

PASCN Discussion Paper No. 2000-01

An Evaluation on the Readiness of the Filipino Professionals to Meet International Standards

Tereso S. Tullao, Jr.



The *PASCN Discussion Paper Series* constitutes studies that are preliminary and subject to further revisions and review. They are being circulated in a limited number of copies only for purposes of soliciting comments and suggestions for further refinements.

The views and opinions expressed are those of the author(s) and do not necessarily reflect those of the Network.

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De La Salle University

January 2000

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Executive Summary

Introduction

With the conclusion of the Uruguay Round and the relaxation of trade in commodities, trade in services will take center stage in the next round of trade negotiations under the World Trade Organization (WTO). The expansion of trade in the context of a growing services sector will have a significant impact on human resource development. There is need to improve the human resource capabilities of the Philippines so as to maximize whatever the country may gain and to minimize the costs to bear in the process of liberalization in the trade in services. It is in this light that there is a need to study the ability of various Filipino professionals to face international competition.

Although the benefits of liberalization can be attained through the removal of barriers, reduction of the market power, and the implementation of mutual recognition agreements, a long-term strategy that should be considered seriously is the improvement of the country's professionals (Tullao, 1998a).

Readiness of professionals to compete internationally may be viewed from various perspectives. On one hand, improvement of human resources is a preparation for foreign competition here and abroad. On the other hand, it can be viewed as an investment in human capital and part of expanding the infrastructure of the economy.

The general objective of the study is to evaluate the readiness of Filipino professionals to face global competition under an environment set by the General Agreement on Trade in Services (GATS). The study will trace the current process of preparing, developing and upgrading Filipino professionals in the context of international competition. In particular, it will identify and make a critical review of the educational qualifications, licensing requirements, continuing training programs and other requisites towards the development of Filipino professionals.

II. Role of Professional Services in the Economy

The services sector of the economy covers the non-agricultural and non-industrial productive and distributive activities in the transportation, communication and storage, trade, finance, real estate, private services and government service industries. The share of the sector in national income is quite substantial and has been increasing over the years. However, the employment share of professional workers in the non-agricultural sector has been steadily declining, although slowly, over time. Despite the sudden increase by the end of the 1980s, the employment share of professionals to non-agricultural employment has not changed dramatically remaining at around 12 to 13 per cent at the beginning of the 1990s.

III. General Agreement of Trade in Services (GATS)

The General Agreement on Trade in Services (GATS) has laid down the general legal framework that would govern the promotion of global trade in services. It consists of a set of rules limiting the intervention of governments and other

institutions in the global trade in services by removing hindrances to market entry and providing equal treatment of foreign service providers. The major obligations required from member economies include, among others, market access, national treatment, non-discrimination and transparency.

Upon accession, members are required to make commitments along the four modes of supply which include cross border, consumption abroad, commercial presence and presence of natural persons. A major component of commitments is the identification of the member's limitations on market access, limitations on national treatment and additional commitments.

IV. Education, Development and Liberalization

The initial empirical research on the relationship between education and economic development was centered on the contributions of education to economic growth. The seminal works of Schultz, 1961 and Denison, 1962; 1967 tried to account for the unexplained "residual" growth left when all other factor changes have been accounted for. Manpower forecasting, on the other hand, has been attributed largely to the pioneering work of Frederick Harbison and Charles Myers (1964), and Bowles (1969). By forecasting manpower "requirements" educational planners can determine the expansion of the educational system to meet the future needs of the economy for different types of manpower based on a set of fixed relations between the anticipated growth in output and the educational or skill requirements to produce such output (Snodgrass 1996).

A strong competing paradigm is the human capital theory as developed by Gary Becker and Theodore Schultz. Human capital theory is centered on the expenditures on education, seeing them as investments in human capital analogous to investments in physical capital.

The third view on education and economic development is attributed to the work of Robert Barro and others. This group believes that while education is not a sufficient condition for economic growth to occur, it may be a necessary one. Thus, for education to boost the rate of economic growth, increases in the supply of educated labor must be accompanied by increases in the demand for educated labor.

Over the past several years increasing attention has been paid to the issue of the emergence of international trade in professional and educational services. Attention was centered on some general issues including regulatory measures affecting establishment of professional services firms and the cross-border provision of supply of professional services (OECD 1997). Mallea (1997) has identified four particular and specific issues on international trade in professional and educational services which include professional preparation, professional competence, continuing professional education, and quality assurance.

V. Higher Education in the Philippines

The supervision of institutions of higher learning in the country was assigned to the Commission on Higher Education (CHED) which was created by the "Higher Education Act of 1994". The role of CHED was further articulated under R.A. 8292

or the “Higher Education Modernization Act of 1997 that defined the relationship of CHED with state universities and colleges (SUCs).

The number of higher education institutions (HEIs) has been increasing in recent years. There were only 809 HEIs in 1991, but in 1998 some 1,379 were registered with CHED. Seventy five percent of all students in higher education are enrolled in private educational institutions, and the enrolment trend shows an over-subscription in business administration, engineering, teacher training, medical sciences and liberal arts.

In terms of faculty, several studies have revealed the relative academic inadequacy of teachers. A little over 7% holds doctoral degrees and almost two out of three of all tertiary level teachers in the country do not have advanced degrees.

In the field of research, the situation in many educational institutions is very discouraging. Many of our teachers do not have the necessary qualifications to conduct independent studies, and as a consequence there is hardly any research activity going on in our colleges and universities. Even if the faculty members are qualified to conduct research, they are not given sufficient time to do research and related studies.

There are several reasons for the lack of research activities in many colleges and universities. One, both the faculty and students are in the graduate school on a part-time basis. Second, the graduate programs in this country are concentrated in two fields (education and MBA programs) and there are very few graduate programs in other disciplines. Third, since many higher educational institutions are privately-funded, it is very difficult to finance research activities particularly in the sciences.

Other indicators of the quality of higher education institutions in the country include, among others, low performance of graduates in national licensure examinations, limited number of schools with accredited programs, very few institutions cited as centers of excellence, and only the inclusion of four universities among the top universities in Asia.

VI. Curricular Programs and Licensing Requirements of Selected Professions

The competence of Filipino professionals is comparable with that of their ASEAN counterparts as indicated by the similarity and comparability of the educational qualifications as well as the curricular requirements in various professional programs.

VII. Continuing Professional Education

Continuing education encompasses practices and activities pertaining to the training of individuals after they have left the formal educational system. It includes continuing professional education and further non-formal and informal education and training (Edralin, 1999).

In the Philippines, the administration of continuing professional education is primarily a responsibility of the Professional Regulation Commission (PRC), together

with the appropriate professional organization, as well as the CHED. The PRC requires that all licensed professionals must complete certain number of CPE units prior to the renewal of their license. The current system of giving CPE credits gives rise to certain inequities and a bias against graduate education and research, the more important components of continuing professional education.

VIII. Absorption of Professionals

Professional, technical and related workers account for almost 13 percent of the total non-agricultural members of the labor force. The bulk of these professionals is concentrated in the "community, social and professional services" industry group which absorbs 75% of the total professionals. We have also used the compliance rate in CPE as an indirect indicator of absorption. The low compliance rate may indicate that many professionals, who have passed various licensure examinations in the past, are currently employed in other occupations or holding positions which do not need a professional license to practice. In addition, many licensed professionals are using their licenses as an additional credential for entry to an employment position within or outside their professions.

From 1992 to 1998, a total of 318,392 professional, technical and related workers were reported deployed for overseas employment. More than half of these deployed overseas workers are composers and performing artists who are not classified as professionals by the PRC. The remaining number of professionals absorbed by the external market constitutes about 9% of the total stock of professionals in the register of PRC.

IX. Responses of Key Informants on the Readiness of Filipino Professionals

Key informants gave satisfactory rating on the performance of newly-hired professionals, their technical competence, and the adequacy of course offerings. In addition, they believe Filipino professionals are qualified and ready to face international competition. On training and continuing professional education, majority of respondents revealed that their firms provide some form of training to newly hired professionals and have continuing professional education programs.

X. Conclusion

In spite the inadequacies of the educational system of the Philippines, the curricular offerings of the various professions are comparable with international standards at least in the ASEAN region. The Philippines may be producing a lot of graduates but the licensing examinations as well as the continuing education program serve as a process of selecting the best among these graduates who pursue a career in the profession.

The over expanded higher educational sector in the Philippines has been blamed for the mismatch of graduates and manpower needs of the economy as well as for the excess supply of graduates. To address this issue, there is a need to increase demand for educated labor through the improvement of the economy, greater employment generation and higher rates of savings and investment.

The development of human capital through various forms of schooling and training aimed at addressing the competitiveness of Filipino professionals in the light of a liberalized environment have accompanying social costs. The loss of educated manpower through brain drain, the various social ills resulting from overseas employment may not be fully compensated by the foreign exchange remittances brought into the economy.

Based on the conclusions of the study the following proposals are recommended:

1. Regularly update curricular programs of various professions to keep up with the changes in the market and changes in technology, and to benchmark with some of the best academic programs in the region.
2. Refocus the continuing professional education program towards research, publications, inventions and graduate education and de-emphasize seminars.
3. For further improvement and effectiveness of continuing professional education, give professional organizations more flexibility in developing their members through the institution of a professional ranking system.
4. Link the development of higher education with the improvement of continuing professional education.
5. Encourage professional organizations to have their own professional journals, preferably refereed.
6. Recognizing the opportunity cost of graduate education for professionals, a system of distance education may be devised, where professionals earn a degree without too much sacrifice on their professional practice and income.
7. To minimize the social cost of migration, let students in state colleges and universities internalize the cost of education through an imposition of a users fee. For migrating professionals who have received full support from the state for their education, a form of exit tax may be imposed.
8. Rationalize the allocation of government funds to higher education. There should be a moratorium on the establishment or conversion of state colleges and universities.
9. Encourage the integration of existing state colleges and universities instead of the establishment of autonomous campuses.

An Evaluation on the Readiness of Filipino Professionals to Meet International Competition*

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Abstract

The study is an evaluation of the extent and quality of the various forms of investments in human capital in the formation of Filipino professionals in terms of professional competence, professional preparation and continuing professional education. The competence of professionals was evaluated in terms of the current state of higher education in the Philippines in general and the curricular programs of various professions in particular. Professional preparation, on the other hand, was evaluated in terms of the licensing requirements of various professions while continuing professional education (CPE) was evaluated in terms of the features and weaknesses of the current (CPE) programs supervised by the Professional Regulation Commission (PRC) and various professional organizations.

Introduction

The current review of the competitiveness of various economic sectors is an offshoot of the continuing reforms brought about by the process of liberalization and deregulation of the economy. It has been observed that greater openness of economies to international trade has brought significant impact on their economic performance. For example, the rapid expansion in the services sector in the Philippines and in other parts of the world has been attributed to a great extent the greater openness of trade in services. However, the growth potentials of the services sector are not fully realized because of difficulties and the reluctance of industries to undertake the necessary reforms.

With the conclusion of the Uruguay Round and the relaxation of trade in commodities, the trade in services, including professional services, will take a center stage in the next round of trade negotiations under WTO. The expansion of trade in the context of a growing services sector will have a significant impact on human resource development. There is need to improve the human resource capabilities of the Philippines so as to maximize whatever the country may gain and minimize the costs to bear in the process of liberalization in the trade in services.

It is in this light that there is a need to study the capacity of various Filipino professionals to face international competition. The country's commitments with the

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General Agreements of Trade in Services (GATS), the ASEAN Framework Agreement on Services (AFAS), and the establishment of Mutual Recognition Agreements (MRAs) in various professional groups are related forces that push Filipino professionals to upgrade themselves. The professionals in the country are realizing the need to benchmark with international standards as a relevant strategy for reaping the benefits of a more liberalized trading environment.

Previous studies on trade in professional services examined the perceived costs and benefits from liberalization from the point of view of the key players in the professional services sector (Tullao, 1998a). In a related study, Tullao (1999a) analyzed the various responses of the country to the two GATS issues of recognition and domestic regulation as they impact on the liberalization in the trade of professional services.

These two studies were centered on the reactions of the Philippines to the rules and disciplines set by GATS on the entry of professionals. Since GATS is an international agreement, the Philippines must follow its rules and avoid the sanctions WTO can impose on erring members. By following the rules of the game, the country would have accomplished the main objective of the GATS-liberalization. However, a more positive and pro-active response to the call for liberalization in trade in services is the preparation of the domestic economy to absorb the flow of services ensuing from the liberalization process. One major preparation is the readiness of domestic professionals.

Although the benefits of liberalization can be attained through the removal of institutional barriers, the reduction of the market power of foreign players, and the implementation of mutual recognition agreements, a long-term strategy that should be considered seriously is the improvement of the country's professionals to prepare them for international competition (Tullao, 1998a).

Readiness of professionals to compete internationally may be viewed from several perspectives. First, the facility of Filipinos to work abroad and compete with foreign professionals with similar skills and competence. Second, the ability of professionals to compete with foreign professionals entering the local economy. The third perspective is focused on the ability of professionals to meet the standards and human resource requirements of foreign enterprises as well as domestic companies in their use of various services.

The first and second views are premised on the need to improve human resources in order to prepare Filipino professionals for foreign competition here and abroad within a liberalized global market for services. The third perspective, on the other hand, prepares professionals as an investment in human capital as part of expanding the infrastructure of the economy. Such preparation will have the effect of making local professionals competitive here and abroad plus making the Philippines an attractive site for foreign investment because of the quality of professional services. In effect the country does not prepare its professionals merely to protect them from foreign competition but more so to build a strong human resource infrastructure.

The general objective of the study is to evaluate the readiness of Filipino professionals to face global competition under a more liberalized environment set by the General Agreement on Trade in Services (GATS). The study will trace the current process of preparing, developing and upgrading Filipino professionals in the context of international competition. In particular, it will identify and make a critical review of the educational qualifications, licensing requirements, continuing training programs and other requisites towards the development of Filipino professionals. These components will be compared with standards in the ASEAN region for international benchmarking.

As trade in services expand with liberalization, infrastructure weaknesses of the Philippines are less important to service providers than commodity producers. "The Philippines and India still score quite poorly in the World Economic Forum's global competitiveness ranking, which take into account physical infrastructure, bureaucracy and corruption. But when it comes to quality, cost and availability of skilled labor in Asia, the Philippines and India rank highest" (Political and Economic Risk Consultancy, Ltd. As cited by Far Eastern Economic Review, 1999). To maintain the competitive edge of the Philippines in the light of the growing importance of trade in services is to invest in human capital.

II. Role of Professional Services in the Economy

The services sector of the economy covers the non-agricultural and non-industrial productive and distributive activities in the transportation, communication and storage, trade, finance, real estate, private services and government service industries. The share of the sector in national income is quite substantial and has been increasing over the years. In 1983, about 38 percent of the gross domestic production came from the services sector, and in 1997, its share jumped to over 46 percent. The sector, which is a major source of employment for the country's labor force, absorbed almost 40 percent of the total employed persons in 1997. In addition, the service industries are becoming major players in international trade. The share of exports of the services sector is quite substantial and has been estimated to be close to 35 percent of total trade in 1994 (Perspectives on MAPA, 1996).

It is projected that "demand for white-collar services that can be performed offshore will soar over the next decade. Not only jobs will migrate, but countries with skilled low-wage workforces can grab a piece of the pie" (Far Eastern Economic Review, 1999).

Employment of Professionals in the Non-Agricultural Sector

This section gives some statistics on employment trends for professional workers in the non-agricultural sector gathered from the quarterly census of the LFS (Labor Force Survey). Professional workers are defined here using the categories used in the labor survey – professional, technical and related workers; and administrative, executive and managerial workers.

As shown in Table 1, the employment share of professional workers in the non-agricultural sector has been steadily declining, although slowly, over time. From

a high of 14.74 per cent in 1982 at the start of the liberalization period for the Philippines, it steadily fell to 11.87 percent by 1988. Despite the sudden increase by the end of the 1980s, the employment share of professionals to non-agricultural employment has not changed dramatically remaining at around 12 to 13 per cent at the beginning of the 1990s.

An analysis of Table 2 will show that production and related workers continue to be the dominant occupation of workers in the non-agricultural sector both in the 1980s and 1990s. They account for almost 40 per cent of the share in total non-agricultural employment. They are followed by sales workers accounting for almost 20 to 25 per cent share of total non-agricultural employment. Closely at third are service workers and professional workers accounting for 12 per cent to 16 per cent share of total non-agricultural employment.

The small proportion of professional workers in non-agricultural employment show signs of the inadequacies of the economy to absorb labor force participants that are highly-skilled and with higher educational qualifications. This gap between the supply of graduates from educational institutions, on one hand, and the demand of the labor market, on the other hand, forces many of our skilled and educated workers to search for employment overseas. However, in many occupations where Filipino professional workers are employed, the qualifications of these workers are sometimes questioned. The quality of education received in the Philippines may not be at par, or may be perceived as not up to par, to the standards of the foreign countries.

III. General Agreement of Trade in Services (GATS)

The expansion of global trade is one of the main objectives of the establishment of the World Trade Organization in 1996. To this end, two major agreements governing international trade were constituted. The General Agreement on Tariffs and Trade (GATT) guides the global trade of goods, while the General Agreement on Trade in Services (GATS) establishes the rules for the international flow of services.

The General Agreement on Trade in Services (GATS) has laid down the general legal framework that would govern the promotion of global trade in services. It consists of a set of rules limiting the intervention of governments and other institutions in the global trade in services by removing hindrances to market entry and providing equal treatment of foreign service providers.

A key mode of supply of services is the movement of workers and professionals from one territory to another to supply various forms of services. In turn, this avenue for enhancing global trade in services may be facilitated or obstructed by the degree and levels of obstacles among countries in accepting the competence of these foreigners to perform the service.

An important component of the agreement is the section on specific commitments of member countries on market access and national treatment. Market access refers to the lifting of various forms of limitations on the number of service providers, value of service transactions, number of persons employed by service

providers, value of foreign capital, and the restriction or requirement on a specific type of legal entity in establishing a supply provider. Member countries with market access commitments are prohibited by Article XVI Section 2 to maintain the above mentioned limitations and restrictions. National treatment, on the other hand, refers to the non-discrimination in the treatment of non-local service and service providers (Tullao, 1999a).

Acceding countries to the GATS are committed to observe several obligations including among others, non-discrimination and transparency. Non discrimination or most favored nation treatment requires that “countries shall not discriminate in the extension of concessions to all signatories of the agreement,” while transparency calls for the publication and dissemination of all relevant laws and regulations regarding the conduct of trade in services in member countries.

Upon accession, member countries are required to make commitments along the four modes of supply; and identify their limitations on market access, limitations on national treatment and additional commitments. The four modes of supply, such as cross border, consumption abroad, commercial presence, and presence of natural persons, describe the alternative manner trade in services can take its form as defined in Article I of the agreement. Cross border refers to the supply of service from one territory into another territory. Consumption abroad is the purchase by foreigners of services in the territory of another country. In the case of commercial presence, the service providers are present in the territory in which they supply the service through the establishment of offices, branches, agencies, joint ventures and other forms of equity participation. Presence of natural persons, on the other hand, refers to the entrance and temporary stay of the individuals into the territory of another country to supply services (Tullao, 1999a).

The Philippines is one of the 45 member countries in the category with the highest number of commitments with at least 80 committed sectors for liberalization. To date, there are 134 countries that have acceded to the GATS.

On horizontal commitments, the Philippines has limited the market access in all sectors under the supply mode of commercial presence. In addition, there is also a limitation in the acquisition of land. An important limitation in market access that was scheduled in the supply mode of presence of natural persons is the labor market test. ***“Non resident aliens may be admitted to the Philippines for the supply of a service after a determination of the non-availability of a person in the Philippines who is competent, able and willing, at the time of application, to perform the services for which the alien is desired.”*** The Philippines is required by WTO to review this labor market test within two years after entry into force of the Agreement in the country.

For sector-specific commitments, the Philippines has committed the transport services including the sub-sectors on maritime transport services, air transport services, road transport services, rail transport services, the communications services including courier services and telecommunication services, the financial services including banking and insurance, and the tourism sector. The country has not made any commitment in business services including professional services.

In the ASEAN, the process of liberalizing trade in services is being directed by the Coordinating Committee on Services (CCS) that formulated an “Alternative Approach to Liberalization of Services in ASEAN”. The objective of this plan is to set the long term target for liberalization of services through a free flow of services by 2020.

The plan is quite ambitious since it covers all services sectors and sub-sectors as defined by the WTO with the exclusion of the exercise of governmental authority. The free flow of services across regions will be achieved through national treatment of services and service providers and the elimination of barriers to market access in the four supply modes. Examples of liberalization measures include commitments beyond GATS, binding of existing regimes, liberalization of current restrictions, harmonization of requirements, and the Mutual Recognition Agreement (MRA). Mutual Recognition Agreements (MRAs) are recognized under the Framework Agreement on Services (Article V). These bilateral or multilateral arrangements pertain to the process and conditions of accepting and recognizing qualifications of foreign professionals in terms of education, experience, licensing or certification, obtained in their home territory for licensing, certification and practice in a host territory.

As a consequence of this plan, several concrete actions need to be pursued. These include sector identification, identification of appropriate modes of supply, identification of barriers per mode of supply, harmonization, and process of reciprocity. Sector identification, in turn, will depend on several sectoral characteristics including, among others, sectoral interests, readiness to bind existing regime, degree of competitiveness, existing regime of liberalization, pending liberalization measures, and existing cooperation activities.

In reviewing the country’s commitments, there is a need to look for inconsistencies between local laws, regulations and procedures and that of the major GATS obligations on non-discrimination, domestic regulation, recognition, market access and national treatment. Currently, the most compelling factor preventing the commitment of professional services under the GATS rule is the nationalistic constitutional mandate, “ *the practice of professions in the Philippines shall be limited to Filipino citizens, save in the cases prescribed by law*” (Art. 12. Sec.14). Amending this provision of the Constitution at this time may be difficult, although there are discussions along this line; but the most practicable alternative is to introduce legislation that will make liberal exemptions to the constitutional provision. This route is being used by the Department of Labor and Employment as it proposes a legislative measure to amend Article 40 of the Labor Code of the Philippines. The proposed amendment is being made to answer the instruction of WTO for the Philippines to review its labor market test rule in accepting foreign workers in the country.

One major result of the implementation of the GATS is the tremendous expansion of global trade. The Philippines is bound to benefit from this expansion because the country has sufficient supply of productive and skilled workers in the services sector. To maintain this competitive edge, there is a need to upgrade human resources through various forms of investment in human capital. The succeeding

sections of this study contain an evaluation of the process of human capital formation in the country from formal education to continuing professional education.

IV. Education, Development and Liberalization

Education and Economic Development

The initial empirical research on the relationship between education and economic development was centered on the contributions of education to economic growth. The seminal works of Schultz, 1961 and Denison, 1962; 1967 tried to account for the unexplained “residual” growth left when all other changes have been accounted for (i.e., hours worked per year, and physical capital). The contribution of increased education of the labor force to economic growth was found to be the unexplained residual growth factor.

Developed country estimates have placed the contribution of education to output, from a low of 2 percent to a high of 25 percent. Similar estimates by the World Bank for developing countries also suggest a wide variation of educational contribution ranging from 1 to 16 percent. Based on Schultz’s study, estimates of education contribution are within the 12 to 23 percent range (Psacharopoulos and Woodhall 1985). These studies suggest that, for all their limitations, countries have indeed achieved high economic growth with large investments in education. In addition, Easterlin (1981) examined data for 25 of the world’s largest countries and concluded that the spread of technology depended on the learning potentials and motivation that were linked to the development of formal schooling; in other words, that the most likely causal link is from education to economic growth, not the other way around (Psacharopoulos 1988).

Manpower Forecasting

Attributed largely to the pioneering work of Frederick Harbison and Charles Myers (1964), and Bowles (1969), the idea of forecasting manpower requirements came from their striking observations regarding the correlation between a country’s level of economic development and its level of educational attainment and drawing inferences from this relation. Thus, by forecasting manpower “requirements” educational planners can plan the expansion of the educational system to meet the future needs of the economy for different types of middle- and high-level manpower (Snodgrass 1996).

In short, the forecasting model is based on a set of fixed relations between the anticipated growth in output and the educational or skill requirements to produce such output. Forecasts of the derived demands for educated labor have not always proven reliable, particularly at the level of specific occupations and technical specializations which educational administrators find most useful. Even projecting the overall distribution of enrolment demands among primary, secondary, vocational, and higher education has proven difficult (Psacharopoulos and Woodhall 1985; Schultz 1988). This is not surprising: technological changes and their implications for the demand for skills have been too elusive to predict (Psacharopoulos 1988).

Although models of manpower requirements have lost favor among economists, this perspective retains considerable followers among policy makers and other practitioners. Manpower forecasts are still used in many parts of the world for setting long-term quantitative targets for educational system. Models of manpower requirements are useful in providing an objective description of the economic scarcity of specific skills that the educational system contributes to produce. It also provides information where priorities can be set with the goal of maximizing returns from resources and distributing these returns to individuals equitably (Schultz 1988).

Human Capital Theory

The second perspective on the link between education and economic development emerged as a reaction to the limitations of manpower forecasting. A strong competing paradigm appeared in the form of human capital theory, as developed by Gary Becker and Theodore Schultz. Human capital theory is centered on the expenditures on education, seeing them as investments in human capital analogous to investments in physical capital. Studies have shown that earnings of individuals increase with additional schooling. Moreover, according to the human capital theory, education makes the individual more productive not only in the market place but also in the household. According to Welch (1970) and Schultz (1975), “education has a beneficial allocative effect or helps the individual to deal with disequilibrium situations.”

Extensive empirical work on this view suggests the existence of high rates of return to investments in most levels and forms of education. The research on rates of return appeared to indicate that the highest returns were generally earned on expenditures on primary education, which is contrary to the claim of the manpower forecasting approach that there are significant and high returns of investments in secondary and higher education. This finding emphasized the value of acquiring even modest amounts of education and that there are economies in scale (i.e., cost per pupil tend to decrease) in primary education than in secondary or higher education.

Several studies have calculated rates of return both on private investments in education and on the social rates of return. Private rates of return to educational expenditure were found to be exceptionally high, largely due to the huge premium attached to education’s impact on earnings. In addition, private expenditures to reap this premium are very low given the high prevailing levels of public subsidization on education.

However, widely accepted conclusions on the rates of return to investment in human capital have been subject to challenge. Paul Bennell (1996) has shown that the rate of return estimates published by the World Bank are derived from highly suspect data. In addition, David Lindauer (1995) has questioned how social rates of return in Africa can truly be high when substantial investment in education over a long period has not led to significant economic growth (Snodgrass 1996).

