growth such as tourism, agriculture, skilled manpower in ICT and language proficiency, retail, exports, investments, banking and entrepreneurship.

Furthermore, PUP is one with the National Government in its objective of assuring rapid and sustained growth for the country. In view of this, the University, with its various academic and research arms, identifies important research topics and areas which can be explored (1) to reveal important trends, issues and challenges confronting these industries and (2) to discover devices and ways to address these challenges. The following research topics are hereunder identified:

a. Business processing and outsourcing
b. Cooperative Management
c. E-commerce
d. Human resource management practices and issues
e. Incubation and commercialization
f. Industry needs analysis
g. Investments and banking systems and operations
h. Livelihood and business development
i. Management and organization
j. Market for agriculture industry
k. Micro and macroeconomics
l. National and local economic policy research (NEDA, LGU projects, DTI)
m. Product development and innovation
n. Quality management
o. Resource management
p. Small and medium enterprises (SMEs)
q. Work values, and
r. Other related topics

Agenda 4: Social and Cultural Development

Culture and society are linked to each other. Generally, culture is an important element of social development. The University, with its strong academic/research centers and institutes pertaining to cultural and social studies, is bent to support the National Government in the (1) creation of intellectual potential; (2) building of human capital; (3) popularization of culture, arts and heritage; (4) forging social integration; (5) promotion of national identity through local and national historiography; (6) prevention of social pathologies; (7) initiation and establishment of cooperation; (8) advancement and promotion of national solidarity and patrimony; and (9) reduction of disproportions of personal development of citizens as a form of social advancement.

The following research topics are identified in order to direct the University research activities along the line of cultural and social development:

a. Communication and society
b. Filipino worldview
c. Filipino culture
d. Heritage studies/ intangible cultural heritage/ heritage preservation
e. Historiography
f. Human growth and development studies
g. Information campaign and evaluation, advertising/public relations principles and case studies
h. Literature, performing arts, visual arts, folk arts
i. Media laws and ethics
j. Media literacy
k. Organizational behaviour, multiple intelligences, giftedness and learning disabilities
l. Philosophical studies
m. Popular culture
n. Psychology and society
o. Sociological studies, and
p. Other related topics

Agenda 5: Environmental Conservation, Protection and Rehabilitation towards Sustainable Development

Conservation, protection and rehabilitation of the environment is a significant factor in the maintenance of community's sustainability. It includes the sustainable use and management of the natural resources such as water, natural energy, air, wildlife and minerals. The University recognizes this as a very important element of national development.

The following research areas and topics have been identified to generate knowledge to supplement the existing body of works regarding the management, care, use and exploitation of the natural resources:

a. Biodiversity
b. Climate change mitigation and adaptation
c. Disaster management, preparedness and monitoring
d. Energy conservation
e. Environmental conservation, preservation, protection and stewardship
f. Global warming
g. Urban ecology, and
h. Other related topics

SYSTEM-INPUTS AND PROCESSES

(Lifted from the Computer Engineering Design Project Guidelines)

The Computer Engineering Department, through the combined efforts of the Dean of the College of Engineering, the Department Chair, and the Design Project Coordinator, shall determine the possible projects that students of a particular batch may develop. These design project normally belong to certain areas of research and are identified before the students start developing their project proposals. The expertise of faculty members is commonly the determining factor in the identification of project areas. The CpE Department should make a list of the acceptable areas of research and announce these to the students. The areas of research will be applicable to the whole batch enrolling in Design Project.

Acceptable types of projects are:

3.1. Applications of the different fields of specialization:

3.1.1. Information Technology

The Information Technology specialization is concerned with the development of new solutions to local problems in the integrated management and retrieval of data, information and knowledge in highly distributed networked environments in academe, industry and government. The specialization covers areas such as information systems resource management, systems development methodologies and the use of information systems as a competitive advantage and as a tool for decision making at the operational, tactical and strategic levels of an organization. Specific research interest includes digital libraries, data warehousing, data mining, information search and retrieval, Web-enabled databases, electronic commerce applications, object-oriented databases and distributed databases; systems development methodologies, enterprise collaboration systems, social, ethical and security issues in information systems, electronic business and decision support systems.

3.1.2. Software Engineering / Software Development

The Software Engineering specialization is concerned with the conduct of research in a variety of areas including contemporary programming languages, compilers and software engineering methodologies; concurrent and event driven software; also, educational and other applications of multimedia, computing, communications and connectivity to education and the learning and other work processes in and outside the university. Specific research interest include software architecture, software evolution, and rapid migration; advanced programming languages, including design, semantics, implementations, programming environment tools, collaborative programming, object-oriented programming and prototyping; also, educationally-oriented programming language tools, online course delivery and management; intelligent tutoring systems and adaptive learning environments; distance learning, collaborative teaching, user interfaces and human computer interaction; CASE tools, applied artificial intelligence, human factors engineering, ergonomics, systems engineering and work flow/schedule optimization.

1.1.3. System and Network Administration

The Network Administration specialization is concerned with the pursuit of a variety of research topics related to computer networks and distributed computer systems. The research work combines theoretical foundations with practical applications and will involve interaction with the user community. Specific research interests include network resource management and monitoring, distributed systems and tools; client-server computing; parallel systems; communication protocols for continuous media such as video and audio over the current Internet networks as well as over high-speed networks; multimedia network protocols, extensible operating systems to support multimedia, enterprise computing and connectivity standards.

1.1.4. Microelectronics

The Microelectronics specialization is concerned with the design, manufacture, and use of microchips and microcircuits.

1.1.5. Embedded Systems

Embedded systems is a combination of computer hardware and software, either fixed in capability or programmable, that is designed for a specific function or for specific functions within a larger system.

3.2. Industry-based projects related to computer engineering fields
3.3. Socio-economic projects related to computer engineering fields
3.4. College of Engineering Research Thrusts and Priority Research Concerns
3.5. PUP Research Thrusts and Priority Research Concerns