Endogenous Growth Theory

The third view on education and economic development is attributed to the work of Robert Barro and others who have investigated the determinants of economic

growth rates by fitting endogenous growth models to large cross-country data sets. Barro's work focused on the 1960-85 period and used primary and secondary-level enrolment rates in 1960 to measure "initial endowments" of human capital. However, a recent World Bank study by Lant Pritchett (1996) recalculated the Barro's model and found that greater accumulation of educational capital did not, in general, lead to faster economic growth. On the contrary, the coefficient on this measure of investment in human capital turned out to be negative and statistically significant.

A possible explanation for this result is that expanding education is unlikely to accelerate growth if other important conditions for growth are not satisfied (Snodgrass 1996). The Pritchett study was an affirmation of the consistency of his results with this view that while education is not a sufficient condition for economic growth to occur, it may be a necessary one. Birdsall, Ross, and Sabot (1995) have carried this interpretation a step further by arguing that an increase in the mean years of schooling reflects, strictly speaking, only an increase in the supply of educated labor. For education to boost the rate of economic growth, they say, demand for educated labor must also rise.

The experience of the East Asian economies is a classic example. Educational investments coupled and complemented by strong macroeconomic, agricultural, and especially export promotion policies in the East Asian countries have enhanced the demand for labor. In their own series of tests, Birdsall, Ross, and Sabot (1995) strongly emphasize the role of a higher degree of outward trade-orientation, particularly on the exports of manufactures. Developing countries start with the export of manufactures that are likely using low-skilled labor. However, as the range of goods and services exported becomes more sophisticated over time, demand for workers with higher education becomes more crucial.

The Phenomenon of Brain Drain

Because of the over-expansion of higher education in some countries a phenomenon called "brain drain" emerged. Brain drain occurs when domestic university graduates seek and find employment abroad. The reason for this is that these job opportunities can augment the private returns on higher education. This is a unique problem in the economics of education since the huge investments of government in higher education yield low social returns. The acquired skills in higher education which are supposedly utilized in the domestic economy are transferred abroad where their returns are reaped.

A number of economists have attempted to deal with the international "brain drain" problem. Scott (1976), Bhagwati and Partington (1976) have proposed a variety of tax-transfer schemes but the welfare implications of labor mobility between nations are unclear because the individual and state objectives may conflict. However, a coordinated international response to address this issue never materialized (Schultz, 1988).

The apparent excess demand for and over-expansion of higher education has been traced to the methods of financing higher education. Tuition fees are often minimal and the resulting public subsidies per student enrolled in higher education have become sufficiently large that there is little eventuality for the private sector to

undertake their own complementary higher educational services. In addition, some countries may be training more skilled workers than their labor market is likely to absorb. The obvious economic solution is to reduce the size of the public subsidy and allow student fees to cover a larger share of the costs of higher education. Scholarships and educational loans awarded on the basis of family means can still achieve re-distributive objectives (Hansen and Weisbrod 1969; Schultz 1972; Blaug 1973; Fields 1974a, 1974b; Psacharopoulos and Woodhall 1985; Tan 1985; World Bank 1986).

The study of Tullao (1982) traced the impact of international migration on the demand for nursing education in the Philippines. Because of high expected income differentials between the Philippines and the US, the possibility of migration increases the expected internal rate of return to nursing education, which in turn has enhanced the demand for nursing education in the 70's and 80's.

The Economics of Trade Liberalization

Studies have well documented the benefits from improved resource allocation and long-run efficiency brought about by trade policy reforms. However, the political economy of trade reforms have proven that policy makers are very much reluctant in implementing changes due to fear of excessive adjustments costs. Politicians, in particular, fear the anger and reprisal of owners of displaced resources especially when benefits are only realized in later years when they are no longer in power. As defined by Matusz and Tarr (1999), adjustment costs are the potentially disadvantageous short-run outcomes that might result from trade liberalization. These outcomes may include displacement in employment, reduction in the output of an industry and even loss of firm-specific human capital.

Trade Liberalization and Employment: The Evidence from Developed Countries

For developed countries several studies have investigated the output and employment impact of shifts in the volume and composition of trade. In general, empirical studies have suggested that, for the economy as a whole, the net effect of increasing exports and imports on employment has not been important in industrial countries (Baldwin 1994). A detailed study by the OECD (1992) using input-output analysis to decompose changes in output and employment by industry in nine OECD countries has found that trade in the 1970s and 1980s had a positive effect on employment for all countries, except for the United Kingdom.

Wood (1991, 1994) suggested that a more relevant approach, instead of static analysis using input-output methods, was to compute the amounts of factors required in the North (developed countries) to produce non-competing imports from the South (developing countries) using the factor input coefficients of the South. Using this method, trade liberalization would suggest a major impact on labor markets in developed economies. Wood estimates that increased trade between developed and developing countries have reduced the demand for labor in the manufacturing sector of the developed countries by an amount equivalent to 12 per cent of employment in the manufacturing sector.

However, as noted by Brenton and Sinclair (1997), there are a number of reasons why Wood's conclusions are questionable. First is the assumption that all manufactured products imported from the South have no substitute produced domestically in the North. Another issue relates to technology. If products from the South do not compete with those produced in the North, why should producers in the North adopt new labor-saving technologies?

Thus, the argument that trade is responsible for the loss of jobs of unskilled workers in the manufacturing sector of developed countries is far from convincing. Economists view the loss of unskilled jobs in manufacturing as primarily the result of technological change.

Trade and Employment: The Evidence from Developing Countries

Unskilled labor is relatively abundant in developing countries. From a general equilibrium framework based on Ricardo and Heckscher-Ohlin models, trade reforms in the goods market can lead to an increase in the overall demand for unskilled labor in the long run. However, trade liberalization could lead to short-run adjustment costs. The shift and reallocation towards higher production of goods that uses unskilled labor will lead to a reduction in the relative returns to the owners of capital, as well as, a reduction in returns to the owners of another type of labor-skilled labor in developing countries.

Similar to studies for developed countries, evidence on trade and employment linkages is also weak for developing countries (Harrison and Hanson 1999; Harrison and Revenga 1995). Anne Krueger (1983) and her colleagues hypothesized (not empirically tested) that moving towards a more liberal trade regime can lead to greater labor intensity in production (Harrison and Hanson 1999). However, the weakness of the study was that it did not directly estimate the short run adjustment costs from a policy shift towards a more liberal trade regime.

A World Bank study conducted by Papageorgiou, Choksi, and Michael (1990) has concluded that trade liberalization did not generally result to decreased employment even in the short-run. In addition, studies using partial equilibrium approaches have shown that trade reforms had a significant impact on the level of employment across manufacturing sub-sectors, but with almost no impact on real wages.

Using plant-level employment data in Chile, Levinsohn (1999) study showed that trade reforms in Chile had a significant yet modest impact on manufacturing employment. On the other hand, Revenga (1997), finds a moderate reduction in firm-level employment in Mexico following reductions in tariff levels and quota coverage. While changes in tariffs had no impact on employment, reductions in quotas had a relatively small impact. A similar study by Currie and Harrison (1997) for Morocco finds an even smaller impact of trade reforms on employment. Employment in most manufacturing firms was unaffected by tariff reductions and reductions in quota coverage.

The Complementarity Between the Economics of Trade Liberalization and Education

a. Theory

Lucas (1988) included human capital accumulation in models analyzing the pattern of production in closed and autarkic economy. Individuals acquire human capital by investing time in schooling when they are young, and the level of human capital they achieve depends on the time they spent on schooling activity. Across time, because of the human capital acquired by individuals the “stock of knowledge” by society increases. Thus, the representative individuals of each generation have higher levels of human capital than previous generations. On the production side, there is an imperfect substitution between workers of different levels of human capital (Falvey 1996).

Stokey (1991) extended the theory from an autarky to a small open economy. With international trade, a country’s comparative advantage in the model is then determined by its stock of labor of different skill levels of human capital. Since trade alters relative prices and wages in the small economy as what standard trade theory predicts, it also alters the returns on investments in human capital. This may strengthen or weaken the incentives for human capital accumulation. If the small country is sufficiently backward relative to the rest of the world, as seems the most likely scenario for a developing country, then free trade lowers the relative prices of goods produced by highly-skilled labor and hence reduces the returns to investment in that skill. The outcome is that the small country falls even further behind in terms of skill levels.

However, the small developing country can still potentially benefit from the higher human capital level of the rest of the world. Since the higher human capital in other countries can be treated as a foreign externality, it will be important to consider transferring the said foreign externality to the domestic market. According to Falvey (1996), since an externality that is associated with formal schooling activity is being considered, it would seem inadvisable to restrict the entry of inputs to that activity. Access to foreign educational materials and foreign educators, or even opening up trade in higher and professional education and services broadly interpreted, should not be restricted.

However, in the framework of Pissarides (1997), it is not the case that skilled labor lost out from trade liberalization due to a deterioration of the returns to their human capital skills, as what Stokey (1991) and Falvey (1996) theorized. Instead, according to Pissarides skilled labor gains from trade liberalization using similar linkages – trade liberalization enhances and increases returns to human capital. According to this framework, developing economies may gain by learning from the technology of industrial economies. Learning is faster when trade links the developed and developing economies. Thus, trade liberalization in a developing country leads to more technology transfers from the developed to developing economies.

The key assumption in this framework is that the transfer of technology requires skilled labor. When a developing country liberalizes trade, it experiences more technology transfers than before. As what Pissarides described it, “trade

liberalization moves the economy of the developing country on to a permanently higher level of technology.” Learning about the new technology and putting it to use in developing economies may increase the demand for skilled labor, which raises the returns to human capital, and at the same time, wages of skilled labor also rises.

The increase in the demand for skilled labor due to trade liberalization might also cause a temporary widening in wage differentials. The overall increase in labor demand associated with trade liberalization will have a larger short-run impact on the wages of skilled labor than on the wages of unskilled labor. The supply of skilled labor, and hence employment of skilled labor, also increases to match the higher demand.

b. Empirical Evidence

The complementarity between the economics of trade and education is a new research area, which relates the relation between the economics of trade reform and human resource development. What follows are initial research findings in this rapidly growing arena between trade and education.

Two recent literature supports the idea that more trade brings about more technology transfers. Coe, Helpman, and Hoffmaister (1995) find that the research and development (R&D) spillovers from the industrial countries to the developing countries are substantial. While, the study of Tan and Batra (1995) does not explicitly look at the implications of trade liberalization, they calculate the wage premium paid by firms that engage in R&D, and worker training in Colombia, Mexico, and Taiwan. Using firm-level data, they find that firms that engaged in technology-advancing activities paid all their workers a premium over and above the wages paid by other firms but that the premium paid to skilled workers far exceeded that paid to unskilled workers. Most importantly, Tan and Batra claim that trade liberalization increased the R&D activities of firms and the demand for skilled labor.

Robbins (1994, 1995b) examined data for Chile and Colombia. For Chile, he examined household data for 1957-92 and concluded that skilled labor did not suffer a relative drop in earnings after trade liberalization. Meanwhile, Hanson and Harrison (1994) examined plant-level data for 1984-90 in Mexico and they found that wage inequality increased after trade liberalization. They concluded that the most likely cause of the rise in wage inequality was the importation of skill-biased technology from abroad.

Craig and Epelbaum (1994) this time documented earnings dispersion during the late 80s in Mexico. Their result was that there was a rise in earnings dispersion in Mexico, and they traced it to a rise in the demand for educated workers resulting from the complementarity between skilled labor and investment in capital. Robbins (1995a) examines household data for Argentina, Costa Rica, the Philippines, and Taiwan (China) and also finds similar results. Trade liberalization increased the relative demand for skilled labor in virtually all cases.

c. **The Emergence of International Trade in Professional And Educational Services**

Over the past several years increasing attention has been paid to the issue of the emergence of international trade in professional and educational services. Attention was centered on some general issues including regulatory measures affecting establishment of professional services firms and the cross-border provision of supply of professional services (OECD 1997).

Mallea (1997), identified four particular and specific issues on international trade in professional and educational services which have cropped up as issues for discussions:

- (1). *Professional preparation.* According to Mallea (1997), professional preparation concerns matters of accreditation, certification and licensure. Accreditation is a form of quality assurance for programs and institutions; certification formally attests that an individual has met a certain standard of achievement; and licensure is the process whereby professionals are granted permission to practice. All three processes vary, sometimes considerably, from country to country and from profession to profession (Mallea 1997). And in all three there is growing support for the idea of greater convergence towards international standards and procedures (Mallea (1997); Lenn and Campos, 1997).
- (2). *Professional competency.* This second issue is also being highly addressed internationally. The discussion under this issue has focused on the setting-up of competency-based approach or standards used as basis in the design of undergraduate and postgraduate courses for any discipline, the development of industry-based competency standards, and the articulation of standards for professionals in every discipline.
- (3). *Continuing professional education.* A variety of professions are also addressing the question of whether continuing education should be voluntary or mandatory (Mallea, 1997). In the meantime, professions such as law, accountancy, architecture, and engineering are introducing training programs designed to update and expand the knowledge and skills of experienced professionals.

The impact of liberalization of trade in professionals services on the domestic economy based on the perceptions of various professional organizations were identified in Tullao's Liberalization of Professional Services (Philexport, 1998). The study highlighted the importance of continuing professional education as a positive response to liberalization. This recommendation was echoed by Pobre (Accountants Journal, 1997) in a paper that enumerated the negative impact of the entry of huge multinational accounting firms on the domestic players. He concluded that since the country has to proceed with the process of liberalization, it is imperative that Filipino professionals should upgrade themselves through continuing professional education.

- (4). *Quality assurance.* Concerns over quality assurance form as an integral part of international trade in professional services. Quality assurance have indeed evolved, and is increasingly being defined in terms of reciprocity and

international norms and standards by professional bodies, accreditation agencies, higher education institutions and multilateral and non-government organizations.

The four issues identified above are replete with implications for higher education and the ways in which professionally-oriented undergraduate and graduate programs in colleges and universities are conducted.

d. Some Initial Implications for Higher Education

According to Mallea (1997), the impact of international trade in education and training services for higher education institutions is being felt primarily in the areas of student recruitment, policy development, evaluation, and skills development.

The issue of what skills and competencies higher education graduates will need in order to function successfully in international contexts is also assuming a higher profile. Economists are stressing the need for highly-trained managers and for management teams drawn from diverse cultures (Thurow, 1992). The private sector is calling for increased personal and professional adaptability among graduates (Mallea 1997).

In a study by Nadurata (1998), it was shown that general knowledge is the most significant predictor of performance in auditing firms. She recommends the development of world-class outlook through updating of the curriculum and the use of an interdisciplinary approach to teaching. The same study showed that accounting and accounting-related knowledge were good predictors of CPA board exam results.

According to the International Federation of Accountants (IFAC) education committee, "A program of accounting education and experience must go beyond the traditional approach to accounting education, which has emphasized transfer of knowledge", with learning defined and measured strictly in terms of knowledge of principles, standards, concepts, facts and procedures at a point in time. Emphasis must be placed on a set of knowledge, skills and professional values broad enough to enable adoption to change. Individuals who become professional accountants should be characterized by a constant striving to learn and apply what is new. Although general education requirements vary greatly from program to program and from country to country, a portion of the education must focus on the development of general knowledge, intellectual skills, interpersonal skills and communication skills through a broad range of subjects that provide students with a grounding in arts, science and the humanities. A broad-based general education is critical to life long learning and provides the foundation on which to build professional and accounting studies.

In response, higher education institutions are creating new courses and programs, modifying their curricula, fostering alternative methods of delivery, all with the intention of improving international skills and competencies among their students.

V. Higher Education in the Philippines

Structure of Higher Education

Prior to 1994, all levels of education were under the supervision and regulation of the Department of Education Culture and Sports (DECS). In 1994 the educational bureaucracy was restructured with the subdivision of the DECS into three separate units. This change in the biggest government bureaucracy was an answer to the recommendation of the Congressional Commission on Education (EDCOM), and meant to make the delivery of educational services more efficient. The specific functions of the autonomous units were defined concentrating on the level of education that will enable these units to address relevant issues pertinent to their sphere of responsibility. Basic education became the sole responsibility of the original Department of Education Culture and Sports (DECS).

Higher education was assigned to the Commission on Higher Education (CHED) which was created under Republic Act (R.A.) 7722 or the "Higher Education Act of 1994". The role of CHED was further articulated under R.A. 8292 or the "Higher Education Modernization Act of 1997 that defined the relationship of CHED with state universities and colleges (SUCs).

The third educational agency which emerged from the reform is the Technical Education and Skills Development Authority (TESDA), which was created by R.A.7796 otherwise known as the "Technical Education and Skills Development Act of 1994". The purpose of this legislation is the provision of "relevant, accessible, high quality and efficient technical education and skills development in support of high quality Filipino middle-level manpower responsive to and in accordance with Philippine development goals and priorities" (R.A. 7796).

The formal educational system in the Philippines is composed of a three-tier structure. Pre-university schooling is only 10 years which is two years deficient compared to other countries in the region.

The number of higher education institutions (HEIs) has been increasing in recent years. There were only 809 HEIs in 1991, but in 1998 some 1,379 were registered with CHED. These institutions are classified into public and private schools. In 1998 private schools account for 81% of the total number of higher education institutions in the country.

Schools in the public sector are established by law and administered, supervised and financially supported by the government. Public higher educational institutions includes state universities and colleges (SUCs), CHED-supervised institutions, local universities and colleges, and other government schools. The SUCs were established by legislation have their own charters, and are independent from CHED. CHED-supervised colleges, on the other hand, are non-chartered colleges, directly under the supervision and budgetary control of CHED. Local universities and colleges are operated, supported and maintained by local government units (EDCOM Report, 1993).

It has been observed that the number of SUCs has been increasing rapidly over the years. There were only 23 such institutions in 1972 and their number grew by almost five-fold in the last 25 years reaching 107 in 1998. Because of the SUCs budgetary autonomy specified in their charters, a number of CHED-supervised colleges and some overgrown high schools are lobbying for conversion into state colleges. It is estimated that SUCs account for 77% of the budget allocation to higher education in 1998. This sizable share of public funds together with the wide variability of cost per student among SUCs as well as the resulting inefficiencies are major concern for both educators and policy makers. These issues are further aggravated by the Higher Modernization Act of 1997 which has given the SUCs the power to establish autonomous campuses. This legislation allows further increases in SUCs budget requirements, as well as, threatening the feasibility of existing private HEIs in the locality (Tullao, 1998b).

Private higher education institutions, on the other hand, are established in accordance with law, and duly authorized to operate educational courses by CHED. They are owned by private persons or corporations, and source their funds for operations principally from tuition and other student fees (EDCOM Report, 1993). Because these schools are privately funded, they enjoy financial autonomy as well as flexibility in the implementation of curricular programs, and in the selection of teachers and students (Tullao, 1993). Private schools are further classified into sectarian and non-sectarian schools. Sectarian schools, which are administered by religious sects, have gradually increased in the 1990s registering modest growth from 225 in 1990 to 288 in 1998. On the other hand, non-sectarian schools have doubled in number since 1990 reaching 825 in 1998.

Private schools are also categorized into non-stock/foundation and stock institutions. The former consists of non-profit institutions where share of ownership is not sold, and where surplus are reinvested back to the institutions. Stock institutions, on the other hand, are proprietary businesses that distribute dividends to stockholders (World Bank, 1988 as cited in the EDCOM Report, 1993).

In terms of geographical distribution, many public higher education institutions are concentrated in Region VI (43), Region IV (32), and Region V (26). On the other hand, most private higher educational institutions are operating in the National Capital Region (NCR) with 209 institutions, Region IV (142), and Region III (117).

Student Enrolment

Seventy five percent of all students in higher education are enrolled in private educational institutions. Programs in business administration and related courses have consistently attracted the bulk of students in higher education. Almost 35 % of the 2.2 million students in 1996-97 were enrolled in commercial and related studies. Engineering, teacher education and medical and related programs are the other leading program offerings.

The enrolment trend and over-subscription in business administration, engineering, teacher training, medical sciences and liberal arts continue to persist over the years. This trend is reinforced by the fact that SUCs have amended their charters

to establish programs similar to programs offered by private schools. Graduate education, however, remains small and concentrated in some disciplines in liberal arts, teacher education, and business management. Geographically, almost 31% of the students in higher education in 1996 were enrolled in NCR schools.

Faculty

It is estimated that there were 80,585 teachers in higher education institutions all over the country in 1996-97. Several studies on higher education in the Philippines have revealed the relative academic inadequacy of teachers. A little over 7% holds doctoral degrees while 25 % holds master's degrees. Thus, almost two out of three of all tertiary level teachers in the country do not have advanced degrees. Many of them are overworked carrying a normal teaching load of more than 30 units per semester. Worse, some of them are teaching in several colleges and universities on a part-time basis. By international standards, a 12-unit teaching load per semester is considered the maximum that a professor can carry if he has to fulfill other academic functions. There are very few universities in this country that give this normal teaching load to their faculty members.

Lack of Research Activities

In the field of research, the situation in many educational institutions is very discouraging. Many teachers do not have the necessary qualifications to conduct independent studies, and as a consequence there is hardly any research activity going on in local colleges and universities. Even if the faculty members are qualified to conduct research, they are not given sufficient time to do research and related studies. Because of the heavy teaching load they can hardly do anything beyond academic instruction. In addition, given the high cost of research, schools allot a miniscule, almost insignificant, amount for research activities (Tullao, 1999b).

If there is any research activity going on in schools, these are concentrated in thesis writing and other activities toward the fulfillment of requirements in graduate programs. Very few teachers are publishing their research outputs in journals, whether domestically or internationally.

A survey of higher education researches from 1975 to 1996 conducted by Bernardo (1998) revealed the following trends: 1) higher education research is conducted mostly by graduate students as a degree requirement; 2) many researches address three broad topics which could be considered highly 'researchable' but not always significant; 3) most other topic areas receive only a moderate amount of research attention; 4) some very important problem areas are virtually ignored by higher education researchers; 5) most researches generate descriptive data on matters of limited scope; 6) very few researches attempt to develop, validate, or apply theories relating to higher education concerns; 7) most researches address very narrow concerns and use very confined designs and restricted samples; and 8) recently, large research institutions and organizations have been conducting large-scale, integrative research studies on many important issues facing higher education.

Another important reason for the lack of research activities in several colleges and universities is the relative underdeveloped graduate programs in various

disciplines. The faculty of many graduate schools have neither world-class academic credentials nor impressive track records in the conduct of research (Arcelo, 1998). The research culture in a university is nurtured to a great extent by the presence of well-developed graduate programs. Usually professors conduct research by organizing teams and assigning researchable topics to their graduate assistants and students. As a consequence many of the published works of university professors in advanced countries are collaborative efforts of mentors and their apprentices (Tullao, 1999b).

However, there are several constraints that inhibit the growth of research in graduate schools in the Philippines. One, both the faculty and students are in the graduate school on a part-time basis. As a result, the professors are not doing any research while students are doing research mainly to fulfill degree requirements.

Second, the graduate programs in this country are concentrated in two fields: education and MBA programs. There are very few graduate programs in other disciplines. In the field of business, because the MBA program is geared towards the honing the practitioners' ability and skills in management, research-orientation is not emphasized. In order to address this issue, the CHED has formulated policies and guidelines for the strengthening of graduate programs. Under this approach, graduate programs are guided towards combining instructional tools and research capabilities so as to provide new lines of inquiry. In addition, the implementation of various projects for the development and strengthening of graduate programs was also intended to increase access to graduate education.

Third, funding for research is another problem that has to be addressed. Since many higher educational institutions are privately-funded, it is very difficult to finance research activities particularly in the sciences. The private character of higher education coupled with the demand for higher education that places a heavy premium in teaching have discouraged many higher education institutions to put their resources in research activities. Even in the public sector, majority of the SUCs is spending only up to 5 percent of their total budget for research.

Research is not a priority in many private educational institutions because there are no immediate and tangible returns compared to instruction. The risks are huge and research costs are tremendous. In an environment where education is privately financed, it is very difficult to rationalize a huge expense with no immediate results to those who pay the tuition (Tullao, 1999b). Because of the prohibitive cost of maintaining research activities, the research infrastructure of many colleges and universities is rather weak.

At the national level, funding for research in the Philippines is highly limited because only a small percentage of gross domestic product (GDP) is spent for research and development. Funds, however, are available from a few government agencies (e.g. Department of Science and Technology for science-related projects, CHED for education-related projects, etc.), international agencies such as UNICEF and the World Bank, and the development agencies of foreign countries. A lot of funds earmarked for research are not utilized, however, because academicians are not aware of their availability, they do not know how to prepare research proposals, or they are not capable of managing research projects (Arcelo, 1998).

In line with the development of research culture in higher education institutions, CHED has conducted a massive dissemination campaign on the National Higher Education Research Agenda (NHERA) to engage higher educational institutions to undertake research. The establishment of NHERA was intended to ensure that the quality of tertiary education will improve significantly since this will involve a series of consultations, discussions, meetings and conferences among leading educators, research experts, educational planners and policy makers, business and industry managers both from the public and private sectors.

Indicators of Quality

The trend in the number of graduates of higher education follows the direction of the enrolment in higher education. The numbers of graduates have steadily increased in recent years with close to 80% coming from private higher educational institutions. Business programs produced the most number of graduates followed by medical and allied disciplines, engineering programs and teacher training. In terms of geographical distribution, the NCR maintained its top position for producing the highest number of graduates among all the regions.

In terms of the performance of graduates in national licensure examinations, the average passing percentage from 1992-1997 was recorded at 41.76 percent. The programs with the top 5 average passing rates for the period 1992-1997 are landscape architecture (87.14%), medicine (79.16%), pharmacy (64.96%), nursing (64.96%) and metallurgical engineering (57.20%). The programs with bottom 5 average passing rates are custom broker (11.27%), accountancy (15.51%), master plumbers (17.78%), aeronautical engineering (23.49%), and dentistry (23.70%).

The low average passing percentage has raised concerned from some sectors especially those receiving public funding. If less than half of the graduates of higher education institutions can pass the licensure examinations, schools are not doing a good job in preparing them. Worse, they may be wasting public money educating thousands of students who are likely to fail in professional licensure exams. There are, of course, other factors including the interest of professional organizations that may affect the failure of so many graduates.

Number of HEIs with accredited programs

Higher education institutions that intend to improve the quality of their program offerings may decide to go through voluntary accreditation where they undergo self-evaluation and peer evaluation. Institutions whose programs are accredited are given incentives and priority funding assistance and greater independence in curriculum development and setting tuition fees. Institutions which have already attained Level III accredited status for arts, sciences and for 3 other professional courses are allowed to open and operate new courses in any field without prior approval from CHED provided they meet the minimum requirements of the CHED (Biglete, 1998).

According to the Federation of Accrediting Agencies of the Philippines (FAAP) only 37 programs have attained Level III accreditation, 102 undergraduate

programs were granted Level II accreditation and 42 undergraduate programs attained Level I in 1996. In the graduate programs, 13 have attained Level II and 13 have received Level I accreditation. Combining all these undergraduate programs at various levels of accreditation will yield only 181 programs. Does it mean that only 14 percent of higher education institutions have some form of accreditation? This figure is even overestimated since several of these accredited programs are given to the same higher educational institutions.

Center of Development/Excellence

The Higher Education Act of 1994 provides for the identification, support and development of potential centers of excellence among higher education institutions (HEIs). The need to identify centers of excellence is important since these institutions will serve as the foundations for the development of higher education in the country. The centers will provide necessary training and adequate research for continuing the programs being implemented and at the same time identify the needs for further development.

The CHED has constituted technical panels for different disciplines and program areas as provided for by Section 12 of RA 7722. These technical panels in 9 clusters of disciplines have assisted CHED in setting up academic standards and in the monitoring and evaluation of programs and higher educational institutions. They were given autonomy to revise the curricular offerings and structure of tertiary education. The selection of centers of development/excellence is one of the tasks that the technical panels have accomplished.

The identification of the centers of excellence and development was based on the schools' previous performance and present goals. Specifically the criteria for selection are based on: (1) accredited level 2 or 3; (2) highly educated, professionally qualified and experienced faculty to philosophy, mission, vision and goals of the institution and education; (3) well-selected students; (4) adequate library, research and facilities; (5) competent administrative and support staff; (6) well-planned and relevant instructional programs; (7) adequate student development programs; (8) relevant extension service and outreach programs; and (9) percentage of graduates who become teachers.

The role and responsibility of the identified centers is to meet international academic standards by focusing on research undertakings in order to further update and improve the system. In addition, these institutions are asked to extend their services to other HEIs through technology transfer, industry linkages, sharing of expertise, technical assistance, training and scholarships.

In the field of teacher education, business education, science and mathematics education, engineering and architecture, medical education, and nursing education, only 59 higher educational institutions were identified as centers of excellence and centers of development. This is only one-third of the number of accredited programs identified by FAAP. It also constitutes a little more than 4.5% of the total number of HEIs in the country today.

Of these 59 HEIs, only seven institutions have nine or more programs granted Center of Excellence and Center of Development status. These are UP-Diliman, University of Santo Tomas, Mindanao State University-Iligan Institute of Technology, De La Salle University-Manila, University of San Carlos, Xavier University, and St. Louis University. This implies that these schools have a variety of program offerings and exhibit potentials for academic development.

The schools with the most number of programs cited as centers of excellence are UP-Diliman (9); De La Salle University-Manila (7); University of Santo Tomas (5), Ateneo de Manila University (4), UP-Los Banos (3), MSU-Iligan Institute of Technology (3); These schools have consistently shown the research capability of their academic programs. These universities, however, constitute only 3 percent of FAAP accredited program and 0.46 percent of the total number of HEIs in the country today.

VI. Curricular Programs and Licensing Requirements of Selected Professions

Accountancy Program

The accountancy program offered in Philippine schools is comparable with similar programs offered in countries in the ASEAN region. The minimum units required by the Commission on Higher Education to complete the course consist of 144 credit units although the Board of Accountancy is requiring 165 units as spelled out in the accounting law. General education courses make up some 40% of the subjects while 60% constitute the professional courses.

To obtain a license in the Philippines, a graduate of an accountancy program must pass the CPA licensure examination given by the Board of Accountancy. The examination covers the following areas: Theory of Accounts, Business Law and Taxation, Management Services, Auditing Theory, Auditing Problems, and Practical Accounting Problems 1 and 2. The Professional Regulation Commission (PRC) supervises and regulates the practice of various professions in the Philippines including the accountancy profession. A Board of Accountancy, under the supervision of the PRC, controls the licensing processes of CPAs.

Sample schools in Thailand and Indonesia require students to take at least 142-144 units to finish an accountancy program. One of the leading schools in the Philippines offering an accountancy program requires the completion of at least 209.5 units, where 60 units are devoted to major accounting subjects and another 69 units for business professional subjects. A sample school in Indonesia allocates 65 units out of the 144 units for accounting subjects while a school in Thailand devotes 54 units for major accounting required, elective and free elective courses.

One strong component of the Accountancy program of Singapore is the incorporation of professional exposure with industry and a submission of an applied research project in the final year of study. Similarly, a sample school in the Philippines requires students to complete 120 hours of practicum work with the top auditing firms in the country. In addition students are required to come up with a

research project or a feasibility study. Indonesian schools require visits to business organizations.

Renewal of the professional license in the Philippines is set every three years and requires the completion of 60 continuing professional education (CPE) units given by accredited bodies. The requirement of completing CPE units was borrowed from American practice. The Illinois Public Accounting Act, for example, requires the completion of 120 hours of continuing professional education within a three-year licensing cycle prior to the renewal of a CPA license. Courses must be taken from bodies registered with the Department of Professional Regulation.

In Singapore, the Institute of Certified Public Accountants is the official accounting body responsible for all matter pertaining to the practice of the accounting profession. It administers the licensure examination and maintains a register of qualified accountants. The Public Accountants Board, on the other hand, is in charge of the regulation of the profession. In Brunei, it is interesting to note that there is no rule or a policy that has been issued by either a professional body or a government agency on the regulation of the practice of the accountancy profession. In Indonesia, the profession is regulated and monitored by the Ministry of Finance. The Indonesian Institute of Accountants is the organization recognized by the government responsible for establishing and reviewing accounting and auditing standards as well as the accountant's code of ethics. In Malaysia, the Malaysian Institute of Accountants (MIA) and the Malaysian Association of Certified Public Accountants are recognized and empowered by the government to regulate the profession. They have the power to investigate and take disciplinary action on complaints filed against any of its members (See Appendix B for a comparison of various programs in the ASEAN).

Civil Engineering Program

To prepare graduates for professional practice in the field of civil engineering in the Philippines, the Commission on Higher Education requires a minimum of 54 units for technical courses, 58 units in professional/allied courses, 12 units of electives and 36 units of non-technical subjects. Completion of the degree requires a total of 160 credit units. Passing a licensure examination in civil engineering given by the Board of Civil Engineering to graduates is a requirement for professional practice. The examination covers the following areas: Mathematics and Surveying, Design and Construction, and Hydraulics.

In Malaysia, to be eligible for a bachelor's degree in civil engineering, a student is required to earn a minimum of 127 credit hours. In Thailand, the academic program includes 41 credit units devoted for general basic courses and basic courses in science and mathematics, 103 credits for engineering courses and 6 credits for free elective courses. In Indonesia, the number of credit units required to earn a degree in civil engineering is 148 units, which is divided into 63 units for common basic components and 70 units for skills components. In Singapore, the academic training courses include structural mechanics, theory of structures, steel and reinforced concrete design and detailing, mathematics, applied science, soil and fluid mechanics, foundation engineering, environment engineering, transportation engineering, construction technology, computer programming, computer-aided drafting, contract administration, project management and communication skills.

Teacher Education Program

The minimum course requirements set by CHED for the bachelor degrees in elementary education and secondary education are 149 and 152 academic units, respectively. The curriculum in elementary education is broken down into 68 units of general education, 51 units of professional education and 24 units in area of concentration. A sample school in the Philippines requires the completion of 211.5 to 248.5 credit units to graduate from a bachelor's degree in secondary education.

In 1994, the Philippine Teachers Professionalization Act was passed to strengthen the regulation and supervision of the practice of teaching. A Board of Professional Teachers was constituted to conduct regular licensure examinations. The examination for elementary teachers covers professional education and general education, while the coverage for secondary teacher includes professional education, general education and field of specialization.

In Malaysia, to obtain a bachelor's degree in education, completion of 150 academic units is required. In Thailand, the four-year teacher program requires no less than 140 credits. Practice teaching is a common component in the curriculum in teacher training programs in Malaysia, Singapore and the Philippines.

Mechanical Engineering Program

To provide quality mechanical engineering education for global competitiveness, the Commission of Higher Education in the Philippines requires a student to complete a minimum of 72 units for basic courses, 33 units for basic engineering sciences, 38 units for allied courses and 38 units for professional courses and 14 units of miscellaneous courses. The school is given the option to have either plant inspection programs or on-the-job training programs whichever is applicable. Professional practice requires the passing of a licensure examination given by the Board of Mechanical Engineers. The examination covers the following fields: Power and Industrial Plant Engineering, Mathematics, Engineering Economics, Basic Engineering Sciences, Machine Design and Shop Practice.

In Indonesia, the curriculum consists of 152 credits units divided into 12 credits for general science courses, 2 credits for selective science courses, 22 credits for basic skill courses, 36 credits for special basic courses, 55 credits for skill courses, and 25 credits for additional courses. In Thailand, completion of 148 credits is required to finish an undergraduate course in mechanical engineering. The total credit units is subdivided into 41 credits for general basic courses and basic courses in science and mathematics, 101 credits for engineering courses and 6 credits for free elective courses.

Electrical Engineering Program

The minimum course requirements for the degree of Bachelor of Science in Electrical Engineering as specified by the Commission on Higher Education in the Philippines consist of 21 units for languages and humanities, 15 units for social sciences, 3 units for mandated courses, 26 units for mathematics, 10 units for

natural/physical sciences, 41 units for basic engineering courses, 62 units for professional and allied courses and 14 units for miscellaneous courses. Professional practice requires the passing of a licensure examination given by the Board of Electrical Engineering. The examination covers a detailed subdivision of Mathematics, Engineering Sciences and Allied Fields and Electrical Engineering Professional subjects.

In Thailand, the total credit requirement consists of 150 credit units. Compulsory courses for all majors account for 94 credits, 12 credits for technical elective courses for general electrical engineering majors and 12 credits of compulsory technical courses for majors in either telecommunication or power system.

Industrial Engineering Program

A sample school in the Philippines requires the completion of 210 units to earn a degree in industrial engineering. The total number of units is divided into 18 units for languages, 23 units for mathematics, 8 units for physical education, 12 units for religious studies, 18 units for social sciences, 32 units for basic engineering sciences, 16 units for natural sciences, 71 units for professional courses, 12 units for technical electives. Licensure examination is not required for individuals to practice this profession in the Philippines.

In Thailand, completion of 150 credits is required to finish the program. General basic courses account for 44 credit units, while 100 credits are allocated for engineering courses and 3 credits for free elective. In Indonesia the number of credits to be earned to complete the program is 152 credits. The emphasis of the curriculum is focused on industrial systems such as manufacturing industry.

Nursing Program

The minimum units prescribed by the Commission on Higher Education in the Philippines for the completion of the nursing program is 153 to 159 units. The total number of units is subdivided into 73 units for general education, 72 units for nursing and 8 units for physical education. Passing a licensure examination given by the Board of Nursing is required for graduates of a bachelor's degree in nursing to practice the profession. The examination covers the following areas: Promotive Care, Preventive Care, Curative Care, and Rehabilitative Care.

In Thailand, a sample school of nursing requires 142 credits to finish the course. The total number of units is subdivided into 36 credits for general education, 28 credits for pre-professional education, 72 credits in professional education and 6 credits for elective courses.

Architecture Program

A sample school in the Philippines (USC) offers a BS Architecture program that covers the three-year building construction program plus two or more years of higher studies in architectural theory and design. A two-year practicum is built in into the program. In the fifth year, a range of electives is offered together with the

completion of an undergraduate thesis. A license is required for the practice of architecture in the Philippines. The Board of Architecture supervises the licensure examination which covers the following areas: Architecture Design and Planning, Structural Design and Utilities System, Architectural Practice, and History of Architecture.

In Thailand, the academic program requires the completion of 171 units. The curriculum is divided into 45 units for core courses, 90 units for major required courses, 3 units for major elective course and 3 units for free elective course. In Indonesia, the credits required are 144 (SKS) to be completed in 8 semesters. Architectural design is the most important course, supported by other courses such as environment science, construction structure, history and theory of architecture, city planning, community planning, construction economics, professional practice and others.

Law Program

In the Philippines, the Commission on Higher Education requires the completion of a minimum of 134 units to earn a degree of Bachelor of Laws, which is a post-baccalaureate degree. In addition, no school shall require more than 152 units to earn a bachelor's degree in law. Passing a licensure examination given by the Supreme Court is required for admission to the bar and professional practice. The practice of law is not under the supervision of the Professional Regulation Commission.

In Thailand, legal education requires the completion of 148 units. Basic courses account for 33 units, 91 units for core courses, 18 units for major required courses, and 6 units for major elective courses. In Indonesia, the academic program consists of 1 credit for general courses, 47 credits for basic legal courses, 36 credits for advanced courses, 17 credits for additional skill courses, 6 credits for elective courses, and 18 credits for improvement of legal skill courses.

Pharmacy Program

A sample school in the Philippines offers a four-year program leading to a Bachelor of Science in Pharmacy where instruction is focused on the three fields of the disciplines: community, manufacturing and hospital pharmacy. Passing a licensure examination given by the Board of Pharmacy is required for professional practice. The examination in pharmacy covers the following areas: Pharmaceutical Chemistry, Pharmacognosy, Practice of Pharmacy, Pharmacology, Pharmaceutics, Quality Assurance and Public Health.

In Thailand, the student must complete two years of basic science study and three years of professional study including 500 hours of pharmacy clerkship.

General Medicine Program

In the Philippines, the regular medical academic program, which is a post-baccalaureate degree, is at least four years consisting of three years of didactic teaching-learning activities and one year of practicum. At least 1.5 years is devoted to

basic biomedical sciences during the first and second years and 1.5 years devoted to clinical sciences during the second and third years of the academic program. The fourth year is devoted to full clinical clerkship. Passing a licensure examination given by the Board of Medicine is required for professional practice. The examination covers the following areas: Biochemistry, Anatomy and Histology, Microbiology, Physiology, Legal Medicine, Ethics and Medical Jurisprudence, Pathology, Pharmacology and Therapeutics, Surgery and Ophthalmology, Otolaryncology and Rhinology, Medicine, Obstetrics and Gynecology, Pediatrics and Nutrition, and Preventive Medicine.

In Thailand, a six-year medical program is divided into three phases: pre-medical phase, pre-clinical phase, and clinical phase. In the pre-medical phase students are required to take general courses in languages, humanities and social sciences. In the pre-clinical phase, students take the fundamental courses in anatomy, bio-chemistry, physiology, microbiology, pathology and introduction to clinical work and beginning clinical work. In the clinical phase the students are introduced to epidemiology, symptoms of diseases, diagnosis, treatment methods, and prevention.

VII. Continuing Professional Education

Continuing education encompasses practices and activities pertaining to the training of individuals after they have left the formal educational system. It includes continuing professional education and further non-formal and informal education and training (Edralin, 1999). It is part of a lifelong learning process intended to improve the adaptability and flexibility of the labor force to technological change. Sometimes continuing education is meant to provide better opportunities for individual development and restore and protect the employment prospects of particular individuals and groups (Edralin, 1999).

In the Philippines, the administration of continuing professional education is primarily a responsibility of the Professional Regulation Commission (PRC), together with the appropriate professional organization, as well as the Commission on Higher Education (CHED). Private companies also provide some forms of continuing education to their professional staff. The regulation of continuing professional education (CPE) in the country was instituted under Executive Order No. 266 in 1995 which mandates the completion of CPE programs as requirement for the renewal of professional licenses. The executive order further authorized the PRC to implement CPE programs adopted by the various professional boards under the supervision and control of the commission.

PRC requires that all licensed professionals must complete 60 units of CPE credits within three years for baccalaureate degree holders and 30 CPE credits for non-baccalaureate degree holders. Non-compliance means non-renewal of license and the possibility of de-listing from the roster of professionals authorized to practice in the Philippines. Based on the figures supplied by PRC at the end of 1998, some 141,362 professionals were given compliance certificates. The commission has estimated that only 23% of the total numbers of professionals have complied with the CPE requirement (See Table 8).

In the 521,400 teachers who have not taken any CPE units, are excluded from the list of professionals licensed from 1960 onwards the estimated compliance rate would be higher at 34 percent. Although this is a significant improvement over the estimated compliance rate of the PRC, it is nevertheless still low.

There are several reasons for the low compliance rate. One, some licensed professionals have transferred to various occupations that do not require a license to practice the profession. For example, many certified public accountants (CPA) are no longer in public accounting and have shifted to related fields like management accounting and finance. It is also possible that many of these licensed professionals are currently occupying top managerial positions where renewal of license is no longer necessary. The third reason is that the total stock of professionals has not been updated to account for mortality, disability and migration of professionals.

Under the CPE program, the Professional Regulation Commission allows professionals to earn credit units from a variety of programs and activities undertaken as part of their continuing professional education. These acceptable CPE activities include attendance and participation in seminars/conventions, completion of academic graduate courses, production of self-directed learning packages, authorship, invention, postgraduate/in service training, study/observational tour, delivery of professorial lectures and other approved activities (See Table 9).

Although there is a variety of activities that professionals may choose to fulfill CPE requirements, there is a bias towards participating in seminars and convention as shown by the inequitable allocation of credit units to various activities. For example, by participating in a whole day 8-hour seminar, a professional can earn CPE credits equivalent to the production of 8 technical papers or 8 articles published in professional journals or completion of 5 graduate subjects in the masters program, or 4 doctoral subjects or one year fellowship. In addition, a two-day seminar can give the professional higher CPE credits compared to his research or creative project. In terms of research, an article is preferred than a technical paper or a publication in a professional journal (Tullao, 1998c).

The outcome of these inequities in the valuation of CPE activities is the neglect of the more important components of continuing professional education. This reflects a parallel problem encountered in higher education where research and graduate education is de-emphasized. If continuing professional education will become relevant in updating professionals, there is a need to refocus CPE programs towards research, graduate education, inventions, and publications.

Professional organizations should have their own journals reviewed by national or international experts. They should also sponsor professorial lectures where their distinguished members or outside experts are asked to discuss topics of their expertise. Similar to the quest of higher educational institutions to make the research outputs of their professors published in international journals, professional organizations should encourage their members to publish in refereed international journals.

Refocusing of the CPE programs towards research and graduate education, in addition, may assist the development of higher educational institutions through the

improvement of their graduate programs as well as their research capabilities. Linking the development of research and graduate education in higher educational institutions, on one hand, and the improvement of CPE programs, on the other hand, should be explored seriously. The centers of excellence in various disciplines that have been identified by CHED can play a key role in improving current CPE programs. Since CPE is a requirement for renewal of licenses, the existing stock of professionals is a potential market for the graduate programs in various disciplines. If heavier credit units will be given to graduate programs offered by centers of excellence identified by CHED, the Continuing Professional Education program of the PRC can boost the academic capabilities of these centers of excellence, and in turn contribute to the improvement of higher education in the country.

Because of the heavier credit units given for attendance in seminars and conventions in the CPE programs and activities, a number of organizations and institutions have applied to the Professional Regulation Commission as accredited CPE providers. As of 1998, there are 1611 CPE providers, that include schools, professional associations and private companies, accredited by the PRC to conduct seminars and training programs in various professions (See Table 10). Sometimes competition among CPE providers has been stiff that some sectors have questioned the rationale of the CPE and others are clamoring for its removal as requirement for the renewal of a professional license.

Based on formal and informal consultations with key informants and leaders of various professional organizations, several options may be implemented in strengthening the CPE programs instead of removing it as a requirement for renewal of license as proposed by some sectors. A system of accreditation and promotion in the professional ranks may be instituted by professional organizations. Elevation to ranks will require more competencies as evidenced by acceptable outputs. Some professions are doing this practice including electrical engineers and various specialized fields in the medical profession.

Another avenue for the improvement of current CPE programs is to learn from the experience of the private sector in providing continuing professional education programs for their employees. Moreover, the program of the Department of Science and Technology of giving awards for best technical papers, research and outstanding young scientists can be integrated with the current practice of PRC and various professional organizations of giving awards to their outstanding professionals.

VIII. Absorption of Professionals

Domestic Absorption

Professional, technical and related workers account for almost 13 percent of the total non-agricultural members of the labor force. In 1998, some 2.168 million workers were estimated to be included in this group. The bulk of these professionals is concentrated in community, social and professional services industry group which absorbs 75% of the total professionals (See Table 11 and Table 12). Based on PRC data, there are some 1.850 million registered licensed professionals in the country as

of 1998 (Table 8). If only the number of professionals licensed since 1960 are counted, the adjusted stock of professionals is estimated at 1.75 million.

Although many of these licensed professionals could be working as professionals and holding administrative positions, it is not certain whether they are still in their respective professions where they were originally licensed. Assuming a 34 percent compliance rate in the continuing professional education, an estimated 419,000 professionals may be actively practicing their professions. If the more than half a million teachers are included, close to a million professionals would have been accounted for. Thus, another 1.2 million professional workers are either licensed professionals who have shifted to other occupations or other professionals who do not need a license to get a job like economists, IT specialists, non-accounting commerce graduates, graduates of arts, humanities, social and natural sciences and others.

After analyzing the supply side of professionals, we will evaluate the demand for professional services using the compliance rate for CPE as an instrument to indirectly measure demand. Another indicator of demand is the external market. Using data from POEA and PRC, we will determine the extent of external absorption of our professionals.

As mentioned earlier, the compliance rate for the CPE is relatively low as measured by the Professional Regulation Commission. There are several factors that may contribute to the low CPE compliance rate and non-renewal of professional license. These reasons may reveal how the services of professionals are utilized. One, many professionals, who have passed various licensure examinations in the past, are currently employed in other occupations or holding positions which do not need a professional license to practice. For example, many CPAs are no longer in public accounting; and they may be employed in related fields where renewal of a license is unnecessary. Another reason for the low compliance rate is the fact that as these licensed professionals climb the corporate managerial ladder, many of them will not need a renewal of a professional license to assume top management positions. These may possibly explain why licensed chemical engineers, CPAs, chemists and assistant electrical engineers have low CPE compliance rates.

On the other hand, professional electrical engineers, physicians, nurses and pharmacists have relatively high CPE compliance rates. For professions with well-defined professional career paths, compliance rate of those on the higher ranks of the professional ladder would be higher compared to the lower ranks. Those in the lower ranks would have more flexible professional options while those in the higher ranks would have limited options for inter-occupational changes. In addition, once a professional attains the apex of his career, it is assumed that he has been seriously pursuing the profession's career path by taking various examinations and CPE programs to attain and maintain his professional rank. As a consequence professional electrical engineers have a 71% compliance rate compared to a 19 % compliance rate of assistant electrical engineers.

Physicians also follow a clear and formal career path defined by their professional organizations. This may explain their relative high compliance rate of 40% compared to 22% for accountants and 17% for chemical engineers. Compliance

rates for other health professionals are also high like in pharmacy (57%) and nursing (40%). (See Table 13)

Moreover, the low CPE compliance rate and subsequent non-renewal of license in several professions may imply that many licensed professionals are using their licenses as an additional credential for entry to an employment position within or outside their professions. It is possible that many graduates assume that employers attach a premium to a licensed professional in hiring personnel. Thus, aside from professional practice, a legitimate reason that graduates consider when they take a licensure exam is to increase their employability in general. But once employed in a related occupation, they do not continue their professional practice as shown by the low compliance rate in fulfilling continuing professional education units in professions like accountancy, chemical engineering and others. Professionals who will need continuing professional education, on the other hand, are those who are still in the professions where a license is required. Once a licensed professional has decided to pursue the career path in his profession, he will need to improve professionally as a requirement for the renewal of his license. As mentioned earlier, this trend is happening to professional electrical engineers, pharmacists, nurses and physicians.

The relatively low compliance rate estimated at 34% and the subsequent non-renewal of license among professionals may be viewed as a waste of resources in the initial education and training of these professionals. Although many licensed professionals are no longer practicing their professions, they remain as an educated stock of human resources and as trainable individuals. Sometimes they are the ones who bump other educated manpower with no professional license since a license is a premium to the employability of young professionals.

For example, for every 100 graduates of accountancy, only 15 will pass the CPA based on the national average passing rate; and only 3 will remain in the profession based on a compliance rate of 22 percent. What happens to 97 graduates? It is known that 85 of them did not pass the licensure examination but they cannot be considered as waste in human capital investment since they can end up in other occupations. The twelve who passed the CPA but are no longer practicing public accounting are probably in better positions in management, finance and other fields. The remaining 3 are the loyal ones and willing to pursue a career in accountancy. They are the candidates for graduate programs in accountancy; the ones who can do research in the profession; the ones whose improvement will strengthen the international competitiveness of Filipino accountants. These are the ones that the country wants to improve further through a refocusing of the CPE programs as mentioned earlier.

External Absorption

From 1992 to 1998, a total of 318,392 professional, technical and related workers were reported deployed for overseas employment (See Table 14). More than half of these deployed overseas workers are composers and performing artists. In fact almost half (49%) of the total professional technical workers deployed for overseas employment are choreographers and dancers. Since choreographers and dancers are not professionally licensed under PRC, they can be removed from the total number of

professionals deployed overseas. The remaining number of professionals absorbed by the external market constitutes about 9% of the total stock of professionals in the register of PRC.

Other leading professionals working overseas include the 56,539 medical, dental and other health professionals. The leading health professionals are the 37,767 professional nurses that account for close to 12 % of the total deployed professionals. A good number of surveyors and geodetic engineers are also working overseas that account for 12% of deployed professionals. Architects and engineers account for only 5.75 % of the total deployed professionals and surprisingly, less than 1% are coming from the accountancy profession which has one of the biggest stocks of professionals next to nursing and midwifery.

Using data from the Professional Regulation Commission, an estimated 31,762 exemptions from CPE compliance were given in 1998 to various professionals. Many of these professionals were exempted because they are working overseas. The professions with relatively high number of exemptions are nursing (9,467), various levels of marine engineers (6428) and physicians (1039). (See Table 8).

Preparing local professionals to compete internationally through investments in human capital entails some social costs as well. On one hand, relevant curricular offerings, reforms in higher education and improvements in continuing professional education may further enhance the competitiveness of professionals in a liberalized setting in the trade of professional services. On the other hand, the increase in the human capital value of professionals may push many of them to work overseas, which may lead to the problem of brain drain.

In addition, the improvement of higher education through the selection of centers of excellence may contain some equity issues since many of these private educational institutions are catering to students from high-income families. The granting of subsidies to these institutions as centers of excellence may further reinforce the existing inequities. A worse situation may occur if graduates from these institutions end up working abroad. The country may end up subsidizing the provision of services in a developed country which experts call the reverse transfer of technology. Liberalization of professional services may not be able to answer this major concern in many developing countries in the light of inequities in education as well wide wage differentials across countries in the same profession. Of course in theory, equalization of factor prices may eliminate these disparities.

IX. Responses of Key Informants on Readiness of Filipino Professionals

The last indicator of demand is the perception of key informants on the ability of Filipino professionals to compete domestically and internationally. First level of competition is external. Are Filipino professionals able to compete and practice abroad? The second level of competition is domestic. Can Filipino professionals face foreign professionals with the liberalization of trade in services, particularly professional services?

Despite a very limited sample size, the respondents were drawn from key informants in various industries. They were asked on their perceptions on the readiness of newly hired professionals, readiness to compete, types of training provided and the top source of professional manpower.

On the performance of newly hired professionals, key informants interviewed gave an average rating of 3.61 indicating above satisfactory performance. A similar rating of 3.56 was given for technical competence while only 3.33 or satisfactory rating was recorded for the adequacy of course offerings. Majority of the respondents (61%) view that academic training received by newly hired professionals is adequate but those who view otherwise is still very high and significant. Although the leading items cited under need for improvements are technical know-how and current trends in the fields, they have minimal citations compared to the possible number of items key informants can cite as areas for improvement. (See Appendix E.2)

In terms of the competitiveness of newly hired professionals, respondents believe that they are competitive. Fifteen out the 17 respondents believe that Filipino professionals can compete abroad as well as compete with foreign professionals in the country (See Appendix E.3). This indicates that as individuals they are not apprehensive about the liberalization of professional services, an indicator of the quality of local professionals and their confidence on the quality and capability of these professionals. Although there are inadequacies in the educational system, the system of licensure and continuing education program serves as process of selecting professionals from the graduates. A select pool of professionals are the ones who competes with foreign professionals.

On the training and continuing professional education, majority of respondents (94.1 %) revealed that their firms provide some forms of training to newly hired professionals and have continuing professional education programs. New trends and developments in the field is the most cited type of specialized training provided by firms. On the forms of continuing professional education, the most cited response is attendance in outside seminars together with in-house seminar and internal training programs. More than half of the key informants disclosed that their companies allow their professionals to work with their affiliate companies abroad (See Appendix E.5).

The 18 key informants, cited 26 schools where they source their professionals in various fields. The leading schools cited are UP (11), UST (9), DLSU (7), UE (5) and Mapua Institute of Technology (4).

X. Conclusion

To reap the benefits of an expanded global trade in services with the full implementation of GATS, there is a need to upgrade human resources through various forms of investment in human capital. This upgrading process is not intended to protect Filipino professionals from foreign competition but more importantly to build a strong human resource infrastructure in the light of a globalized trading environment. Specifically, the readiness to compete internationally should be viewed in terms of the ability of local professionals to meet the standards and human resource requirements of foreign as well as domestic companies.

As we review the process of human capital formation in the country, we concur with the conclusions documented in various research and reports on the inadequacies of higher education in the Philippines. Several factors hinder the development of higher education in the country. The over-expanded higher education in the country is accompanied by inadequate faculty qualifications, lack of research orientation, underdeveloped graduate programs, misallocation of resources in public institutions, and over-concentration of enrollment in few programs.

As a result of these factors, there are very few accredited institutions of higher learning offering quality education. Of the more than 1,300 higher educational institutions, only 4.5% colleges and universities were cited by CHED as centers of excellence/ development. Only six institutions have at least three centers of excellence while only four universities were included in the top universities in the Asian region.

The allocation of limited government funds to higher educational institutions is not helping solve the problem of over-expansion and poor quality. More than 3/4 of public spending in higher education is allocated for the operation and maintenance of 107 state colleges and universities. With the implementation of the Higher Education Modernization Act of 1997, many of these state colleges and universities were given leeway to expand through the establishment of autonomous campuses and offer academic programs in direct competition with the private sector when what is called for is more integration and cooperation.

With the establishment of the Commission on Higher Education (CHED), various programs were initiated to address key problems confronting higher education in the country. The formation of technical panels for various disciplines to review and evaluate curriculum is working very well. The members of each panel are drawn from the leaders of industry as well as respected individuals in the academe. Aside from the curricular review and changes proposed by the technical panels, they have also named various colleges and universities as centers of excellence and centers of developments. The citation is not only to recognize schools with excellent programs but more as a mechanism for channeling government funds for the development of the discipline in the school. If these institutions can provide the academic leadership and research support among the other colleges and universities, then there is promise for the educational system in preparing the needed human capital for global competition. In addition, the CHED has prepared a national research agenda for higher education to emphasize research activities in academic institutions and provide the necessary funding for this educational priority.

In spite of the inadequacies of the educational system, the curricular offerings of the various professions are comparable with international standards at least in the ASEAN region. The country may be producing a lot of graduates but the licensing examinations as well as the continuing education program serve as a process of selecting the best among these graduates who pursue a career in the profession. Moreover, the fact that close to 9% of the stock of professionals are able to work overseas including a good number of nurses, physician, and engineers speak highly of the academic training they have received in the country. However, with the liberalization of trade in services can the graduates of the educational sector compete

with foreign professionals given that more half of them fail the licensure examinations of various professions?

The over expanded higher educational sector in the Philippines has been blamed for the mismatch of graduates and manpower needs of the economy as well as for the excess supply of graduates. To address this issue, there is a need to increase demand for educated labor through the improvement of the economy, greater employment generation and higher rates of savings and investment. The expansion of trade in services through liberalization is an avenue that creates demand for educated manpower particularly professionals. The question is the readiness of the country to absorb these trade inflows in services if more than half of its graduates fail the licensure examinations.

Thus, there is a need to develop higher education and improve continuing professional education as a strategy for meeting the expanded demand. The bias towards attendance of seminars over the importance of research and graduate education should be rectified. Many of the professionals are now reaping the benefits of their initial investment in human capital and they have the ability to pay the cost of graduate education. The development of graduate education and research can be supported from two ends. On one hand, the government can put more resources to these programs via the centers of excellence. On the other hand, the needed warm bodies will be available from the stock of professionals. Even if only 34% of the 1.75 million professionals will really pursue CPE that will be close to 600,000 potential students in graduate education. In addition, upgrading teachers through graduate education will really make a dent in improving the low quality of instruction in basic education.

Because of the huge amount required in the formation of human capital, the role of the government in the provision of education should take into account the returns and equity considerations to various types of schooling. A sizable portion of returns to higher education, including the training of professionals, is reaped privately compared to the social returns to basic education. Although government support for the advancement of knowledge through research and graduate education can be rationalized on social grounds; such legitimate state support can be channeled to higher education institutions through the centers of excellence in various disciplines.

Although graduate education is a valuable route for improving the quality of continuing professional education in the country, it may not be as practicable as conceptualized after taking into account the huge opportunity cost of professionals. The busy schedule of professionals at work may prevent them in pursuing professional upgrading through formal schooling. Given the advances in information technology and improvements in distance learning, centers of excellence can devise programs in which the opportunity cost of professionals may be reduced in pursuing graduate studies.

The development of human capital through various forms of schooling and training aimed at addressing the competitiveness of local professionals in the light of a liberalized environment have accompanying social costs. The loss of educated manpower through brain drain, the various social ills resulting from the overseas employment may not be fully compensated by the foreign exchange remittances

brought into the economy. The problem of brain drain and the exodus of manpower to overseas employment however, are problems of the educational system brought about by the inability to create domestic demand for educated manpower. If the supply of educated manpower the schools are producing will remain in this country and reap the benefits of investment in human capital, there is a need to further create employment opportunities in the country, and to minimize the rate of population growth. Then if these two conditions are present, then the output of education in number and quality will be further enhanced.

Given these conclusions from the study, we propose the following recommendations:

1. Regularly update curricular programs of various professions to keep up with the changes in the market, changes in technology and to bench mark with some of the best academic programs in the region.
2. Refocus the continuing professional education program towards research, publications, inventions and graduate education and de-emphasize seminars program.
3. For further improvement and effectiveness of professional continuing education, give professional organizations more flexibility in developing their members through the institution of a professional ranking system. Passing the licensure examination given by the PRC will be used to determine entry level position in any profession. Subsequent promotion to various professional ranks will have to be given by professional organizations. Since promotion to various ranks entails the fulfillment of professional accomplishments, such promotion may be counted as fulfilling the CPE requirements and the subsequent renewal of license. In addition, various CPE programs including graduate and research will be given heavier points for faster professional advances in ranks. The organization may institute an academy of fellows whose membership may initially come from former recipients of outstanding professionals given by the professional organizations. The academy may institute rules and policies on how to promote and induct members to higher ranks similar to the practice done by physicians, electrical engineers, marine engineers and other professionals.
4. Link the development of higher education with the improvement of continuing professional education. Encourage professionals to conduct research and do graduate work in centers of excellence. In addition, giving heavier CPE credits on graduate units earned in programs cited as centers of excellence will further reinforce the subsidy given by CHED to these educational institutions. For quality control, the center of excellence can be given scholarship slots, heavier points, and discounted tuition fees. This combination of private funding, and limited government support can make a dent in improving the quality of higher education in the country. Accredited graduate school programs will also be allowed in the CPE accreditation scheme but graduates from these programs will receive lower

points compared with the graduates from programs operated by centers of excellence.

5. Encourage professional organizations to have their own professional journals, preferably refereed. Give monetary incentives to members who publish in international journals. Adopt a system of professorial lectures for foreign and local experts.
6. Recognizing the opportunity cost of graduate education for professionals, a system of distance education may be devised, where professionals earn a degree without too much sacrifice on their professional practice and income.
7. To minimize the social cost of migration, let the students in state colleges and universities internalize the cost of education through an imposition of a users fee. For the needy ones, scholarship grants or a voucher system can be utilized as an efficient means of addressing the issue of equity. For migrating professionals who have received full support from the state for their education, a form of exit tax may be imposed.
8. Rationalize the allocation of government funds to higher education. There should be a moratorium on the establishment or conversion of state colleges and universities. There should also be a moratorium on the establishment of autonomous campuses of existing SUCs. If this is going to be allowed, however, funding must come from LGUs and other sources.
9. Encourage the integration of existing state colleges and universities instead of the establishment of autonomous campuses.

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Table 1

**Employment Share of Professional Workers
to Non-Agricultural Employment (In Percent)
1977 – 1998**

Year	Employment Share
1977 – 1980	14.09
1981	14.53
1982	14.74
1983	13.97
1984	13.47
1985	13.05
1986	12.88
1987	12.4
1988	11.87
1989	13.88
1990	12.97
1991	12.76
1992	12.37
1993	12.79
1994	12.46
1995	12.52
1996	12.75
1997	13.08
1998	13.00

Source of raw data: Labor Force Survey (LFS) various years; average for the year

Table 2

**Employment Share of Professional Workers to Non-Agricultural Employment
Classified by Occupation Selected Years (In Percent)**

	Ave. 1978-1980	1985	1990	1995	1996	1997	1998
Professional workers	14.09	13.05	12.97	12.52	12.75	13.08	13.0
Clerical workers	8.73	8.14	7.80	7.67	7.55	7.49	7.17
Sales workers	21.28	25.14	24.61	24.54	24.67	23.82	23.87
Service workers	15.81	16.38	16.22	15.95	15.7	16.59	16.92
Agricultural, Animal Husbandry and Forestry workers, etc.	0.71	0.32	0.77	0.59	0.52	0.52	0.45
Production and related workers, Transport equipment and laborers	38.81	36.85	37.19	38.54	38.61	38.29	38.33

Source of raw data: Labor Force Survey (LFS) various years; average for the year

Table 3
Passing Percentages Professional Licensure Examinations
1992-1997

Name of Board	1997 (%)	1996 (%)	1995 (%)	1994 (%)	1993 (%)	1992 (%)	Ave. (%)
Accountancy	17.95	18.00	14.15	14.76	15.27	15.25	15.51
Aeronautical Engineering	17.65	20.80	18.64	33.00	17.00	28.00	23.49
Agricultural Engineering	52.93	57.70	23.75	44.00	37.00	42.00	40.89
Architecture	34.65	36.65	37.09	32.07	19.31	22.90	29.60
Chemical Engineering	36.50	31.00	39.89	31.14	44.00	51.08	34.42
Chemistry	45.50	39.30	39.68	49.00	27.00	25.00	36.00
Civil Engineering	26.20	33.30	34.04	33.62	28.10	28.15	30.72
Criminology	46.85	41.05	60.25	50.36	32.53	28.00	42.44
Customs Broker	11.20	10.70	11.00	8.67	12.00	14.00	11.27
Dentistry	32.87	25.45	22.62	18.18	25.90	26.36	23.70
Electrical Engineering	38.00	29.55	35.36	42.81	39.94	30.50	35.45
Electronics & Comm. Eng'g.	50.00	45.00	52.41	50.43	40.52	32.14	44.10
Environmental Planning	55.55	100.00	-	-	-	-	100.00
Foresters	31.80	32.50	58.36	44.00	30.00	16.00	36.17
Geodetic Engineering	33.92	41.22	45.20	53.98	47.19	54.45	48.41
Geology	68.57	68.00	50.00	7.00	38.00	59.00	50.40
Interior Design	31.88	39.50	40.32	35.00	38.00	40.00	38.56
Landscape Architecture	66.66	66.70	75.00	75.00	33.00	86.00	87.14
Librarians	54.32	44.4	51.71	50.05	-	-	48.72
Marine Deck Officers	43.40	25.52	19.42	14.77	9.28	32.23	20.24
Marine Engine Officers	44.81	33.88	26.55	25.11	32.38	51.34	33.85
Master Plumbers	19.70	16.60	16.67	20.15	15.47	20.00	17.78
Mechanical Engineering	36.93	34.35	35.76	43.11	22.29	14.72	30.05
Medical Technology	50.72	32.95	61.71	48.09	36.53	34.20	42.70
Medicine	72.13	74.85	75.16	86.54	61.14	78.29	79.16
Metallurgical Engineering	55.55	52.50	64.51	55.00	55.00	59.00	57.20
Midwifery	51.75	50.40	59.39	54.08	45.15	48.94	51.59
Mining Engineering	34.48	30.80	10.00	45.00	41.00	68.00	38.96
Naval Arch. & Marine Eng'g	38.89	37.50	29.41	66.66	3.00	67.00	40.35
Nursing	50.19	54.00	58.24	61.45	63.21	61.00	58.58
Nutrition & Dietetics	46.00	55.80	44.00	37.80	33.00	33.00	40.72
Optometry	56.70	54.70	50.66	67.00	24.00	44.00	46.07
Pharmacy	67.08	57.60	39.61	63.02	66.00	68.58	64.96
Phys. & Occup. Therapy	39.76	29.00	36.88	43.88	46.75	47.23	40.75
Professional Teachers	32.08	27.50	-	-	-	-	29.79
Radiology/X-ray Technology	36.79	41.43	42.63	50.10	-	-	44.72
Sanitary Engineering	41.00	51.30	48.91	54.00	50.00	67.20	54.28
School Superintendent	32.50	33.90	-	-	-	-	33.20
Social Workers	49.69	56.80	58.30	42.12	29.00	54.00	50.04
Veterinary Medicine	45.06	44.90	31.88	37.00	49.00	61.00	44.76
AVERAGE	42.46	41.88	41.87	43.16	35.86	43.10	41.80

Source: Professional Regulation Commission

Table 4

**Top Five Multi-disciplinary Universities in Asia (1999)
General Criteria and Ranking**

Institution	Overall score 100% & Rank	Academic reputation (Rank)	Faculty resources (Rank)	Student selectivity (Rank)	Financial resources (Rank)	Research Output (Rank)
Tohoku University (Japan)	73.71 % (1)	14	3	5	3	6
Kyoto University	73.10 % (2)	1	20	12	9	2
Seoul University	71.28 % (3)	4	12	4	29	11
University of Hong Kong	70.97 % (4)	6	1	55	4	5
Taiwan University	66.86 % (5)	7	17	13	22	15

Source: Asiaweek Survey 1999

Table 5

**Top Five Multi-disciplinary Universities in Asia (1999)
Specific Criteria and Ranking**

Institution	Median annual pay, teachers & researchers, PPP\$ (Rank)	Students per teacher (Rank)	Citations in international journal, per teacher (Rank)	Internet bandwidth per student, kbbps (Rank)
Tohoku University	7	2	11	4
Kyoto University	31	5	8	7
Seoul University	46	43	13	9
University of Hong Kong	1	50	5	31
Taiwan University	39	19	20	17

Source: Asiaweek Survey 1999

Table 6

**Performance of the Four Philippine Universities (1999)
General Criteria and Ranking**

Institution	Overall score 100% & Rank	Academic reputation (Rank)	Faculty resources (Rank)	Student selectivity (Rank)	Financial resources (Rank)	Research Output (Rank)
University of the Philippine	53.80 % (32)	24	58	8	64	52
Ateneo de Manila University	42.74 % (71)	73	66	46	60	62
De La Salle University	36.74 % (76)	58	74	76	59	78
University of Santo Tomas	35.60 % (78)	67	78	66	71	76

Source: Asiaweek 1999

Table 7

**Performance of the Four Philippine Universities (1999)
Specific Criteria and Ranking**

Institution	Median annual pay, teachers & researchers, PPP\$ (Rank)	Students per teacher (Rank)	Citations in international journal, per teacher (Rank)	Internet bandwidth per student, kbbps (Rank)
University of the Philippine	61	24	68	69
Ateneo de Manila University	62	53	70	45
De La Salle University	58	56	73	50
University of Santo Tomas	67	73	74	69

Source: Asiaweek 1999

Table 8

**Continuing Professional Education (CPE) Compliance
and Renewal of Professional License
January-December 1998**

	Profession	CPE Compliance			Total Issued	Total No. of Prof. (as of Dec 1998)	33% of Total Prof.	% Compliance
		Units Earned	Exemption	Under taking				
1	Accountancy	1226	371	5163	6760	98121	32707	21
2	Aeronautical Engineer	36	5	37	78	480	160	49
3	Agricultural Engineer	76	6	162	244	4476	1492	16
4	Architecture	743	309	555	1607	14623	4874	33
	Interior Design	28	9	59	96	672	224	43
	Landscape Architecture	7	4	10	21	110	37	57
5	Chemical Engineering	326	104	722	1152	21893	7298	16
6	Chemistry	127	9	123	259	8057	2686	10
	Chemical Tech.	5	0	1	6	589	196	3
7	Civil Engineering	3474	1428	733	12235	83300	27767	44
8	Criminology	122	7	480	609	6072	2024	30
9	Customs Broker	169	12	332	513	3078	1026	50
10	Dentistry	1220	489	3640	5349	39669	13223	40
	Dental Hygienist	4	0	0	4	6	2	200
11	Professional Electrical Engr	235	161	283	679	3101	1034	66
	Reg. Electrical Engineer	550	16	409	975	19637	6546	15
	Reg. Master Electrician	6	8	0	14	2968	989	1
	Master Electrician	258	810	575	1643	15034	5011	33
	Associate Electrical Engr	16	72	116	204	3651	1217	17
	Assistant Electrical Engr	311	736	954	2001	31690	10563	19
12	Elec. & Comm Engineer	570	255	984	1809	18478	6159	29
13	Environmental Planner	60	13	84	157	412	137	114
14	Forestry	436	16	306	758	6756	2252	34
15	Geodetic Engineering	328	90	192	610	4934	1645	37
	Jr. Geodetic Engineer	140	68	316	524	5746	1915	27
	Geodetic Engineer's Aide	7	1	10	18	100	33	54
16	Geologist	66	12	26	104	1382	461	23
	Geologic Aide	0	0	0	0	66	22	0
17	Library Science	216	8	69	293	2128	709	41
18	Chief Mate	339	841	100	1280	12315	4105	31
	Second Mate	432	1117	139	1688	19702	6567	26
	Third Mate	1114	2221	315	3650	39629	13210	28
	Major Patron	126	143	211	480	2976	992	48
	Minor Patron	50	13	78	141	1760	587	24
	Master Mariner	388	969	178	1535	7479	2493	62
	HBRL	4	4	26	34	1315	438	8
19	Chief Marine Engineer	187	882	161	1230	6310	2103	58
	Second Marine Engineer	253	1167	196	1616	12687	4229	38
	Third Marine Engineer	370	1447	249	2066	22326	7442	28
	Fourth Marine Engineer	885	2932	803	4620	48225	16075	29
	Motor Engineer	7	10	10	27	1210	403	7
20	Master Plumbing	68	30	111	209	2405	802	26

(con't. Table 8)

	Profession	CPE Compliance			Total Issued	Total No. of Prof. (as of Dec 1998)	33% of Total Prof.	% Compliance
		Units Earned	Exemption	Under taking				
21	Prof. Mechanical Engineer	80	52	111	243	3454	1151	21
	Mechanical Engineer	1033	943	2543	4519	54403	18134	25
	Certified Plant Mechanic	21	53	126	200	9312	3104	6
	Mechanical Plant Engineer	0	4	0	4	2070	690	1
	ACRE	0	2	2	4	65	22	18
22	Medical Technology	1046	584	1974	3604	37369	12456	29
	Medical Lab. Tech	244	32	53	329	3143	1048	31
23	Metallurgical Engineer	10	6	13	29	427	142	20
	Met. Plant Foreman	1	0	0	1	57	19	5
24	Midwifery	6728	1478	5041	13247	125516	41839	32
25	Mining Engineer	44	14	89	147	2608	869	17
	Certified Mine Foreman	1	0	3	4	649	216	2
	Certified Mill Foreman	0	0	1	1	191	64	2
	Certified Quarry Foreman	0	0	1	1	66	22	5
26	Naval Achi. & Marine Engr.	15	10	29	54	400	133	41
27	Nursing	14313	9467	17376	41156	323736	107912	38
28	Nutrition & Dietetics	343	53	234	630	10165	3388	19
	Dietitian	2	1	3	6	1410	470	1
29	Optometry	366	101	300	767	8971	2990	26
30	Pharmacy	2664	596	1916	5176	40979	13660	38
	Chinese Druggist	2	0	1	3	485	162	2
31	Physician	6045	1039	2995	10049	90566	30189	33
32	Physical Therapy	125	140	199	464	6988	2329	20
	Physical Therapy Tech.	0	0	5	5	78	26	19
33	Occupational Therapy	20	26	7	53	636	212	25
	Occupational Therapy Tech.	4	7	4	15	119	40	38
34	Professional Teachers	0	0	0	0	521400	173800	0
	Superintendent	0	0	0	0	269	90	0
35	Radiologic Technology	147	77	190	414	2959	986	42
36	X-ray Technology	439	208	598	1245	7581	2527	49
37	Sanitary Engineer	68	33	151	252	2056	685	37
38	Social Work	385	29	569	983	11058	3686	27
39	Sugar Technologist	1	0	21	22	183	61	36
40	Veterinary Medicine	246	12	179	437	5077	1692	26
	TOTAL	49,387	31,762	60,222	141,362	1,850,014	616,671	23

Source: Philippine Regulation Commission

Table 9

Matrix For CPE Programs, Activities or Sources

PROGRAMS	CREDITS UNITS	SUPPORTING DOCUMENTS
1. SEMINARS/ CONVENTIONS		
1.1 Participant	1 CU Per Hour	Certificate of Attendance with number of hours, seminar program & certified list of participants
1.2 Resource Speaker	<u>5 CU Per Hour</u>	Photocopy of Plaque or Certification & Copy of Paper, Program Invitation
1.3 Panelist/Reactor	<u>3 CU Per Hour</u>	Certification from Sponsoring Org. & Copy of Program
1.4 Facilitator/ Moderator	<u>2 CU Per Hour</u>	Certification from Sponsoring Org. & Copy of Program
2. ACADEMIC PREPARATION (Residential & Distance Mode)		
2.1 Master's Degree	<u>1 CU Per Academic Unit</u> 30 CU Additional Upon Completion of Degree	University Certification Diploma & Transcript of Records
2.2 Doctoral Degree	<u>2 CU Per Academic Unit</u> 450 CU Additional Upon Completion of Degree	University Certification Diploma & Transcript of Records
2.3 Residency/ Externship	10 CU Per Year	Hospital Certification Certificate of Completion
2.4 Fellowship	<u>15 CU Per Year</u>	Certification from the Granting Institution, Certificate of Fellowship
3. SELF-DIRECTED LEARNING PACKAGE		
3.1 Module	10 CU Per Complete Set of <u>Module</u>	Copy of Duly- Accomplished Module and Evaluation
3.2 Technical Paper/ Professional Journal Article	<u>1 CU/Professional/ Technical Article</u>	Copy of Duly Accomplished Article and Evaluation

(Con't. of Table .9)

PROGRAMS	CREDITS UNITS	SUPPORTING DOCUMENTS
4. AUTHORSHIP		
4.1 Research/ Innovative Programs/ Creative Projects	10 Credit Units	Duly Certified/ Published Article and Evaluation
4.2 Book/Monograph Single Author 2 Authors 3 or More	[25-50Pp.] [51-100Pp.] [101 or more Pp.] 20 CU 30 CU 40 CU 10 CU 20 CU 30 CU 5 CU 10 CU 20 CU	Published Book with Proof of Copyright
4.3 Editor	½OF THE CU OF AUTHORSHIP CATEGORY	Published Book with Proof of Authorship
4.4 Article Single Author 2 Authors 3 or More	[1-3 Pp.] [4-6Pp.] [7 or more Pp.] 4 CU 6 CU 8 CU 3 CU 4 CU 6 CU 2 CU 3 CU 4 CU	Proof of Publication of Article
4.5 Professional Journal Editor	5 CU Per Issue	Copy of Published Journal
4.6 Peer Reviewer	2 CU/Article	Duly Certified Copy of Published Article/ Book
5. INVENTIONS	10-30 Credit Units per Invention	Certified Copy of Patent Certificate
6. POSTGRADUATE/ IN- SERVICE TRAINING	0.25 CU Per Hour (Maximum of 40 CU/Training)	Certified of Training & Training Description
7. STUDY/ OBSERVATION TOUR	2 CU/Day (Maximum of 30 CU/Tour)	Certified from Sponsoring Institution
8. PROFESSIONAL CHAIR	10 CU PER/CHAIR	Certified of Grant or Appointment Paper
9. SUCH OTHER ACTIVITIES PRE- APPROVED BY THE COUNCIL WHICH ARE IN COMPLIANCE WITH THE OBJECTIVES AS EMBODIED IN E.O. 266.		

Table 10

**Number of Accredited CPE Providers by Profession
1999**

Regulated profession	No. of accredited providers
Accountancy	67
Aeronautical engineering	1
Agricultural engineering	13
Architecture	21
Chemical engineering	16
Chemistry	30
Civil engineering	17
Custom broker	17
Criminology	10
Dentistry	121
Electronics and communication engineering	9 (and 50 other multidisciplinary providers)
Electrical engineering	22 (and 4 other multidisciplinary providers)
Environmental planning	5
Foresters	5
Geodetic engineering	8
Geology	4
Interior design	5
Landscape architecture	Not available
Librarian	30
Marine deck officer	53
Marine engine officer	53
Master plumbing	3
Mechanical engineering	28
Medicine	230
Metallurgical engineering	7
Midwifery	63
Mining engineering	19
Naval architecture and marine engineering	6
Nursing	360
Nutrition and dietetics	26
Optometry	8
Pharmacy	34
Physical therapy / Occupational therapy	52
Professional teachers	116
Medical technology	77
Radiologic and x-ray technology	25
Sanitary engineering	2
Social work	33
Veterinary medicine	15
TOTAL	1611

Source: Aggregated based on the raw data provided by the Continuing Professional Education Office, Professional Regulation Commission (as of April 1999)

Table 11

**Employment and Share of Major Occupation Group
in Non-Agricultural Employment (In Thousands)
1998**

	January	Share in Non-Agricultural Employment (%)
		January
Professional, technical and related workers	2168	13.006
Clerical workers	1195	7.169
Sales workers	3979	23.871
Service workers	2820	16.918
Agricultural, Animal Husbandry and Forestry		
Workers, fishermen and hunters	75	0.450
Production and Related Workers, Transport		
Equipment Operators and Laborers	6389	38.329

Table 12
Professionals Employed in Major Industry Groups
(In Thousands)
January 1998

		Mining & Quar- rying	Manu- facturing	Electri- city, gas, water, & sanitary services	Cons- truction	Whole- sale & Retail Trade	Transport, storage & commu- nication	Financing, insurance, & business services	Commu- nity social & personal services	Industry not Ade- quately defined	
Professional, technical & related workers		4	58	17	49	32	24	87	1,359	1	
Administrative, executive & managerial workers		3	58	7	12	31	85	61	280	0	
	Total	7	116	24	61	63	109	148	1639	1	2168
Total Employment in the Non- agricultural sector	16,669										
Share of major industry group to employment in the non-agricultural sector		0.042	0.696	0.144	0.366	0.378	0.654	0.888	9.833	0.006	13.006

Source: Labor Force Survey, 1998

Table 13**Continuing Professional Education (CPE) Compliance
Based on Adjusted Stock of Professionals
Selected Professions**

Profession	CPE compliance issued	Adjusted stock of professionals as of Dec. 1998	33% of total professionals	% compliance
Accounting	6,760	92,378	30,485	22
Architecture	1,607	13,394	4,420	36
Chemical Engineering	1,152	20,904	6,898	17
Chemistry	259	6,916	2,282	11
Civil Engineering	12,235	77,529	25,585	48
Dentistry	5,349	31,476	10,387	52
Professional Electrical Engr.	679	2,852	941	72
Asst. Electrical Engr.	2,001	30,978	10,223	20
Prof. Mechanical Engr.	243	2,864	945	26
Mechanical Plant Engr.	4	696	230	2
Nursing	41,156	30,9432	10,2113	40
Optometry	767	8,077	2,665	29
Pharmacy	5,176	27,349	9,025	57
Physician	10,049	75,082	24,777	41
Sanitary Engineering	252	1,950	644	39
Veterinary Medicine	437	4,687	1,547	28

Table 14

**Selected Professionals Deployed Overseas
by Skill Category, 1992 to 1998**

		Share
Professional Technical and Related Workers	318392	100.00
Accountants	2986	0.94
Aircraft and Ships' Officers	397	
Architects and Engineers	18322	5.75
Engineers Civil	3954	
Engineers Electrical and Electronics	4134	
Engineers Mechanical	3357	
Authors Journalists and Related Workers	69	
Composers and Performing Artists	187246	58.81
Choreographers and Dancers	157409	49.44
Economists	16	
Jurists	16	
Life Scientists and Related Technicians	3998	
Medical Dental Veterinary and Related Fields	56539	17.76
Doctors Medical	387	
Nurses Professional	37767	11.86
Pharmacists	299	
Physiotherapists	3209	1.00
Technicians Medical X-ray	2147	
Physical Scientists	295	
Statisticians/ Mathematicians	4969	
Surveyors Geodetic Engineers	38299	12.02
Teachers	860	
Professional Technical and Related Librarian	988	
Religion Worker	10	
Sculptors Painters and Photographers	2922	
Sportsmen Athletes and Related	471	

Source: Phil. Overseas Employment Administration

Appendix A

CENTERS OF EXCELLENCE AND CENTERS OF DEVELOPMENT

IN SELECTED DISCIPLINES
BY SCHOOL AND BY REGION

1999

Region I

Mariano Marcos University (Public)
1. Teacher Education (E)
2. Ceramics Engineering (D)

Region II

Saint Paul University (Private)
1. Teacher Education (E)
2. Business Education (D)
3. Nursing Education (E)
4. Geodetic Engineering (D)
5. Civil Engineering (D)

Saint Mary's University (Private)
1. Teacher Education (E)
2. Civil Engineering (D)

St. Louis College of Tuguegarao
(Private)
1. Architecture (D)
2. Geodetic Engineering (D)
3. Civil Engineering (D)

Cagayan State University (Public)
1. Electrical Engineering (D)
2. Civil Engineering (D)
3. Computer Engineering (D)

University of La Salette (Private)
1. Civil Engineering (D)

Region III

Central Luzon State University
(Public)
1. Teacher Education (D)
2. Biology (D)
3. Chemistry (D)

Bulacan State University (Public)
1. Electrical Engineering (D)
2. Mechanical Engineering (D)

Holy Angel University (Private)
1. Electrical Engineering (D)
2. Industrial Engineering (D)

Tarlac State University (Public)
1. Electrical Engineering (D)

Pamantasan ng Araullo (Private)
1. Geodetic Engineering (D)

Region IV

Palawan State University (Public)
1. Teacher Education (E)

UP - Los Baños (Public)
1. Biology (E)
2. Chemistry (E)
3. Mathematics (E)
4. Physics (D)

Pablo Borbon Memorial Institute of
Technology (Public)
1. Mechanical Engineering (D)

Region V

Bicol University (Public)
1. Teacher Education (E)

Aquinas University (Public)
1. Teacher Education (E)
2. Computer Engineering (D)

Ateneo de Naga University (Private)
1. Business Education (D)

Region VI

West Visayas State University (Public)

1. Teacher Education (E)

University of St. La Salle (Private)

1. Business Education (D)
2. Chemical Engineering (D)
3. Electronics and Communication Engineering (D)
4. Computer Engineering (D)

Central Philippine University (Private)

1. Chemical Engineering (D)
2. Civil Engineering (D)
3. Electrical Engineering (D)
4. Mechanical Engineering (D)

Western Institute of Technology (Private)

1. Electrical Engineering (D)
2. Mechanical Engineering (D)

St. Paul Iloilo (Private)

1. Nursing Education (E)

Region VII

University of San Jose Recoletos (Private)

1. Teacher Education (E)
2. Business Education (D)

University of San Carlos (Private)

1. Teacher Education (E)
2. Business Education (D)
3. Biology (D)
4. Chemistry (D)
5. Mathematics (D)
6. Physics (D)
7. Chemical Engineering (D)
8. Electrical Engineering (D)
9. Civil Engineering (D)

Siliman University (Private)

1. Teacher Education (E)
2. Business Education (D)
3. Biology (D)
4. Physics (D)
5. Mechanical Engineering (D)
6. Nursing Education (E)

Cebu Institute of Medicine (Private)

1. Medical Education (E)

Region VIII

Leyte Normal University (Public)

1. Teacher Education (E)

UP Visayas (Public)

1. Biology (D)

Leyte Institute of Technology (Public)

1. Civil Engineering (D)

Samar State Polytechnic College (Public)

1. Civil Engineering (D)

Region IX

Western Mindanao State University (Public)

1. Teacher Education (E)
2. Architecture (D)

Ateneo de Zamboanga (Private)

1. Business Education (D)

Region X

Xavier University (Private)

1. Teacher Education (E)
2. Business Education (D)
3. Chemistry (D)
4. Mathematics (D)
5. Electrical Engineering (D)
6. Chemical Engineering (D)
7. Mechanical Engineering (D)
8. Medical Education (D)
9. Civil Engineering (D)

Central Mindanao University (Private)

1. Biology (D)
2. Mathematics (D)

Mindanao Polytechnic State College
(Public)

1. Mathematics (D)

Liceo de Cagayan (Private)

1. Nursing Education (E)

Cagayan Capitol Colleges (Private)

1. Civil Engineering (D)

Region XI

Notre Dame of Marbel University
(Private)

1. Teacher Education (E)

Ateneo de Davao University (Private)

1. Teacher Education (E)
2. Business Education (D)
3. Biology (D)
4. Chemistry (D)
5. Mathematics (D)
6. Physics (D)

University of Mindanao (Private)

1. Chemical Engineering (D)
2. Electrical Engineering (D)
3. Mechanical Engineering (D)
4. Civil Engineering (D)

University of Southeastern Philippines
(Public)

1. Electrical Engineering (D)
2. Electronics and
Communication
Engineering (D)

San Pedro College (Private)

1. Nursing Education (D)

Region XII

Mindanao State University (Public)

1. Teacher Education (D)
2. Chemistry (D)

MSU - Iligan Institute of Technology
(Public)

1. Biology (D)
2. Chemistry (E)
3. Mathematics (E)
4. Physics (E)
5. Ceramics Engineering (D)
6. Civil Engineering (D)
7. Electronics and Communication
Engineering (D)
8. Mechanical Engineering (D)
9. Metallurgical Engineering (D)
10. Electrical Engineering (D)

Region (CAR)

St. Louis University (Private)

1. Teacher Education (E)
2. Business Education (D)
3. Architecture (D)
4. Electrical Engineering (D)
5. Electronics and Communication
Engineering (D)
6. Industrial Engineering (D)
7. Mechanical Engineering (D)
8. Nursing Education (E)
9. Civil Engineering (D)

UP - Baguio (Public)

1. Biology (D)
2. Mathematics (D)
3. Physics (D)

Baguio Colleges Foundation (Private)

1. Sanitary Engineering (D)

University of Baguio (CAR) (Private)

1. Sanitary Engineering (D)

Region (ARMM)

Notre Dame of Jolo (Private)

1. Teacher Education (D)

Region (NCR)

Philippine Normal University (Public)

1. Teacher Education (E)

UP - Diliman (Public)

1. Business Education (D)
2. Biology (E)
3. Chemistry (E)
4. Mathematics (E)
5. Physics (E)
6. Architecture (E)
7. Electrical Engineering (E)
8. Geodetic Engineering (E)
9. Industrial Engineering (E)
10. Metallurgical Engineering (E)
11. Chemical Engineering (D)
12. Civil Engineering (D)
13. Electronics and Communication Engineering (D)
14. Mechanical Engineering (D)
15. Mining Engineering (D)
16. Computer Engineering (D)

De La Salle University (Private)

1. Business Education (D)
2. Biology (E)
3. Chemistry (E)
4. Mathematics (E)
5. Physics (E)
6. Chemical Engineering (E)
7. Electronics and Communication Engineering (E)
8. Mechanical Engineering (E)
9. Civil Engineering (D)
10. Industrial Engineering (D)

University of Santo Tomas (Private)

1. Business Education (D)
2. Biology (D)
3. Architecture (E)
4. Electronics and Communication Engineering (E)
5. Chemical Engineering (D)
6. Electrical Engineering (D)
7. Industrial Engineering (D)
8. Mechanical Engineering (D)
9. Medical Education (E)
10. Nursing Education (E)
11. Civil Engineering (D)
12. Chemistry (E)

Ateneo de Manila University (Private)

1. Business Education (D)
2. Biology (E)
3. Chemistry (E)
4. Mathematics (E)
5. Physics (E)

UP Manila (Public)

1. Biology (D)
2. Medical Education (E)
3. Nursing Education (E)

Mapua Institute of Technology (Private)

1. Chemical Engineering (D)
2. Metallurgical Engineering (D)
3. Mining Engineering (D)

Technological University of the Philippines (Public)

1. Civil Engineering (D)
2. Mechanical Engineering (D)
3. Electrical Engineering (D)

Adamson University (Private)

1. Electrical Engineering (D)
2. Industrial Engineering (D)
3. Chemical Engineering (D)
4. Electronics and Communication Engineering (D)
5. Mechanical Engineering (D)
6. Civil Engineering (D)
7. Computer Engineering (D)

Region (CARAGA)

San Nicolas College (Private)

1. Teacher Education (D)

Legend: E: Center of Excellence
D: Center of Development

Disciplines in Business Education, Teacher Education, Engineering and Architecture, Science and Mathematics Education, Medical Education and Nursing Education

Appendix B

COMPARATIVE CURRICULAR PROGRAMS IN VARIOUS PROFESSIONS

UNITED STATES	MALAYSIA	INDONESIA	SINGAPORE	PHILIPPINES	THAILAND																																						
<p>ACCOUNTANCY</p> <ul style="list-style-type: none"> • The minimum educational requirement for accountants is a bachelor's degree in accounting. Programs are offered in colleges and universities throughout the country. • Some positions require a master's degree in either accounting or business administration with a concentration in accounting. • Individuals who hold C. P. A. and P. A. designations must usually take continuing education courses to renew their licenses. 	<ul style="list-style-type: none"> • Association of Chartered Certified Accountants. Educational qualification must meet UK University Entrance Level or equivalent. For Malaysian Singapore Student: <ul style="list-style-type: none"> a) Cambridge overseas School Certificate/ Cambridge Overseas Higher Certificate <ul style="list-style-type: none"> - 2 advanced/ Principal levels (5 distinct and separate subjects) - Subjects must incl. English Language and Mathematics - (or other approved numerate subjects, e.g. statistics counting or commercial math) - Passes at "o" level must be at Grade C level or higher if obtained in or after 1975 	<ul style="list-style-type: none"> • The curriculum is divided into: accounting lessons (45.16% from the total credits), management lessons (11.09 % from the total credits), economics (12.5 % from the total credits), general lessons (24.3% from the total credits). The accounting program in Petra Christian University has three majors: Information System, Auditing and Taxes. It has been done the curriculum efficiency for the accounting program, that is 144 credits for at least seven semesters and reducing some lessons in order to give new lessons which anticipate the development of the accounting and monetary world. 	<ul style="list-style-type: none"> • The three-year accountancy course trains students in a wide range of professional capabilities with emphasis on accounting skills and knowledge. The course emphasizes a practice oriented approach to education and integrates accounting and related disciplines to equip students with the necessary analytical, conceptual, communication and interpersonal skills. Incorporated in the course is a compulsory 8-week professional attachment in industry and an applied research project in the final year of study. • Accountancy students can broaden their training by reading a minor in a selected area of business studies or do a research minor to further equip themselves for post graduate research. An honors degree is awarded for consistent good performance throughout the three-year course of study. 	<ul style="list-style-type: none"> • The accounting program prepares students for careers in accounting and related fields, and makes them ready to deal effectively with the problems they will face as professional accountants and responsible citizens. The programs aims to develop the qualities that enhance the student's professional competence, awareness of responsibilities to society and appreciation of an accountant's high standard of integrity and objectivity. <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">Requirements</th> <th style="text-align: right;">No. of units</th> </tr> </thead> <tbody> <tr> <td>Languages</td> <td style="text-align: right;">21</td> </tr> <tr> <td>Mathematics</td> <td style="text-align: right;">12</td> </tr> <tr> <td>Natural Science</td> <td style="text-align: right;">6</td> </tr> <tr> <td>Physical Education</td> <td style="text-align: right;">8</td> </tr> <tr> <td>Religious Studies</td> <td style="text-align: right;">12</td> </tr> <tr> <td>Social Sciences</td> <td style="text-align: right;">15</td> </tr> <tr> <td>Core Business</td> <td></td> </tr> <tr> <td style="padding-left: 20px;">Professional courses</td> <td style="text-align: right;">69</td> </tr> <tr> <td style="padding-left: 20px;">Major Accounting Subjects</td> <td style="text-align: right;">60</td> </tr> <tr> <td>Total Academic Units</td> <td style="text-align: right;">200</td> </tr> <tr> <td>Non Academics</td> <td style="text-align: right;">9.5</td> </tr> <tr> <td>Total Number of Units</td> <td style="text-align: right;">209.5</td> </tr> </tbody> </table>	Requirements	No. of units	Languages	21	Mathematics	12	Natural Science	6	Physical Education	8	Religious Studies	12	Social Sciences	15	Core Business		Professional courses	69	Major Accounting Subjects	60	Total Academic Units	200	Non Academics	9.5	Total Number of Units	209.5	<table style="width: 100%; border-collapse: collapse;"> <tbody> <tr> <td>Basic courses</td> <td style="text-align: right;">31</td> </tr> <tr> <td>Basic core courses</td> <td style="text-align: right;">57</td> </tr> <tr> <td>Major required course</td> <td style="text-align: right;">30</td> </tr> <tr> <td>Major elective course</td> <td style="text-align: right;">12</td> </tr> <tr> <td>Free elective course</td> <td style="text-align: right;">12</td> </tr> <tr> <td>Total credits</td> <td style="text-align: right;">142</td> </tr> </tbody> </table>	Basic courses	31	Basic core courses	57	Major required course	30	Major elective course	12	Free elective course	12	Total credits	142
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UNITED STATES	MALAYSIA	INDONESIA	SINGAPORE	PHILIPPINES	THAILAND
<p><u>...ACCOUNTANCY</u></p>	<p>b. Sijil Tinggi Persekolaha Malaysia (STPM)</p> <ul style="list-style-type: none"> - Two passes of at least Grade E in the STPM plus 3 passes of at least Grade 6 in SPM - Subjects must include English language and Math <ul style="list-style-type: none"> • Malaysian Association of CPA's (MACPA) <ul style="list-style-type: none"> a. Minimum requirements <ul style="list-style-type: none"> - obtained principal level passes in at least two subjects in the HSC/STPM exams - obtained MCE/SPM with credits in English language and Math and ordinary pass in Bahasa Malaysia b. Degrees, Diplomas and Professional Qualification <ul style="list-style-type: none"> - a range of degrees, diplomas and professional qualification from both local and overseas institution <p>Note: To qualify as a CPA, a person must first register as a student of MACPA and complete the MACPA examinations within the prescribed period; and three years practical</p>		<ul style="list-style-type: none"> • The Bachelor of Accountancy degree is widely recognized by professional accounting as well as by reputable universities overseas for post graduate studies. Upon being required relevant practical experience, Bachelor of Accountancy graduates are also recognized by the Institute of Certified Public Accountants of Singapore as having fulfilled all necessary academic requirements for membership (Nanyang Technological University) <p>Note: Certification of accountants. The Institute of Certified Public Accountants of Singapore is the only official accounting body in Singapore administered by a full-time secretariat. The Institute is responsible for all matters concerning the accounting profession, including the establishment of guidelines for professional procedures, practices and ethics. The body administers the examination for accountants and maintains a</p>	<p>CHED REQUIREMENTS:</p> <ul style="list-style-type: none"> • The maximum curricular requirements for the Bachelor of Science in Accountancy (BS Accounting) as specified in Annex III is 144 units (excluding Physical Education etc.) • The required total number of units for the CPA examinations is 165 units as spelled out in the Accountancy Law. <p>General Education courses make up some 40% of the subjects while 60% constitute the professional courses. The latter in turn consist of 30% business administration and 30% accounting courses.</p>	

UNITED STATES	MALAYSIA	INDONESIA	SINGAPORE	PHILIPPINES	THAILAND
<p>...<u>ACCOUNTANCY</u></p>	<p>b. obtain not less than three years practical training under the supervision of a member of MACPA in public practice or in the employment of an organization approved by the Association to provide CPA training.</p>		<p>register of qualified accountants. Membership without examination is open to members of the Institutes of Chartered Accountants of England and Wales, Australia, Scotland, Ireland and of a number of other accounting bodies.</p>		
<p>CIVIL ENGINEERING</p> <ul style="list-style-type: none"> The minimum education needed for civil engineer is a bachelor's degree in engineering. Many individuals go on to get a master's degree or a Ph. D. The minimum education needed for civil engineer is a bachelor's degree in engineering. Many individuals go on to get a master's degree or a Ph. D. Courses in the first two years of the bachelor's program consists of math and basic sciences such as physics and chemistry. Other courses include social sciences, humanities, English and introductory engineering. During the final two years, students are expected to take all engineering courses. 	<ul style="list-style-type: none"> There are three undergraduate courses offered by the faculty, they are: <ol style="list-style-type: none"> Bachelor in Civil Engineering – Beng (civil) Sarjana Muda Kejuruteraan Awam (SAA) Bachelor in Civil Engineering (Environmental Engineering) – Beng (civil-env.eng) Sarjana Muda Kejuruteraan Awam (Kejuruteraan Alam Sekitar) (SAE) Bachelor in Civil Engineering (Construction Management) Sarjana Muda Kejuruteraan Awam (Pengurusan Pembinaan) (SAC) 	<ul style="list-style-type: none"> It has five major fields: Structure, hydraulic, transportation, geotechnique and Construction Management. The number of credits to be completed is 148 (SKS) within 8 semesters, comprised of common basic components (63 SKS) and skill components (70 SKS) <p>(Tersedia dalam Bahasa Indonesia)</p>	<ul style="list-style-type: none"> In this course, students are equipped with technical, analytical and supervisory skills to support engineers and project managers in the design, construction and maintenance of public infrastructure and buildings. In addition, those who are successful in the training as Building Construction Site Safety Supervisors (BCSS) will be awarded the BCSS Certificate jointly issued by the Ministry of Labour and the Singapore Polytechnic. 	<ul style="list-style-type: none"> The Civil Engineering program aims to respond to the ever increasing demand for high quality civil engineering graduates who can furnish the expertise in the provision of shelter to Filipinos and who can develop the country's infrastructure. Serving both the private and the public sectors of the society, civil engineers engage in various services which include consultation, planning, design, preparation of plans, specifications and estimates, contracting, works engineering and construction project management. 	

UNITED STATES	MALAYSIA	INDONESIA	SINGAPORE	PHILIPPINES	THAILAND
<p>... CIVIL ENGINEERING Many employers offer on-the-job training as well as seminars, classes and workshops. Civil engineers often continue their education to keep up with trends in technology.</p>	<ul style="list-style-type: none"> • The duration of the program is a minimum of eight semesters to a maximum of 12 semesters. As part of the requirements of the course, students are required to attend a survey field course for two weeks at the end of the fourth semester and to submit a report at the end of the course. • • Students are also required to undergo industrial training for eight weeks upon completion of their third year and to submit a report upon completion of the training. In addition, a final year project on a topic approved by the faculty is also compulsory and has to be submitted within the allocated time frame (normally two semesters). • In order to be eligible for an award of a bachelor's degree, minimum credit hours of 127 are required. Students holding a Diploma may be taken directly into the third year degree course with a transfer credit of 63. 		<ul style="list-style-type: none"> • The training covers structural mechanics, theory of structures, steel and reinforced concrete design and detailing, mathematics, applied science, soil and fluid mechanics, foundation engineering, environment engineering, transportation engineering, construction technology, computer programming, computer-aided draughting, contract administration, project management and communication skills. • Graduates with the Diploma in Civil and Structural Engineering are certified by the Building Control Division of the Public Works Department (Singapore) to work as structural clerks-of-works in accordance with the Building Control Act. 	<ul style="list-style-type: none"> • Civil engineering has grown into a diverse branch of engineering which involves various fields of specialization such as structural engineering, construction highway engineering, hydraulics engineering, foundation engineering, and water resources engineering, among others. In response to this development, The Department of Civil Engineering • Introduced innovations in the undergraduate curriculum by incorporating specializations in the field of Structural Engineering (STE), and Construction Technology and Management (CTM) starting in SY 1992-93. The areas of specialization have increased with the addition of Hydraulics and Water Resources Engineering (HWR) in SY 1996-1997 and Transportation Engineering (TRE) starting in SY 1997-1998. In the succeeding years, the specialization in Geotechnical Engineering (GTE) will be implemented. 	

UNITED STATES	MALAYSIA	INDONESIA	SINGAPORE	PHILIPPINES	THAILAND																										
<p>... <u>CIVIL ENGINEERING</u></p>			<ul style="list-style-type: none"> Over the years, graduates have found work as assistant designers, senior draughtspersons, marketing executives for building products, construction supervisors, clerks-of-works, computer software programmers, civil engineering quantity surveyors, site supervisors and project managers in private companies and public agencies. 	<ul style="list-style-type: none"> Under the present curriculum, students are required to take 15 units of specialization courses in STE, CTM, HWR or TRE after they have gained formal admission into one of these specialization programs. The students' undergraduate training will culminate in their exposure to actual industry practice related to their field of specialization through the CE Practicum. <table data-bbox="1377 760 1682 1141"> <thead> <tr> <th>Requirements</th> <th>No. of units</th> </tr> </thead> <tbody> <tr> <td>Language</td> <td>18</td> </tr> <tr> <td>Physical Education</td> <td>8</td> </tr> <tr> <td>Religious Studies</td> <td>12</td> </tr> <tr> <td>Social Sciences</td> <td>18</td> </tr> <tr> <td>Basic Engineering Science</td> <td>22</td> </tr> <tr> <td>Natural Sciences</td> <td>16</td> </tr> <tr> <td>Professional Courses</td> <td>81</td> </tr> <tr> <td>Technical Electives</td> <td>15</td> </tr> <tr> <td>Total Academic Units</td> <td>210</td> </tr> <tr> <td>Non Academic Subjects</td> <td>(6)</td> </tr> <tr> <td>Orientation</td> <td>(1.5)</td> </tr> <tr> <td>Total Number of Units</td> <td>210 (7.5)</td> </tr> </tbody> </table>	Requirements	No. of units	Language	18	Physical Education	8	Religious Studies	12	Social Sciences	18	Basic Engineering Science	22	Natural Sciences	16	Professional Courses	81	Technical Electives	15	Total Academic Units	210	Non Academic Subjects	(6)	Orientation	(1.5)	Total Number of Units	210 (7.5)	
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<p>... CIVIL ENGINEERING</p>				<p>CHED REQUIREMENTS Bachelor of Science in Civil Engineering</p> <p>I Technical Courses</p> <p>a. Mathematics 20</p> <p>b. Natural/Physical Sciences 10</p> <p>c. Basic Eng. Sciences 24</p> <p>d. Professional and Allied Courses 58</p> <p>e. Technical Electives 12</p> <p>TOTAL TECHNICAL COURSES 121</p> <p>II Non Technical Courses</p> <p>a. Language, Humanities & Social Sciences 36</p> <p>b. Miscellany PE (8) CMT (6)</p> <p>TOTAL NON TECHNICAL COURSES 36</p> <p>GRAND TOTAL 160</p>													
<p>LAWYER</p> <ul style="list-style-type: none"> Educational requirements for lawyers include a bachelor's degree plus three years of law school. Individuals should graduate from an American Bar Association approved college or university and will receive a Juris Doctor or J. D. degree. 	<p>The following are requirements for practicing law:</p> <p>a. holder of law degrees awarded by Universities in England, Wales and Northern Ireland or CNNA (UK)</p>	<p>The curriculum consists of General courses (1 credit) Basic Legal courses (47 credits) , Advanced courses (36 credits), Additional skill courses (17 credits), elective courses (6 credits), Improvement Legal skill courses (18 credits) and Sports (non-credits)</p>		<p>CHED REQUIREMENT</p> <p>Subject to the approval of the Bureau of Higher Education, the law school may design its own law curriculum, provided that it complies with the requirements of the Rules of Court.</p>	<table> <tr> <td>1. Law</td> <td>units</td> </tr> <tr> <td>Basic courses</td> <td>33</td> </tr> <tr> <td>Core courses</td> <td>91</td> </tr> <tr> <td>Major required course</td> <td>18</td> </tr> <tr> <td>Major elective course</td> <td>6</td> </tr> <tr> <td>Total credits</td> <td>148</td> </tr> </table> <p>(Assumption University of Thailand)</p>	1. Law	units	Basic courses	33	Core courses	91	Major required course	18	Major elective course	6	Total credits	148
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UNITED STATES	MALAYSIA	INDONESIA	SINGAPORE	PHILIPPINES	THAILAND
<p>...LAWYER</p> <p>A few states may permit individuals to clerk for lawyers instead of one or more years of law school. Clerking means that the individual will be studying with lawyers to get on-the-job training. California allows individuals to take correspondence courses in law instead of classroom training.</p> <ul style="list-style-type: none"> • In order to get into law school, individuals must usually take an examination called the LSAT (Law School Admission Test). 	<ul style="list-style-type: none"> b. Holder of common degree in law or other subjects awarded by the above Universities c. holder of law degrees in Australia and New Zealand if above is insufficient d. passed core subjects in Law of Contracts, Law of Torts, Constitutional and Administrative Law. Land Law and Law of Trusts e. law degree obtained within 6 years except if degree was earned from University of London, which can be earned within 4 years. 	<ul style="list-style-type: none"> • The teaching and learning process is based on the combination of traditional and innovative teaching methods. These skills provide a dynamic professional program for students to develop practical knowledge, understanding and communicative skills <p>(Diponegoro University)</p>		<p>The Law Curriculum shall use the interdisciplinary approach, interrelating with the behavioral sciences. The law curriculum shall reflect the objectives of legal education.</p> <p>Courses in Law shall be generally classified into the following areas:</p> <ul style="list-style-type: none"> a. Perspective courses, consisting of such subjects as Introduction to Law, Roman Law, Legal History, Legal Philosophy, Legal Profession and Legal Bibliography, which may be taken ahead of basic law subjects. b. Basic Law Subjects in the general areas of Civil Law, Political Law, Commercial Law, Criminal Law, Remedial Law, Labor Law and Legal Ethics. c. Specialized Law Subjects in various areas such as Election Law, Agrarian Law, Banking Law, and Taxation. d. Practicum Subjects which are skill courses in legal writing and research, counseling and advocacy, appellate practice, and the like. 	

UNITED STATES	MALAYSIA	INDONESIA	SINGAPORE	PHILIPPINES	THAILAND
<p>...<u>LAWYER</u></p>				<ul style="list-style-type: none"> • Legal Ethics should be a basic component of all courses; toward this end, the law school shall encourage its faculty to focus whenever relevant on the ethical element in each subject. • A law student who is enrolled in clinical legal education program approved by the Supreme Court as part of the curriculum, may assist in the handling of actual cases either in the legal aid clinic of the law school, the Integrated Bar or a voluntary bar or civic association; a private law firm, a legal department of a business enterprise or a government office, including a court or prosecutory office, under the tutelage, supervision and control of judges, fiscals or members of the Bar duly accredited by the law school. Similarly, the business enterprises, government office or private firm above mentioned must also be duly accredited. 	

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<p><u>...LAWYER</u></p>				<ul style="list-style-type: none"> • The law school is encouraged to specialize in a particular field, and the concept of cross enrolment for elective subjects in schools may be allowed, subject to the favor recommendation of the Dean with the approval of the CHED. • A student must have successfully completed a minimum of 134 units to earn a Bachelor of Laws degree, otherwise authorized by the Department. No school shall require more than 152 units to earn a Bachelor's degree in Law. • The school may offer a five-year curriculum spreading out the regular four (4) years to a period of five academic years, subject to the approval of CHED. 	
<p><u>TEACHER</u></p> <ul style="list-style-type: none"> • The minimum educational requirement for teachers is a bachelor's degree in education. Many school districts require their teachers to have or obtain a master's degree. 	<ul style="list-style-type: none"> • For the Bachelor of Education degree, the total number of units required is 150 (64 units from Education, 60 units from the Academic component and 26 units from the University courses). 		<ul style="list-style-type: none"> • Arts with Diploma in Education <p>The four- year Bachelor of Arts with Diploma in Education course combines vigorous academic study with challenging training in pedagogy. Some of the modules being offered include areas such as environmental studies and geographic information systems.</p>	<p>The Teacher Education Department prepares students to teach in any of the following fields of specialization at the Secondary Level: Mathematics, Science, Computer Application, Humanities, Economics, History, Literature, Psychology, Religious and Values Education, English, Behavioral Sciences and Filipino</p>	<p>Plan A: A four-year program requiring no less than 140 credits.</p> <p>Plan B: A two-year program requiring no less than 80 credits.</p> <p>To enter this program, applicants must finish freshmen and sophomore years at Teacher's College.</p>

UNITED STATES	MALAYSIA	INDONESIA	SINGAPORE	PHILIPPINES	THAILAND														
<p>... TEACHER</p>	<ul style="list-style-type: none"> Students must complete their studies within a minimum of 8 semesters and a maximum of 14 semesters. For each semester they are allowed to register for a minimum of 12 and maximum of 22 units of courses. The number of units accumulated at the end of the sixth semester must not be more than 115 units. This number does not include the Teaching Practice units. Requirements for the Award of Degree Bachelor of Education <p>Programme: B. ED (Hons.)</p> <p>Period of Candidature (No. of Semesters)</p> <p>Min: 8 Max: 15</p> <p>Total Minimum Units Required 150</p> <p>No. of Units Allowed To Register Per Semester</p> <p>Min: 12 Max: 22</p> <p>No. of Units Allowed to Accumulate at the End of 6th Semester</p>		<p>Chinese language, cultural history and the history of science, ethnomusicology and the music technology, applied linguistics literature and literary expressions, English, theater –in- education and art education history, critical and contextual studies, design and technology. A special feature of the curriculum is its provision for multilateral development, which allows a student to combine disciplines across divisions or across schools to form innovative programs.</p> <ul style="list-style-type: none"> Outstanding students will be selected to do honours in Chinese language, Chinese Literature, English literature, English language history, geography, Art or Music after their second year. Undergraduates may also choose to be trained as physical educators through the BA with Dip. Ed (PE) course <p>o Science with Diploma in Education</p> <p>The science course incorporates a professional diploma in education or physical education.</p>	<p>Combined Bachelor of Secondary Education and Bachelor of Science.</p> <p>Requirements No. of Units</p> <table> <tr> <td>General Educ.</td> <td>92</td> </tr> <tr> <td>Non Acad. Subjects</td> <td>7.5</td> </tr> <tr> <td> Orient</td> <td>(1.5)</td> </tr> <tr> <td> ROTC</td> <td>(6)</td> </tr> <tr> <td>Major Courses</td> <td>65-102</td> </tr> <tr> <td>Research</td> <td>6</td> </tr> <tr> <td>Professional Educ.</td> <td>41</td> </tr> </table> <p>Total Number of Units 211.5-248.5</p> <p>CHED REQUIREMENTS:</p> <p>SUMMARY OF BEED CURRICULUM</p> <p>General Education – 68 units (46%) Professional Education – 57 units (38%) Area of Concentration – 24 units (16%) Total = 149 units (100%)</p> <p>A minimum academic units of 149 for BEED and 152 for BSED is required for graduation.</p>	General Educ.	92	Non Acad. Subjects	7.5	Orient	(1.5)	ROTC	(6)	Major Courses	65-102	Research	6	Professional Educ.	41	<p>Major Areas:</p> <ol style="list-style-type: none"> Sciences-Mathematics Sciences-Chemistry Sciences-Biology Sciences-Physics Sciences and Biological Sciences Home Economics Elementary Education Educational Technology Guidance Educational Measurement Adult Education Social Studies
General Educ.	92																		
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<p>... TEACHER</p>	<p>Total number of units accumulated at the end of 5th semester together with those registered for the 6th semester should not exceed 115 units.</p> <p>However, the Dean has the right to waive the rules governing the minimum/ maximum number of units that a candidate can register per semester. But this provision cannot be used to enable a candidate to obtain a degree in less than eight semesters.</p> <p>Last updated : 10 April 1996</p>		<p>It is designed to provide undergraduates with rigorous academic and pedagogical knowledge and skills not only to prepare them for their professional roles as primary, secondary science teachers and school leaders, but also to widen their future career prospects.</p> <p>A special feature of the course is that students have the flexibility either to read only Science subjects, e.g biology and mathematics or to select a cross disciplinary mode by combining a science subject with one in arts /humanities, e.g. Physics and Music</p> <p>Curriculum and education studies, Teaching Practice and School. Attachments and research project works are also emphasized.</p> <p>Outstanding students will be selected to read honours in Biology, Chemistry, Mathematics, Physics and Zoology</p> <p>Higher degree by research in MSc and PhD are offered for graduates and professional seeking to upgrade themselves.</p> <p>(Nanyang Technological University)</p>	<p>Consist of the humanities, natural and behavioral sciences and computer literary, mathematics, logic and ethics aimed at developing a broad educated, creative cultured and morally upright and productive person.</p> <p>Includes philosophy and aims of education, curriculum development teaching and learning processes, teaching and learning principles and theories, direct and substantial participation in teaching to provide clinical experience over a period of time. equip the teacher with in depth knowledge of the context and specified skills in the major field.</p>	

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<p><u>MECHANICAL ENGINEERING</u> Mechanical Engineers should have at least a Bachelor's degree in engineering with an emphasis in mechanical engineering. A master's or PhD degree maybe required for some administrative, supervisory or teaching positions. Courses in the first two years of the Bachelor's program consists of Math and basic sciences such as physics and chemistry, social sciences, humanities, and introductory engineering. During the final two years, students are expected to take all engineering courses with a major emphasis in mechanical engineering. It is recommended that mechanical engineers continue their education to keep up with trends in technology. Many employers also offer on-the-job training as well as seminars, classes and workshops.</p>	<p>ME 111 Engineering Drawing (3 credit) The principles of engineering design and drawing; the principles of projection, and perspective drawing and its conclusion; assembly drawing; dimensioning; and design by computer.</p> <p>ME112 Workshop Practice (1 credit) Machine operations such as lathing, shaping, surface finishing, hobbing, fitting, gas, and electric welding; high pressure welding, sheet metal work.</p> <p>ME 121 Engineering Materials (3 credit) The structures and properties of crystals and amorphous substances; the movement of electrons in sold and conductivity; metals; charts of materials; heat treatment; the study of corrosion; ceramic property; polymer; concrete and reinforcement.</p>	<ul style="list-style-type: none"> A Bachelor in Mechanical engineering is considered as a general practitioner since his educational scope is broa and his field includes a variety of interdisiplinary approach such as engineering, social, environment and economical issues. Thus, the curriculum is designed in such fashion that the students are not only capable in their own field but also in comprehending other problems. The number of credits to be taken is 152 credits within 8 semesters comprised of General science course (12 credits) Selective Science courses (2 credits); Basic skill course (22 credits); Special basic course's (36 credits); Skill course (55 credits); Additional courses (25 credits) Mechanical engineering of Petra has three majors Productional Engineering, Design and Energy conversion. 	<ul style="list-style-type: none"> All engineering students follow a common course during their first year of study after which the students will elect to pursue courses for their second, third and final years in one of the following branches: <ul style="list-style-type: none"> - Civil and structural engineering - Electrical and Electronic engineer - Mechanical and Production Engineering - The first-year curriculum is designe to expose students to basic subject relevant to all branches of engineering such as engineering physics, mathematics, graphics, computing, economics as well as laboratory experiments and workshops. <p>The second and third year curricula consists of core subjects in the particular branches of engineering. An In house practica ll training programme are also included to prepare students to play an effective role in industry upon graduation.</p>	<p>Mechanical Engineering (ME) is a course profession that concerns itself with mechanical design, energy conversion, fuel and combustion technologies, heat transfer, engineering materials, manufacturing processes, automatic control, product safety and reliability, alternative sources of energy, and technological impacts on society. Recent technological developments have necessitated changes in the curriculum to include computer applications, electronic controls and mechatronics.</p> <ul style="list-style-type: none"> The DLSU Mechanical Engineering program has been revitalized to reflect these changes. The entire course provides the students with a solid scientific and technological knowledge, a grounding in the Code of Ethics and opportunities for students to exercise engineering judgement, creativity ingenuity and ability to lead others. 	

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<p><u>...MECHANICAL ENGINEERING</u></p>	<p>ME 122 Engineering Graphics (2 credits)</p> <p>An introduction to drawing of sign symbols by computer, electronic circuits and mechanical devices; and engineering applications of CAD-CAM.</p> <p>ME 211 Engineering Mechanics (3 credits) Prerequisites: PH 101, MA 106</p> <p>The study of topics such as: equilibrium force analysis; applying equilibrium equations to structures and machines; the center of gravity; Poppus's theory; beams; fluid mechanics; friction; analyses by virtual work principles; the equilibrium stability; and moments of inertia of area.</p> <p>ME 221 Engineering Mechanics II (3 credits) Prerequisite: ME 211</p> <p>Topics: Mass moments of inertia; the mechanics of particle and object; velocity and acceleration; the impulse and momentum principles; energy and work principles; central force motion; gravity force; impact force; movements inclined planes.</p>		<p>In the final year of study, students are encouraged to specialize through taking optional subjects groups. In civil engineering, for example, students can specialize in structure, Geotechnics Water and transportation. In electrical engineering students can specialize in power, Control, electronics, computer Avionics and Communication Engineering, While in mechanical engineering, students can specialize in Thermal engineering, Applied mechanics, Production engineering and Aeronautical Engineering.</p> <p>(Nanyang Technological university)</p>	<p>Requirements No. of Units</p> <p>Language 18</p> <p>Mathematics 20</p> <p>Physical Educ. 8</p> <p>Religious Studies 12</p> <p>Social Sciences 18</p> <p>Basic Engineering Science 22</p> <p>Natural Sciences 16</p> <p>Professional Courses 94</p> <p>Technical Electives 2</p> <p>Total Acad. Units 210</p> <p>Non Acad. Subjects Orientation (6) (1.5)</p> <p>Total No. of Units 210(7.5)</p>	

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<p>...MECHANICAL ENGINEERING</p>	<p>ME 311 Fluid Mechanics (3 credits) Prerequisites : MA 107, ME 221</p> <p>The study of definitions, dimensions and units; fluid properties and fluid statics; the pressure and measurement of forces on submerged surfaces; the stability of floating bodies and the equilibrium of ideal and real fluid; laminar and turbulence flows; compressible and incompressible fluids; continuity and Euler's equation; Bernoulli's equation; equation energy and their applications ; flow measurements; momentum equation; power losses of fluid in pipes; analysis of pipe networks; dimensional analysis and modeling.</p> <p>ME 321 Thermodynamics (3 credits) Prerequisites: MA 107, ME 221</p> <p>The study of definitions; the properties of pure substances and ideal gases; work and heat; the first and second laws of thermodynamics and Carnot's cycle and the standard air power cycle; the refrigeration cycle.</p>				

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<u>GENERAL MEDICINE</u>		<p>The length of study is 12 semesters plus 3 months of Kuliah Kerja Nyata (on-the-job training outside campus mostly in rural areas)</p> <ul style="list-style-type: none"> ▪ Based on the decree of the Ministry of Education and Culture in November 1994, all medical schools in Indonesia have to carry out the National as a core curriculum. The faculty has designed its curriculum and 20% of local contents. Within the local contents are the community oriented medical education (COME) and student research assignment to fulfill the Development of Karya Tulis Ilmiah (KTI= Skripsi) Final scientific paper. Each department is permitted, or motivated, to add more instructional objectives which are still relevant or to broaden the existing core objectives. In the first 6 semesters <p>(Program Pendidikan Dasar) (PPD). Most of the instructional designs are subject based, except those of the field assignment in COME.</p>	<p>The course consists of lectures and practical work, which will extend over three terms of the third year.</p> <p>Syllabus: Systematic lectures in internal medicine and pediatrics and the clinical examination of patients.</p> <p>Examination: The examination will comprise one three-hour paper, a clinical examination and an oral examination (National University of Singapore).</p>	<p>CHED REQUIREMENTS</p> <p>The curriculum shall be at least four years consisting of 3 years of dedicated teaching learning activities and one year of practicum. At least 1 ½ shall be devoted to basic biomedical science in the first and second year and 1 ½ year to clinical sciences in the second and third year. The fourth year shall be a full clinical clerkship.</p> <p>The curriculum shall include the following:</p> <ol style="list-style-type: none"> 1. Anatomy 2. Anesthesiology 3. Biochemistry, Molecular Biology and Nutrition 4. Clinical Pathology or Laboratory Diagnosis 4.5 Legal Medicine, Medical Jurisprudence, Health Economics and Medical Ethics 4.6 Medicine, Microbiology, Neurology, Obstetrics- Gynecology, Ophthalmology and Otorhinolaryngology, Parasitology, Pathology, Pediatrics, Pharmacology and Therapeutics Physical Medicine and Rehabilitation 	<p>Today, third to sixth year medical students of Srinakharinwirot University still enjoy the wide range of experiences available from the staff and resources of these affiliated hospitals in this cooperative-study program.</p> <p>Throughout the years, the Faculty of Medicine at Srinakharinwirot University has kept to the original objective of its establishment, that is, to produce physicians to meet the demand for doctors throughout the country, especially outside of Bangkok in the more rural areas.</p> <p>Its curriculum includes field work that open students from the second year onwards to the health problems and living conditions of people in very rural areas. Sixth year students are required to do field work in village, subdistrict or provincial hospitals. Approximately 50% of seats in each year is available for students from outside of Bangkok.</p>

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<p><u>...GENERAL MEDICINE</u></p>		<p>However , since 1987, in the Program Pendidikan Sarjana (PPS), a problem based approach has been introduced through an integrated teaching known as kepanite raan Umum (Panum= general clerkship).</p> <p>This panum is used to bridge the theoretical phase in I –III semester to practical work with patients in the wards in the last phase of the study. In the Program Pendidikan Profes (PPP= in the last 4 semester) all the departments use the problem-based approach. COME is carried out in the form of field experience for students from the 3rd trimester to the 12th semester.</p> <p>The leading sector is the Department of Public Health, with other departments involved, such as the Department of Nutrition, Department of Child Health, Department of Obstetrics and Gynecology and Department of Psychiatics. These departments provide supervisors for students. Different levels of community understanding is given to the students, which are RT/Rk ? hamlet and Kecamatan.</p>		<p>Physiology Family and Community Medicine Psychiatry Radiology Surgery</p>	<p>The six-year medical program is divided into 3 phases:</p> <ol style="list-style-type: none"> 1. The Pre-Medical Phase (1 year) Students are required to take general courses in languages, the humanities & social sciences as well as in science (i.e. biology, chemistry, physics, & math). These provide students with a general background that prepares them for further medical studies. 2. The Pre-Clinical Phase (2 years) Students begin to take fundamental courses in anatomy, bio-chemistry, physiology, microbiology, pathology, introduction to clinical work and beginning clinical work. For the first one and a half years, students study at Srinakharinwirot University (Prasarnmit), and the latter half year at Vajira Hospital. <p>The Clinical Phase (3 years) Clinical study introduces students to epidemiology, symptoms of diseases, diagnosis, treatment methods, and prevention. This part of education takes 3 years at Vajira Hospital, Police General Hospital and other affiliated hospitals.</p>

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<p><u>INDUSTRIAL ENGINEERING</u></p>	<ul style="list-style-type: none"> • The number of specialist streams and examples of core subjects offered: <ul style="list-style-type: none"> - Production Planning and Control - Statistical Quality and Control Operation Research - Facilities Planning and Layout - Project Management • The S-I-T Diploma in Engineering is recognized by many Australian and UK universities which admit holders directly into the second year engineering (Honours) degree programs. <p>Duration : 2 years full-time (3 semester per year)</p>	<p>The emphasis of curriculum in Industrial engineering is in mastering industrial systems such as those in the manufacturing industry. The number of credits to be completed is 152 credits in 8 semesters. The curriculum is classified into 4 stages:</p> <p>Stage 1: The students have awareness and technical skill for basic technical and economic knowledge</p> <p>Stage 2: The students have concept of planning an industrial system</p> <p>Stage 3: The students can integrate all the knowledge they get to analyze an industrial system</p> <p>Stage 4: The students can design a complex industrial system</p> <p>In stages 3 and 4, students begin to specialize themselves in the fields of skill which interest them. In industrial engineering and management, there are two major fields: industrial engineering and management engineering.</p>		<p>The Department of Industrial Engineering envisions its graduates as professionals with working competence in Production Systems, Operations Research, and Ergonomics and Product Design. The Industrial Engineering graduate is knowledgeable in the different engineering processes which enables him/her to develop an understanding of the implications of technological parameters, problems, opportunities, and operations to the whole set of management systems, and conversely, the implication of management decisions to the technical aspect of the enterprise. The graduates employ disciplined and systematic approaches to the management of people, equipment materials, capital energy, and information drawing upon knowledge and skills from the mathematical, physical and social sciences.</p>	<p>The curriculum is administered by the Industrial Engineering Program.</p> <p>Modern industrial engineering is a combination of basic engineering knowledge and quantitative analysis techniques to support managerial decision making. It is concerned with the efficiency in which work is performed by machines, people, and computers. Industrial engineers use the information and techniques from physical, mathematical, biological, behavioral and engineering sciences to plan, control, design and manage complex organizations and systems. Specifically, they utilize knowledge and principles in operations research, ergonomics, management and manufacturing systems in specifying, predicting and evaluating the results obtained from industrial and business systems.</p>

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<u>...INDUSTRIAL ENGINEERING</u>				<p>Thus, the Department of Industrial Engineering is a resource of the University in developing scientific disciplines, and consequently provides an environment that promotes national development in the Christian context and a commitment to the socially responsible practice of one's profession.</p> <table border="0"> <thead> <tr> <th>Requirements</th> <th>No. of Units</th> </tr> </thead> <tbody> <tr> <td>Language</td> <td>18</td> </tr> <tr> <td>Mathematics</td> <td>23</td> </tr> <tr> <td>Physical Education</td> <td>8</td> </tr> <tr> <td>Religious Studies</td> <td>12</td> </tr> <tr> <td>Social Sciences</td> <td>18</td> </tr> <tr> <td>Basic Engineering Science</td> <td>32</td> </tr> <tr> <td>Natural Sciences</td> <td>16</td> </tr> <tr> <td>Professional Course</td> <td>71</td> </tr> <tr> <td>Technical Electives</td> <td>12</td> </tr> <tr> <td>Total Acad. Units</td> <td>210</td> </tr> <tr> <td>Non Acad. Subjects Orientation</td> <td>(6) (1.5)</td> </tr> <tr> <td>Total No. of Units</td> <td>210(7.5)</td> </tr> </tbody> </table>	Requirements	No. of Units	Language	18	Mathematics	23	Physical Education	8	Religious Studies	12	Social Sciences	18	Basic Engineering Science	32	Natural Sciences	16	Professional Course	71	Technical Electives	12	Total Acad. Units	210	Non Acad. Subjects Orientation	(6) (1.5)	Total No. of Units	210(7.5)	<p>The study of industrial engineering places emphasis upon developing the students abilities to analyze and design systems that integrate technical, economic, and social behavioral factors in industrial, service, social, and government organizations. This study leads to a variety of professional opportunities in industry and manufacturing, health care services, research and development, financial centers, public enterprises, and business corporations. Its concepts and principles also help prepare students for their graduate study in industrial engineering, management engineering, business administration, and other fields.</p> <p>In order to accomplish these objectives, the Department of Industrial Engineering offers a curriculum that is specifically designed to distinguish itself from the curricula offered at other Thai technical institutions, but is also at the standard comparable to those offered at renowned international universities. The curriculum presents industrial engineering courses that cover four major areas .</p>
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<u>...INDUSTRIAL ENGINEERING</u>					Namely, operations research/ quantitative analysis, manufacturing systems, ergonomics, and management. Although, the curriculum is well-balanced among four areas, the Department places its main emphasis on quantitative analysis and highlights its applications especially to the areas mentioned earlier. The offering of courses is carefully arranged so that those providing basic and fundamental concepts are taught in the early years to build adequate technical background. Then, their applications are discussed in depth in courses presented in the later years.
<u>ELECTRICAL ENGINEERING</u>	<ul style="list-style-type: none"> Starting from the academic session of 1996/97, the university has introduced a semester system. This system will take effect starting on this session's first year students and consecutive enrolments. Every student pursuing a course in Engineering must take at least 12 credit hours in the ordinary semester and they should fulfill the Engineering Faculty Course requirements listed below: 	It is directed to prepare students to be Electrical Engineering Bachelors who have additional values by giving lecture materials that are always up-to-date and follows the development of technology and offering students with managerial ability. Electrical engineering has three major courses: Power engineering, Electronics engineering, and computer engineering.		The course structure has a continuing theme of electrical and electronic engineering, backed up by engineering science, mathematics, computer application in engineering and related engineering studies. Emphasis is given to the utilization and control of electrical energy. Theoretical and practical technical subjects are dealt with so as to relate them to current engineering practice.	From the total credit requirement of 150 credits, 94 credits are allocated for compulsory courses for all majors and 12 credits of technical elective courses for the General EE major and 12 credits of compulsory technical courses for majors in either Telecommunications of Power Systems. The compulsory courses for all majors are designed to provide the student with broad knowledge in

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<p>...<u>ELECTRICAL ENGINEERING</u></p>	<p>Science Fundamental and Material Engineering (3 credits) Engineering Drawing And Computer Aided Design (4 credits) Engineering Mathematic 1 (3 credits) Engineering Mathematic 2 (3 credits) Engineering Mathematic 3 (3 credits) Computer And Programming (3 credits) Engineer and Society (3 credits) Management Theory, Economics And Law (3 credits) Industrial Training (3 credits)</p>		<p>SECOND YEAR Core Subjects Communication Skills II Principles of Economics* Network Analysis Analogue Electronics Electronic Materials & Devices Engineering Mathematics I Electromagnetic Theory Digital Electronics AC Circuits & Devices Engineering Mathematics II Laboratory I Laboratory II Engineering Design A Project A In-House Practical Training</p> <p>Note: Direct-entry students are required to take G133 in addition to the core subjects.</p> <p>THIRD YEAR Core Subjects Control Engineering Communication Principles Integrated Circuits and Semiconductor Processing Technology Microprocessors Power Systems & Machines Laboratory III Engineering Design B Project B Industrial Attachment</p>	<p>The content of subjects is kept in line with the rapidly advancing technology. Various modern trainers are widely used within the course. The course educates potential leaders, able to work in multi-disciplinary teams in engineering profession, capable of adapting to the complex technological and human problems which they will encounter in society. In the course structure there is a subject in improving communication skills and leadership capabilities.</p>	<p>electrical engineering which is necessary to satisfy the general needs of the industrial sector in Thailand. The compulsory courses include five laboratory courses in electrical engineering which are provided to illustrate practical aspects of electrical circuits and machines, electronics, and feedback control. The curriculum is designed so that by the end of the third year, the student will have completed all compulsory courses, except for project courses which will be taken in the fourth year.</p>

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<p><u>...ELECTRICAL ENGINEERING</u></p>	<p>ELECTRICAL ENGINEERING COURSE SYLLABUS</p> <p>FIRST STAGE:</p> <p>Circuit Theory and Field Theory (4 credits) Electronics I (4 credits) Digital System (3 credits) Electrical Machine (3 credits) Mechanics Engineering (3 credits) Laboratory 1 (1 credit) Laboratory 2 (1 credit)</p> <p>INTERMEDIATE STAGE :</p> <p>Communication I (3 credits) Circuit Theory II (3 credits) Optics Communication and Optoelectronics (3 credits) Remote Sensing (3 credits) Microprocessor/Signal Processing (3 credits) Microelectronics (3 credits) Artificial Intelligence, Fuzzy Logics and Neural Network (3 credits) Power System (3 credits) Power System Operation (2 credits) Power Quality (2 credits)</p>		<p>FINAL YEAR Core Subjects Engineers and Society Managing Human Resource and Entrepreneurship Principles of Law Final Year Project Software Engineering</p> <p>Prescribed Electives In addition to the core subjects, students are required to take 2 prescribed subjects and 3 prescribed elective subjects to be selected from one option group and 1 additional prescribed elective subject to be selected from any option group (Table 1) or the Open List (Table 2).</p> <p>General Electives In addition to the core subjects and prescribed electives, students are required to take a minimum of 6 academic units of general electives from the following list of subjects offered by the school or subjects offered by other schools with the approval of the Dean.</p> <p>Direct-entry students are required to take G133 as part of their general core requirement in lieu of 4 academic units of general elective.</p>	<ul style="list-style-type: none"> The course is offered as a cooperative education program Full-time students intermit their formal academic studies to enter industrial attachments for a period of three months. The academic components of the course is present in two stages extending over eight semesters. At the end of the last academic stages of the course, students are sent to suitable industrial firms for attachment. The aim of this attachment is to familiarize students with industrial work environment. <p>CHED REQUIREMENTS</p> <p>To prepare the graduate for a professional Electrical Engineering career, including professional practices, management and entrepreneurship, the graduate must have a strong foundation in the basic science and mathematics and should consider the economic social and environmental significance of electrical projects.</p>	<ul style="list-style-type: none"> For the general EE major, a high number of total credits for technical elective courses are allocated in the curriculum so that students, with the aid of faculty advisors, can plan a sequence of technical elective courses with high flexibility in order to intensify their knowledge in study areas of interest. Three areas of study provided in the curriculum are: <ul style="list-style-type: none"> Communications and Networking Power Systems and Energy Solid State and Electronics In addition, technical elective courses are provided for students who would like to gain experience in the area of research and development Courses for topics in electrical engineering are also offered as technical elective courses in order to cope with rapid changes in technology and the highly diverse areas of study in electrical engineering.

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<p><u>...ELECTRICAL ENGINEERING</u></p>			<p>E980 Research Exercise E981 Financial and Management Accounting E982 Industrial Management E983 Communicating Scientific Ideas E984 Introduction to Technology Management</p> <p>Note: Not all subjects are offered in any one academic year.</p>	<p>I. Technical Courses b. Mathematics - 26 c. Natural/Physical Sciences . 10 d. Basic Engineering Science . 41 e. Professional and Allied Courses 62</p> <p>II. Non Technical Courses a. Languages and Humanities . 21 b. Social Sciences 15 c. Mandated Course 3 d. Miscellany PE 8 CMT 6 Grand Total 178</p>	<p>Students who would like to apply for an Engineering Professional Control License in either Communications or Power Systems must take 4 compulsory technical courses (12 credits) approved by the Engineering Professional Control Committee instead of technical elective courses. Students will be allowed to re-register in any course offered by the program which are required for applying for the license if they have previously received a grade lower than "C"</p>
<p><u>ARCHITECTURE</u></p>	<p>Bachelor of Architecture This program is offered to meet the manpower needs for architects and for the schools development to fully utilize the existing personnel and physical resources. This would also strengthen the effort in research development in the field of local architecture. This program is implemented on a two-year system whereby in the first stage (3 years) the Bachelor of Science (H.B.P.) degree is awarded followed by the Bachelor of Architecture degree in the second stage (1 year).</p>	<p>The aim of this department is to improve the skill of designing elaborate environments that could naturally satisfy the physical, emotional, and social needs of the consumer and that are friendly towards nature. The credits to be met are 144 (SKS) completed in 8 semesters. Since the designing skill is estimated, the Architecture Designing course is the most essential course, supported by other courses such as Environment Science, Construction Structure, The History/Theory of architecture, City Planning, Community</p>		<p>The University of San Carlos BS Architecture program spans the three-year Building Construction program plus 2 or more years of higher studies in Architecture Theory and Design. These professional courses place emphasis on design approaches sensitive to local conditions, utilizing basic and empirical data as starting points for design . Placement and time slot for a 2-year practicum are built in features of this 5-year ladder type program. In the terminal year, a range of electives plus an undergraduate thesis complete the requirements for the B.S. Architecture degree.</p>	<p>General Education Courses 30 units Core courses 45 units Major required course 90 units Major elective course 3 units Free elective course 3 units Total credits 171 units (Assumption University of Thailand)</p>

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<p>...<u>ARCHITECTURE</u></p>	<p>The Bachelor of Science (H.B.P.) has the following features:</p> <p>Bachelor of Science (H.B.P.) with Honours</p> <ul style="list-style-type: none"> • This is a minimum of three-year or 6 semester programme. • Successful students will be conferred the Bachelor of Science (HBP) with honours. • This programme was established in response to the call of government to produce trained, skilled and knowledgeable graduates to overcome problems facing the development of the built environment. • They also will undertake responsibility in relation to the various planning and construction processes. Therefore, specialization in the initial years of the programme is reduced as compared to other similar programmes at other institutions. • The school emphasizes training to improve interrogatively the technical, management, administrative and development fields that provide graduates the 	<p>Planning, Construction Economics, Professional study, CADD, etc. In order to improve the learning process, all of the odd and even semester courses are offered every semester.</p>			

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<p><u>...ARCHITECTURE</u></p>	<p>opportunity to absorb a wider range of knowledge, able to adapt to various conditions and to solve problems creatively and innovatively.</p> <p>HBP graduates can contribute their resources in various fields, for example as development administrators and project managers. Many others have gone on to further advanced studies, leading to a professional status in</p> <ul style="list-style-type: none"> • Architect ure • Planning • Quantity Surveying • Construction Management <p style="text-align: center;">OR</p> <ul style="list-style-type: none"> • Higher academic qualification. 																																				
<p><u>DENTISTRY</u></p> <ul style="list-style-type: none"> • Dentist must attend a dental school approved by the Commission on Dental Accreditation. They may graduate with either a Doctor of Dental Surgery or a Doctor of Dental Medicine (D.D.M.) degree. Dental students go through dental instructions, laboratory work and preclinical and practical experience. This course of study usually takes four years to complete. 		<ul style="list-style-type: none"> • The new curriculum is competency-based, with emphasis in imparting basic skills essential to the practice of dentistry. The didactic programme will teach relevant knowledge and skills necessary to train a competent general dental practitioner. This will reduce excesses in the curriculum. 	<p>Goal</p> <p>The curriculum should be one which will provide adequate training for a dental graduate to practice sound general dentistry and to instill a commitment to learning throughout his/her professional life.</p>	<p>CHEd REQUIREMENT</p> <p style="text-align: center;">FIRST YEAR</p> <p>FIRST SEMESTER</p> <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th></th> <th style="text-align: center;">Hrs.</th> <th style="text-align: center;">Units</th> <th></th> </tr> <tr> <th></th> <th style="text-align: center;">Lec</th> <th style="text-align: center;">Lab</th> <th style="text-align: center;">Total</th> </tr> </thead> <tbody> <tr> <td>Gen. Anatomy I</td> <td style="text-align: center;">3</td> <td style="text-align: center;">6</td> <td style="text-align: center;">5</td> </tr> <tr> <td>Gen. Microscopic Anatomy and Embryology</td> <td style="text-align: center;">2</td> <td style="text-align: center;">6</td> <td style="text-align: center;">5</td> </tr> <tr> <td>Biochemistry</td> <td style="text-align: center;">2</td> <td style="text-align: center;">6</td> <td style="text-align: center;">5</td> </tr> <tr> <td>Oral Anatomy</td> <td style="text-align: center;">2</td> <td style="text-align: center;">6</td> <td style="text-align: center;">4</td> </tr> <tr> <td>Computer Program 1</td> <td style="text-align: center;">2</td> <td style="text-align: center;">3</td> <td style="text-align: center;">5</td> </tr> <tr> <td>TOTAL</td> <td></td> <td></td> <td style="text-align: center;">21</td> </tr> </tbody> </table>		Hrs.	Units			Lec	Lab	Total	Gen. Anatomy I	3	6	5	Gen. Microscopic Anatomy and Embryology	2	6	5	Biochemistry	2	6	5	Oral Anatomy	2	6	4	Computer Program 1	2	3	5	TOTAL			21	
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<p>...DENTISTRY</p> <ul style="list-style-type: none"> In order to be accepted at dental school, you must have at least three to four years of college education with courses in sciences and humanities. Individuals must also take a national examination. Preference is often given to students who are residents of the state in which the dental school is located. Admissions are based on a number of factors including scores on the national exam, overall grade point average and the grade point average for science classes and personal interviews and recommendations. Additional education must be obtained in order for dentists to practice specialties. 		<ul style="list-style-type: none"> Clinical competency tests will replace the current schedule-based clinical assessment. A student will sign up for competency tests for different procedures after he or she has adequate exposure to basic clinical competency. This will allow the more clinically-competent students to progress at a faster rate. At the same time, students who may need remedial help can be identified. <p>Integration of courses</p> <p>There will be more integration and co-ordination between disciplines and departments. This will reduce duplication and increase multi-disciplinary teaching. The introduction of the Oral Biology module integrates oral physiology and oral biochemistry which were previously taught in different departments. Other integrated multidisciplinary courses are Cariology, Occlusion, Radiology, Behavioral Science, Ethics and Jurisprudence and General Practice Management</p> <p>Development of analytical and problem solving skills</p>	<p>Objectives</p> <p>The dental graduate should possess:</p> <p>A thorough understanding of the biological sciences to enable the integration and correlation of these basic sciences with clinical dental practice.</p> <ol style="list-style-type: none"> Competence in diagnosis of oral and dental diseases including an understanding of the relationship between general and oral diseases. Skills to provide the preventive and treatment services commonly required in dental practice. The ability to organize and administer a dental practice efficiently. Ability to appraise and apply research findings and new technology. A commitment towards continuing education. A sense of professional, ethical and social responsibility. 	<p>SECOND SEMESTER</p> <table border="1"> <thead> <tr> <th></th> <th>Hrs.</th> <th>Units</th> <th></th> </tr> <tr> <th></th> <th>Lec</th> <th>Lab</th> <th>Total</th> </tr> </thead> <tbody> <tr> <td>Gen. Anatomy II (H and N)</td> <td>3</td> <td>6</td> <td>5</td> </tr> <tr> <td>Oral Microscopic Anatomy & Embryology</td> <td>2</td> <td>6</td> <td>4</td> </tr> <tr> <td>Gen. Physiology with Family Planning</td> <td>2</td> <td>3</td> <td>3</td> </tr> <tr> <td>Dental Materials</td> <td>2</td> <td>3</td> <td>3</td> </tr> <tr> <td>Nutrition</td> <td>2</td> <td>-</td> <td>2</td> </tr> <tr> <td>Microbiology</td> <td>2</td> <td>3</td> <td>3</td> </tr> <tr> <td>TOTAL</td> <td></td> <td></td> <td>21</td> </tr> </tbody> </table> <p>SECOND YEAR</p> <p>FIRST SEMESTER</p> <table border="1"> <tbody> <tr> <td>Gen. Pathology</td> <td>2</td> <td>6</td> <td>4</td> </tr> <tr> <td>Pharmacology</td> <td>2</td> <td>3</td> <td>3</td> </tr> <tr> <td>Restorative Dentistry I</td> <td>2</td> <td>6</td> <td>4</td> </tr> <tr> <td>Prosthodontics I (C&B)</td> <td>2</td> <td>6</td> <td>4</td> </tr> <tr> <td>Technical Composition</td> <td>2</td> <td>-</td> <td>2</td> </tr> <tr> <td>Oral Physiology</td> <td>2</td> <td>3</td> <td>3</td> </tr> <tr> <td>TOTAL</td> <td></td> <td></td> <td>20</td> </tr> </tbody> </table> <p>SECOND SEMESTER</p> <table border="1"> <tbody> <tr> <td>Oral Pathology I</td> <td>2</td> <td>6</td> <td>4</td> </tr> <tr> <td>Restorative Dentistry II</td> <td>2</td> <td>3</td> <td>3</td> </tr> <tr> <td>Prosthodontics II (R.P.D.)</td> <td>2</td> <td>6</td> <td>4</td> </tr> <tr> <td>Prosthodontics III (C.D.)</td> <td>2</td> <td>6</td> <td>4</td> </tr> <tr> <td>Anesthesiology</td> <td>2</td> <td>-</td> <td>2</td> </tr> <tr> <td>Orthodontics I (Growth & Devt.)</td> <td>1</td> <td>3</td> <td>2</td> </tr> <tr> <td>TOTAL</td> <td></td> <td></td> <td>19</td> </tr> </tbody> </table>		Hrs.	Units			Lec	Lab	Total	Gen. Anatomy II (H and N)	3	6	5	Oral Microscopic Anatomy & Embryology	2	6	4	Gen. Physiology with Family Planning	2	3	3	Dental Materials	2	3	3	Nutrition	2	-	2	Microbiology	2	3	3	TOTAL			21	Gen. Pathology	2	6	4	Pharmacology	2	3	3	Restorative Dentistry I	2	6	4	Prosthodontics I (C&B)	2	6	4	Technical Composition	2	-	2	Oral Physiology	2	3	3	TOTAL			20	Oral Pathology I	2	6	4	Restorative Dentistry II	2	3	3	Prosthodontics II (R.P.D.)	2	6	4	Prosthodontics III (C.D.)	2	6	4	Anesthesiology	2	-	2	Orthodontics I (Growth & Devt.)	1	3	2	TOTAL			19	
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<p><u>...DENTISTRY</u></p>		<p>The new curriculum will aim at developing students' analytical and problem-solving skills. Problem-based learning (PBL) has been introduced. PBL involves the presentation of a clinical problem to the students and they will analyse and then look for the information themselves. This will train the students to be independent learners, an important trait to acquire for survival in the next millennium.</p> <p>Research projects will be given more emphasis in the new curriculum.</p> <p>Information Technology The new curriculum will exploit information technology (IT). IT will be incorporated where applicable in the curriculum. Students will be able to plug-in at various locations in the Faculty, clinic, laboratories, tutorial rooms etc. to be able to access information.</p>		<p>THIRD YEAR</p> <p>FIRST SEMESTER</p> <table border="0"> <thead> <tr> <th></th> <th>Hrs.</th> <th>Units</th> <th></th> </tr> <tr> <th></th> <th>Lec</th> <th>Lab</th> <th>Total</th> </tr> </thead> <tbody> <tr> <td>Oral Surgery I</td> <td>2</td> <td>-</td> <td>2</td> </tr> <tr> <td>Oral Diag. & Treat Planning</td> <td>2</td> <td>-</td> <td>2</td> </tr> <tr> <td>Endodontics</td> <td>2</td> <td>2</td> <td>2</td> </tr> <tr> <td>Orthodontics II</td> <td>1</td> <td>3</td> <td>2</td> </tr> <tr> <td>Roentgenology</td> <td>2</td> <td></td> <td>2</td> </tr> <tr> <td>Principles of Medicine Practice</td> <td>2</td> <td>-</td> <td>2</td> </tr> <tr> <td>Management</td> <td>2</td> <td>-</td> <td>2</td> </tr> <tr> <td>Clinical Dentistry</td> <td>-</td> <td>18</td> <td><u>6</u></td> </tr> <tr> <td>TOTAL</td> <td></td> <td></td> <td>20</td> </tr> </tbody> </table> <p>SECOND SEMESTER</p> <table border="0"> <tbody> <tr> <td>Oral Surgery II</td> <td>2</td> <td>-</td> <td>2</td> </tr> <tr> <td>Technical Composition</td> <td>2</td> <td>-</td> <td>2</td> </tr> <tr> <td>(Methods of Research)</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Periodontics</td> <td>2</td> <td>1</td> <td>2</td> </tr> <tr> <td>Oral Pathology II (Oncology)</td> <td>2</td> <td>1</td> <td>3</td> </tr> <tr> <td>Dental Jurisprudence & Ethics</td> <td>2</td> <td>-</td> <td>2</td> </tr> <tr> <td>Community Dentistry I</td> <td>2</td> <td>-</td> <td>2</td> </tr> <tr> <td>Pedodontics (Pediatric Dentistry)</td> <td>2</td> <td>-</td> <td>2</td> </tr> <tr> <td>Clinical Dentistry II</td> <td>-</td> <td>18</td> <td><u>6</u></td> </tr> <tr> <td>TOTAL</td> <td></td> <td></td> <td>21</td> </tr> </tbody> </table>		Hrs.	Units			Lec	Lab	Total	Oral Surgery I	2	-	2	Oral Diag. & Treat Planning	2	-	2	Endodontics	2	2	2	Orthodontics II	1	3	2	Roentgenology	2		2	Principles of Medicine Practice	2	-	2	Management	2	-	2	Clinical Dentistry	-	18	<u>6</u>	TOTAL			20	Oral Surgery II	2	-	2	Technical Composition	2	-	2	(Methods of Research)				Periodontics	2	1	2	Oral Pathology II (Oncology)	2	1	3	Dental Jurisprudence & Ethics	2	-	2	Community Dentistry I	2	-	2	Pedodontics (Pediatric Dentistry)	2	-	2	Clinical Dentistry II	-	18	<u>6</u>	TOTAL			21	
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UNITED STATES	MALAYSIA	INDONESIA	SINGAPORE	PHILIPPINES	THAILAND
<p><u>DENTISTRY</u></p>		<p>Broadening students' education International student exchange programmes have also been introduced. Students can apply to visit dental schools in the US, Canada, Japan, and Australia as an elective. This will broaden students' outlook and experience.</p> <p>In tandem with the University's broad-based education, students will have to take a cross faculty module of their interest and choice.</p> <p>With these changes, the Faculty hopes to nurture through the curriculum not only a knowledgeable graduate but one with a sense of confidence and pride in his profession and an independent learner with a commitment towards continuing education</p>		<p>PHILIPPINES FOURTH YEAR</p> <p>FIRST SEMESTER Hospital Dentistry I 2 6 3 Community Dentistry II 2 3 3 Special Studies: Restorative Dentistry 1 - 1 Prosthodontics 1 - 1 Oral Med. & Oral Surgery I 1 - 1 Ortho-Pedo 1 1 Clinical Dentistry III 30 <u>10</u> TOTAL 20</p> <p>SECOND SEMESTER Hospital Dentistry II 2 6 3 Community Dentistry III 1 6 3 Special Studies: Restorative Dentistry 1 - 1 Prosthodontics 1 - 1 Oral Med & Oral Surgery II 1 - 1 Ortho-Pedo 1 - 1 Clinical Dentistry IV 30 <u>10</u> TOTAL 20</p> <p>SUMMARY I. Professional Dental /Medical Courses 105 II. Clinical/Hospital Dentistry 46 III. Special Studies/ Seminars 8 TOTAL 159</p>	

UNITED STATES	MALAYSIA	INDONESIA	SINGAPORE	PHILIPPINES	THAILAND
<p><u>NURSING</u></p> <ul style="list-style-type: none"> Individuals aspiring to become registered nurses may pursue an associate degree in nursing culminating in A.D.N. ; Bachelor of Science Degree in nursing called a B.S.N.; or a diploma program. Associate and Bachelor's Degree programs are offered in community colleges or Universities. The diploma program is offered by the hospital. Length of program varies. A.D.N degrees usually requires two years of schooling while diploma programs last to two to three years. The B.S.N. will generally take four years. Any of the three possible programs will qualify individual for entry level position. However, earnings and advancement will be better for those BSN's Nurses training includes classroom study, supervised training and clinical experience. Classes include anatomy, microbiology, chemistry, nutrition, physiology, psychology, nursing and computer usage. 				<ul style="list-style-type: none"> The nursing program is a community oriented, competency based program consisting of two equally important components theory and practice (Related Learning Experiences) A modified team teaching approach in handling classroom responsibilities, i.e. teaching one nursing course is a shared responsibility with a specific unit being taught by the faculty members whose expertise lies in that particular field. <p>CHED REQUIREMENTS</p> <p>BSN: NURSING</p> <p>I General Education Language and Literature (21 Units) Mathematics and Natural Sciences (25 units) Social Sciences (27 units) Total - 73 units</p> <p>II Nursing - 72 units -6</p> <p>III PE - 8</p> <p>TOTAL 153 – 159 units</p> <p>Summary</p> <p>II. N– 105 Nursing Practice III</p>	<p>Components of the Curriculum</p> <ol style="list-style-type: none"> General Education 36 credits <ol style="list-style-type: none"> Languages 8 credits Humanities 4 credits Social Science 4 credits Basic Science And Math 19 credits Physical Educ. 1 credit Preprofessional Education 28 credits Professional Education 72 credits Elective 6 credits <p>TOTAL CREDITS 142 credits</p> <p>Admission : There are two modes of admission in Bachelor of Nursing Science Program</p> <ol style="list-style-type: none"> Through the national entrance examination organized of Ministry of University Affairs Through a written and oral exam organized by the committee <p>Applicant must possess: MC Certificate or its equivalent as issued by the Ministry of Education. Good physical and mental health clean record of good behavior.</p>

UNITED STATES	MALAYSIA	INDONESIA	SINGAPORE	PHILIPPINES	THAILAND
<p>PHARMACIST</p> <ul style="list-style-type: none"> Pharmacist must graduate from a college of pharmacy accredited by the American Council on Pharmaceutical Education . The minimum requirement for pharmacists includes attendance of at least five years of college resulting in a Bachelor of Science or a Bachelor of Pharmacy degree. Some individuals choose to obtain a Doctor of Pharmacy degree or Pharm. D. A bachelor's degree is not required to enter this type of program. Instead the aspiring pharmacist will go through six years of a school in a combined bachelor's and doctoral program (A bachelor's degree is not awarded). <p>Those who choose to obtain a bachelor's first may also go on for a doctoral degree, but it will usually take longer.</p> <p>Individuals could also obtain a Masters Science Degree in pharmacy if they are interested in research, teaching or administrative positions.</p>	<p>The degree of Bachelor of Pharmacy with Honours is awarded after the student has successfully fulfilled all the requirements of a four year pharmacy programme. The Pharmacy course consists of basic, core, elective, option or minor and languages courses. The main course can be divided into basic and core courses, in addition elective courses that provide additional knowledge on certain areas of pharmacy which the School considers are important and useful towards the progress of the profession. Students may choose any elective course that is offered. Minor or option courses, on the other hand, are courses in Humanities, Social Sciences and Management such as sociology, economics, Public relations, marketing, accounting, management and advertising. These courses are intended to equip the students to interact constructively with society, cultivate an understanding attitude towards people and develop a strong sense of responsibility towards the community.</p> <p>Main courses offered at level 100, 200, 300 and 400 can be divided into various disciplines, namely:</p>			<ul style="list-style-type: none"> Offers general four-year plan leading to a degree of Bachelor of Science in Pharmacy where instruction is focused in the three fields of discipline namely; community, manufacturing and hospital pharmacy. Since the profession of Pharmacy is service-oriented in nature, it is inculcated specially in community pharmacy or drugstore practice where the pharmacist and patient converge. To supplement the manufacturing pharmacy program, plant tours or visits to pharmaceutical companies are encouraged as exposure towards producing quality medicines. Hospital pharmacy training is backed by its affiliations with the major hospitals in the city to augment the interns' know-how in hospital and clinical pharmacy. 	<p>The faculty strives to produce highly qualified pharmacists who have full responsibility in the welfare of people concerning drugs and drug use. Students must complete two years of basic science study and three years of professional study. They will also be required to complete 500 hours of pharmacy clerkship.</p>

UNITED STATES	MALAYSIA	INDONESIA	SINGAPORE	PHILIPPINES	THAILAND
<p>...<u>PHARMACIST</u></p> <p>Entrance requirements to colleges of pharmacy vary. Some schools require individuals to take the Pharmacy College Admission test (P-CAT). Others require up to two years of prepharmacy education in an accredited two year school, college or university. Some schools will admit students after graduation.</p>	<ul style="list-style-type: none"> • Pharmaceutical Chemistry • Pharmaceutical Technology • Physiology • Pharmacology, and • Clinical Pharmacy <p>These courses are integrated in the curriculum.</p> <p>Besides these, mathematics, statistics and forensic pharmacy courses are offered as main professional courses.</p> <p>Pharmaceutical Chemistry - emphasizes the application of the principles of basic chemistry to the study of drugs, their physico-chemical properties, structures and their relationship to biological activities. Analytical techniques for identification and quality control of drugs and some aspects of natural product chemistry are also covered. Pharmaceutical Technology - provides the knowledge in pharmaceutical formulation and preparation, industrial processes, quality control, microbiological control besides biopharmacy and Pharmacokinetic aspects.</p> <p>Ethics and Pharmacy Legislation Course - is also provided to enable students to gain the necessary knowledge pertaining to ethics and legal responsibilities of a Pharmacist.</p>				

Appendix C

Permanent Schedule of Subjects in Various Professional Licensure Exams

BOARD OF ACCOUNTANCY

1. Theory of Accounts
2. Business Law Taxation
3. Management Services
4. Auditing Theory
5. Auditing Problems
6. Practical Accounting Problems I
7. Practical Accounting Problems II

BOARD OF AERONAUTICAL ENGINEERING

1. Aerodynamics
2. Aircraft Structure and Design
3. Aircraft Power Plant
4. Aircraft Construction, Repair & Modification
5. Engineering Economics and Management, Laws and Ethics
6. Mathematics

BOARD OF AGRICULTURAL ENGINEERING

1. Farm Mechanization, Farm Power, Farm Machinery and Equipment, and Allied Subjects
2. Soil and Water Conservation, Farm Irrigation and Drainage, Allied Subjects
3. Rural Electrification, Farm Processing and Farm Structures

BOARD OF ARCHITECTURE

1. Architecture Design and Planning
2. Structural Design and Utilities System
3. Architectural Practice and History of Architecture

BOARD OF ARCHITECTURE

INTERIOR DESIGN

1. Interior Design
2. Furniture Design and Construction
3. Materials of Decoration
4. History of Art Period Styles
5. Building Construction
6. Professional Ethics, Contracts, Specification and Business Procedure

BOARD OF ARCHITECTURE

SPECIALTY BOARD FOR LANDSCAPE ARCHITECTURE

1. Landscape Design
2. Ecology and Nature Conservation
3. Landscaping Technology and Materials
4. Planting Design and Interior Landscaping
5. Professional Practice and Ethics
6. History of Landscaping Architecture and Theory of Design

BOARD OF CHEMICAL ENGINEERING

1. Chemical Engineering
2. Physical and Chemical Principles
3. General Engineering

BOARD OF CHEMISTRY

1. Inorganic Chemistry
2. Organic Chemistry
3. Analytic Chemistry
4. Physical Chemistry

BOARD OF CIVIL ENGINEERING

1. Mathematics and Surveying
2. Design and Construction
3. Hydraulics

BOARD OF CRIMINOLOGY

1. Criminal Jurisprudence & Procedure
2. Law Enforcement Administration
3. Criminalistics
4. Crime Detection, Investigation & Prevention
5. Criminal Sociology, Ethics & Human Relations
6. Correctional Administration

BOARD OF CUSTOM BROKERS

1. Custom Law (Marine Warehousing, Seizures, Reg. Of Vessel, etc...)
2. Custom Law (Surveyor and other Laws enforced by the Bureau of Customs)
3. Customs Procedures and Practices
4. Tariff Law (Practical Problems on Classification and Computation of Duties, etc...)
5. Tariff Law (Administrative Provisions on Tariff Laws, Rules and Regulations on tariff, etc...)

BOARD OF DENTISTRY

1. General and Oral Anatomy and Physiology
2. Gen. & Oral Pathology, Gen. & Oral Microscopic Anatomy & Microbiology
3. Restorative Dentistry and Public Health and Community Dentistry
4. Prosthetic Dentistry (Crown & Bridge, Partial Denture and Complete Dental Materials)
5. Roentgenology, Oral Diagnosis and Oral Surgery
6. Anesthesiology & Pharmacy
7. Pedodontics & Orthodontics
8. Dental Jurisprudence, Ethics & Practice Management
9. Periodontics & Endodontics

BOARD OF ELECTRICAL ENGINEERING

A. REGISTERED ELECTRICAL ENGINEER

1. **Mathematics** - Algebra, Trigonometry, Analytical Geometry, Differential Calculus, Integral Calculus, Differential Equations, Complex Numbers, Probability and Statistics, Advanced Engineering, Advanced Engineering Mathematics including Matrices, Power Series, Fourier Analysis, Laplace Transforms, & others
2. **Engineering Sciences and Allied subjects** - General Chemistry, College Physics, Computer Fundamentals and Programming, Engineering Materials, Engineering Mechanics, Fluid Mechanics, Strength of Materials, Thermodynamics, Electrical Engineering Law, Engineering Economics, Engineering Management, Contracts and Specifications, Code of Professional Ethics, Philippine Electrical Code, Parts 1 & 2, and others.
3. **Electrical Engineering Professional Subjects** - Electrical Circuits, Electronic Theory and Circuits, Energy Conversion, Power Transmission and Distribution, Instrumentation and Measurement, Circuit and Line Protection, Control Systems, Principles of Communication, Electrical Machines, Electrical Equipment, Component and Devices, Electric Systems, Power Plant, Electronic Power Equipment, Illumination, Building Wiring and others.

B. REGISTERED MASTER ELECTRICIAN

1. **Technical Subjects:** Ohm's Law - Calculation of Resistance, Current, Voltage, and Power for Direct Current and Alternating Current. Electrical Machines - Description and Operating Principles of Motors, Generators and Transformers. Control Equipment - Description and Function of Fuses, Overload Relays, Safety Switches, Circuit Breakers, Star-Delta Motors Starters, Transformer Type Motor Starters, D.C. Motor Starters. Maintenance and Repair - Description of the Procedures in the Maintenance of Electrical Machinery. Test Equipment - Types and Uses of Measuring Instruments. Electrical Engineering Law Provisions Pertaining to Master Electricians. Other related subjects as may be prescribed by the Board.
2. **Philippine Electrical Code, Parts 1 & 2:** - General Requirements for Installation of Electric Wiring and Equipment. - Approved Wiring Methods, types of wiring materials and wiring devices. - Installation of Switchboard and Panelboards. - Wiring Diagrams of Different Types Motor Starters with Motor Protection. - Drawing Symbols and wiring plans. - other related subjects as may be prescribed by the board.

BOARD OF ELECTRONICS AND COMMUNICATIONS ENGINEERS

1. Mathematics
2. Electronics Engineering
3. Communications Engineering

BOARD OF FORESTERS

1. Forest Resource Ecosystem
2. Forest Resource Management
3. Forest Resource Engineering and Utilization

BOARD OF GEODETIC ENGINEERING

A. GEODETIC ENGINEERS

1. **Mathematics** - Algebra, Solid Geometry, Analytical Geometry, Engineering Economics, Plane and Spherical Trigonometry, Differential & Integral Calculus, Mechanics, Least Squares
2. **Theory and Practice of Surveying** - Plane Surveying, Isolated Mineral & Cadastral Surveying, Astronomy, Railroad Curves and Earthworks, Hydrographic and Topographic Surveying, Photographic Surveying, Photogrammetry
3. **Geodesy-Geodetic** Surveying, Geodetic Astronomy, Geodetic Triangulation, Geodetic Leveling, Gravity Measurement
4. **Laws and Regulations**- Public Land Laws, Laws on Property, Laws on Natural Resources, Land Registration Laws, Land Reform Code, Professional and Ethical Practices, Rules and Regulations Governing Land Surveying
5. **Cartography**- Plotting and Mapping of Isolated Mineral, Cadastral Hydrographic, Topographic and Photogrammetric Surveying

B. JUNIOR GEODETIC ENGINEERS

1. Theory and Practice of Surveying
2. Mathematics (Geometry, Algebra, Plane & Spherical Trigonometry, Principles of Physics & theory of Lenses)
3. Public Land & Land Registration Laws, Laws on Property, Law on Natural Resources and Land Reform Law
4. Practical Problems on Surveying
5. Plotting and Mapping

BOARD OF GEOLOGY

1. General Geology - Stratigraphy, Physical Geology, Historical/Paleontology, Geomorphology, Structural Geology
2. Rock/Mineral Analysis - Mineralogy, Petrology and Geochemistry
3. Applied Geological Sciences - Field Geology, Geophysics, Economic Geology, Petroleum Geology

BOARD OF LIBRARIANS

1. Organization and Management of Libraries with Laws and Practices Related to Librarianship (Library and Information Management including Laws and Related Practices in Philippine Librarianship); Code of Ethics
2. Reference Bibliography and User Services (Information Sources and Services)
3. Selection, Acquisition of Library Materials (Building Library Collections)
4. Cataloguing and Classification (Organization of Information Services)
5. Indexing and Abstracting
6. Information Technology

BOARD OF DECK OFFICERS

A. MASTER MARINER

1. Navigation and Voyage Planning
2. Management and Maritime Laws
3. Shipboard Operation and Watchkeeping
4. Engineering and Control System
5. General Ship's Knowledge and Cargo Operations

B. CHIEF MATE

1. Navigation and Voyage Planning
2. Management and Maritime Laws
3. Shipboard Operation and Watchkeeping
4. Engineering and Control System
5. General Ship's Knowledge and Cargo Operations

C. SECOND MATE

1. Ocean and Offshore Navigation
2. Watchkeeping and Safe Operation
3. Coastal Navigation
4. Rules of the Road
5. Seamanship Knowledge and Cargo Operations

D. THIRD MATE

1. Ocean and Offshore Navigation
2. Watchkeeping and Safe Operation
3. Coastal Navigation
4. Rules of the Road
5. Seamanship Knowledge and Cargo Operations

E. MAJOR PATRON

1. Principles of Navigation
2. Meteorology
3. Seamanship Knowledge
4. Rules and Regulation

F. MINOR PATRON

1. Principles of Navigation
2. Meteorology
3. Seamanship Knowledge
4. Rules and Regulation

BOARD OF ENGINE OFFICERS

A. CHIEF ENGINE OFFICER

1. Management and Maritime Law
2. Naval Architecture and Ship Construction
3. Engineering Knowledge
4. Maritime Automation Instrumentation and Control System

B. SECOND MARITIME OFFICER

1. Management and Maritime Law
2. Naval Architecture and Ship Construction
3. Engineering Knowledge
4. Maritime Automation Instrumentation and Control System
5. Main Auxillary Machineries

C. THIRD ENGINE OFFICER

1. Watchkeeping and Safe Operations
2. Engineering Knowledge
3. Maritime Electrotechnology
4. Main and Auxillary Machineries

D. FOURTH ENGINE OFFICER

1. Watchkeeping and Safe Operations
2. Engineering Knowledge
3. Maritime Electrotechnology
4. Main and Auxillary Machineries

BOARD FOR MOTOR ENGINEERS

1. Written Examination on Elementary Mathematics, Practical Electricity, Principles of Refrigeration
2. Internal Combustion Engines Practical Questions (includes first-aid at sea), firefighting/fire prevention)

BOARD OF MASTER PLUMBING

1. Plumbing Arithmetic
2. Plumbing Code
3. Sanitation, Plumbing Design and Installation
4. Practical Problems

BOARD OF MECHANICAL ENGINEERING

A. MECHANICAL ENGINEERS

1. Power and Industrial Plant Engineering
2. Mathematics, Engineering Economics and Basic Engineering Sciences
3. Machine Design and Shop Practice

B. CERTIFIED PLANT MECHANICS

1. Elements of Power Plant Machinery (maintenance, repair and operation of types of prime mover, including steam, internal combustion engines, hydro-electric plants and such other motive powers as encountered in practice)
2. Elements of Industrial Plant Machinery (maintenance, operation and repair of all types of such industrial plant machinery and equipment as encountered in sugar mills, ice plants, air conditioning plants, etc.)

BOARD OF MEDICAL TECHNOLOGY

1. Clinical Chemistry
2. Microbiology and Parasitology
3. Hematology
4. Blood Banking and Serology
5. Clinical Microscopy (Urinalysis & other Body Fluids)
6. Hispathologic Techniques

BOARD OF MEDICINE

1. Biochemistry
2. Anatomy and Histology
3. Microbiology
4. Physiology
5. Legal Medicine, Ethics and Medical Jurisprudence
6. Pathology
7. Pharmacology and Therapeutics
8. Surgery and Ophthalmology, Otolaryngology and Rhinology
9. Medicine
10. Obstetrics and Gynecology
11. Pediatrics and Nutrition
12. Preventive Medicine

BOARD OF METALLURGICAL ENGINEERING

1. **Metallurgy I** - Principles of Metallurgy, Mineral Processing, Ore Microscopy, Metallurgical Thermodynamics, Extractive Metallurgy, Hydrometallurgy, Fire Assay and Inorganic, Qualitative, Quantitative and Physical Chemistry
2. **Metallurgy II** - Physical Metallurgy, Mechanical Metallurgy, Crystallography/Metallography, Iron Steel Metallurgy, Ferrous Metallurgy, Foundry
3. **Applied Mathematics** - Statistics Mechanics, Hydraulics, Basic Computer Science and Design Construction, Installation, Maintenance and Operation of Metallurgical Plants, Fuel Technology, Refractory Science, Engineering Management, Metallurgical Laws and Ethics

BOARD MIDWIFERY

1. Obstetrics
2. Fundamentals of Health Care
3. Infant Care and Feeding
4. Primary Health Care
5. Professional Growth and Development

BOARD OF MINING ENGINEERING

1. Mining Engineering I
2. Mining Engineering II
3. Mining Engineering III

BOARD OF NAVAL ARCHITECTURE AND MARINE ENGINEERS.

1. Mathematics, Hydraulics, Strength of Materials, Theoretical and Mechanical and General Engineering
2. Principles of Naval Architecture including Stability, Flooding and Subdivision, Speed Selection, Weight Estimates, Economics of Operations
3. Principles of Machines Engineering including Resistance, Powering, Machinery, Power Plants, Application of Modern Electrical Units, Equipment, Propeller and Shafting
4. Philippine Merchant Marine Regulations and Code Ethics
5. Ship Design, Building and Classing Steel and Wooden Vessels, Construction Methods and Practices

BOARD OF NURSING

1. Test I - Promotive Care
2. Test II - Preventive Care
3. Test III A - Curative Care
4. Test III B - Curative Care
5. Test IV - Rehabilitative

BOARD OF NUTRITION AND DIETETICS

1. Nutritional Biochemistry and Clinical Dietetics
2. Foods and Food Service System
3. Applied and Public Health Nutrition

BOARD OF OPTOMETRY

1. General and Ocular Anatomy (Gross, Histological and Embryological)
2. Practical and Theoretical Optics (Chemistry, Physics and Mathematics)
3. Practical and Theoretical Optometry (Clinical Optometry and Orthoptics)
4. General and Ocular pathology (Bacteriology)
5. Physiological Optics (Physics, Chemistry and Math)
6. Ethics, Economics, Jurisprudence and Hygiene and Sanitation (Sociology)

BOARD OF PHARMACY

1. Pharmaceutical Chemistry - Inorganic Pharmaceutical and Medicinal Chemistry, Qualitative Pharmaceutical Chemistry
2. Pharmacognosy - Plant Chemistry and Biochemistry
3. Practice of Pharmacy - Dispensing Compounding, Hospital/Clinical Pharmacy and Pharmaceutical Calculations
4. Pharmacology - Pharmacokinetics- Toxicology, Incompatibilities and Adverse Drug Reaction
5. Pharmaceutics - Pharmaceutical Dosage Forms, Physical Pharmacy, Manufacturing Jurisprudence and Ethics
6. Quality Assurance/Quality Control Drug Testing with Instrumentation (Quantitative) Microbiology and Public Health

BOARD OF PHYSICAL THERAPY AND OCCUPATIONAL THERAPY

A. PHYSICAL THERAPY

1. Anatomy, Kinesiology and Physiology
2. Medical and Surgical Condition, Pathology
3. Physical Therapy Applications, Electro-Principles, Therapeutics Exercises, Principles of Rehabilitation and Hydrotherapy

B. OCCUPATIONAL THERAPY

1. Anatomy Kinesiology and Physiology
2. General Medical, Surgical and Orthopedic, Neurological Conditions
3. Occupational Treatment Program Organization and Administration in Rehabilitation

BOARD OF RADIOLOGIC TECHNOLOGY

A. RADIOLOGIC TECHNOLOGIST

1. Physics of Diagnostic Radiation (Radiation Physics, Radiobiology and Radiation Protection, Equipment Maintenance)

2. Image Production and Evaluation (Photochemistry and Darkroom Procedures, Radiographic Technique, Film Analysis)
3. Radiographic Procedures and Technique (Special Procedures and Radiographic Positioning)
4. Patient Care and Management (Anatomy, Physiology and Medical Terminology, Nursing, Departmental Procedure, Professional Ethics)
5. Radiological Sciences (Radiation Therapy, Radiographic Pathology, CY/MRI, Diagnostic UltraSound, Nuclear Medicine)

B. X-RAY TECHNOLOGIST

1. Physics of Diagnostic Radiation (Radiation Physics, Radiobiology and Radiation Protection, Equipment Maintenance)
2. Image Production and Evaluation (Photochemistry and Darkroom Procedures, Radiographic Technique, Film Analysis)
3. Radiographic Procedures and Technique (Special Procedures and Radiographic Positioning)
4. Patient Care and Management (Anatomy, Physiology and Medical Terminology, Nursing, Departmental Procedure, Professional Ethics)

BOARD OF SANITARY ENGINEERING

1. Water Supply Engineering
2. Waste Water Engineering
3. Environmental Engineering
4. Plumbing and Public Health
5. Civil Engineering

BOARD OF SOCIAL WORKERS

1. Social Welfare Policies and Program
2. Human Behavior and Social Environment
3. Social Work Methods
4. Field Practice

BOARD OF VETERINARY MEDICINE

1. Anatomy
2. Physiology
3. Pathology
4. Parasitology
5. Material and Medical Therapeutics
6. Bacteriology
7. Medicine and Surgery
8. Zootechnics

Source: Professional Regulation Commission Resolution No. 96-434

Appendix D
Resolution No. 270

DOCUMENTS SIGNED AND USED BY REGISTERED PROFESSIONALS

1. Certified Public Accountant (CPA)

- 1.1 Audit Reports
- 1.2 Financial Statements: Balance Sheets, Income Statements, Cash Flow, Funds/Flow or Changes in Financial Position, Government Trial Balance and Government Vouchers

2. Aeronautical Engineer

- 2.1 Plans
- 2.2 Structural Designs and Analysis
- 2.3 Drawings and Specifications
- 2.4 Technical Reports and Studies
- 2.5 Aerodynamics Analysis
- 2.6 Professional Evaluation and Recommendations
- 2.7 Static Tests
- 2.8 Certificates of Conformity
- 2.9 Certificates of Major Repairs, Alterations and Modifications

3. Architect

- 3.1 Plans for GSIS, SSS, Pag-ibig Loans and other government private lending institutions and other regulatory bodies (permit purposes), e.g., HLURB, etc.
- 3.2 Bill of Materials and Cost Estimates
- 3.3 Project Studies
- 3.4 Structural Computations
- 3.5 Specifications
- 3.6 Building Permit
- 3.7 Form 104 (PRC)

4. Agricultural Engineer

- 4.1 Engineering Plans, Designs, Specifications and Cost Estimates
 - 4.1.a Farm Buildings and structures such as: soils and its components, warehouses, farm machinery sheds, farmer houses, green/screen houses, poultry and livestock houses, slaughter houses, bulk handling systems, agricultural equipment
 - 4.1.b Agricultural processing facilities cold storage, driers, threshers, shellers, mills (rice, corn peanut, feed, etc), seed processing plant, storage, graders, sorters, packaging, labeling, baling, canning, etc.
 - 4.1.c Agricultural power and machinery such as power tillers, seeders, transplanters, weeders, strippers, balers, fans and aerators, pest control equipment, windmill, etc.
 - 4.1.d Soil and water conservation project, technology, structures and systems like drip irrigation, small impounding project, fertigation, contour farming, small farm reservoir, drainage system, sloping agrometeorological devices, water management, water and land development.

4.1.e Farm electrification such as wiring, lighting, electric generators and motors, village type power plant including development of non-conventional energy equipment and facilities for agricultural purposes.

- 4.2 All contracts pertinent to items 1.a to 1.e and farm development
- 4.3 Bid proposals/offers (agricultural machineries and equipment, post harvest facilities, feasibility studies).
- 4.4 Technical reports and studies (evaluation reports, evaluation, appraisal, and testing, and evaluation of agricultural machineries, equipment and facilities.
- 4.5 Certification (patents, copyright, etc.)
- 4.6 Area development planning pertinent to agriculture development, physical development plans and farm subd., etc.
- 4.7 Feasibility studies, programs, project proposals on agricultural engineering field intended for financing and other purposes.
- 4.8 (Agricultural) Resources surveys, assessments and mapping such as water resource inventory for irrigation and farm households use farming systems, land evaluations, agrometeorological assessment, land use surveys, etc. for rural and agricultural development purposes.

5. Chemical Engineer

- 5.1 Plans for Process/Flow Schemes, Detailed Engineering Drawings of Industrial Plants or parts thereof
- 5.2 Designs of Process Equipment for Individual Plants
- 5.3 Technical Reports
- 5.4 Valuation
- 5.5 Estimates

6. Chemist

- 6.1 Technical Reports

7. Civil Engineer

- 7.1 Engineering Plans and Specifications
- 7.2 Engineering Designs and Analysis
- 7.3 Quantity and Cost Estimates
- 7.4 Technical Reports and Studies
- 7.5 Big Proposals
- 7.6 Contract Documents
- 7.7 Professional Evaluations and Recommendations
- 7.8 Project Logbooks
- 7.9 Project Instructions for Implementation

8. Criminologist

- 8.1 Reports (Questioned Documents)
- 8.2 Firearm Identification (Ballistics)
- 8.3 Photographic, Polygraph, and Dactoloscopic Examination

9. Dentist

- 9.1 Referral to Specialist
- 9.2 Prescriptions
- 9.3 Account Slips
- 9.4 Work Authorization to Dental Laboratories
- 9.5 Special or Official Receipts
- 9.6 Post-medication Instruction in Patients

10. Electrical Engineer

- 10.1 Plans
- 10.2 Specifications
- 10.3 Reports
- 10.4 Permits
- 10.5 Completion
- 10.6 Estimates
- 10.7 Certifications
- 10.8 Vouchers for Experiences

11. Electronics and Communications Engineer

- 11.1 Plans
- 11.2 Technical Descriptions
- 11.3 Correspondences, Communications
- 11.4 Specifications
- 11.5 Drawings
- 11.6 Proposals/Offerers
- 11.7 Studies/Reports

12. Forester

- 12.1 Plans (Development Plans and Feasibility Studies on the Wood-based and non-timber based industries, industrial tree plantations, forest land management agreements, forest management agreement, reforestation, range and grazing, watershed and mangrove rehabilitation, integrated social forestry projects (ISF), community forestry program (CFP) and other upland projects, integrated operations plans of logging companies and other wood processing plants).
- 12.2 Reports (forestry consultancy series, annual accomplishment of logging companies and wood processing plants, log and lumber grading, scaling of forest products, major and minor forest products resources inventory, monitoring and evaluation of contract activities on reforestation, CFP, ISF, Watershed and Mangrove Rehabilitation and other upland development projects; administration and supervision contracts in reforestation, CFP, ISF, and other upland development projects);
- 12.3 Contracts (survey, mapping and planning of reforestation, Industrial Tree Plantations. Logging Operations, CFP, ISF, Mangrove Rehabilitation and other upland development objects, comprehensive reforestation activities, monitoring and evaluation, administration and supervision of reforestation, CFP, ISF, watershed and mangrove rehabilitation and other development projects, establishment of logging and access roads and trails and other infrastructures);
- 12.4 References (forest maps, statistics and surveys);
- 12.5 Certifications (status of land classification).

13. Geodetic Engineering

- 13.1 Survey Returns
- 13.2 Plans/Maps
- 13.3 Technical Descriptions
- 13.4 Certifications

- 13.5 Technical Studies and Reports
- 13.6 Expert Opinions
- 13.7 Proposals
- 13.8 Survey Designs and Specifications

14. Geologist

- 14.4 Geological Reports, Maps or Works

15. Mechanical Engineer (Professional)

- 15.1 Reports (consultations, investigators, valuations and technical)
- 15.2 Designs, Plans, Specifications
- 15.3 Estimates, Designs, Layouts of Mechanical Equipment, Machinery, Process, Works, Project or Plant)

16. Physician

- 16.1 Prescriptions, including dangerous drugs

17. Metallurgical Engineer

- 17.1 Documents or Reports on consultation, investigations, valuations, planning and designing
- 17.2 Metallurgical Tests/Analysis

18. Mining Engineer

- 18.1 Technical Reports
- 18.2 Estimates (mine, valuation, mineral ore)

19. Midwife

- 19.1 Birth Certificate
- 19.2 Still Birth Certificate

20. Naval Architect and Marine Engineer

- 20.1 Plans, Designs, Specifications
- 20.2 Reports, Layouts, Estimates

21. Nurse

- 21.1 Contract of Employment in Private Nursing Practice and other Services
- 21.2 Nurse's Notes/Orders in Client/Patient's clinical charts

22. Optometrist

- 22.1 Prescriptions

23. Pharmacist

- 23.1 Applications for BFD Permit to Operate as Company Pharmacist
- 23.2 Laboratory Reports for Submission to BFD
- 23.3 Documents for Submission to BFD for Registration of New Products
- 23.4 Dangerous Drugs Accountability Documents for Submission to DDB

24. Physical Therapist and Occupational Therapist

- 24.1 Medical Charts
- 24.2 Treatment/Dialogue Summary
- 24.3 Working Contract
- 24.4 Treatment Plans
- 24.5 Referrals
- 24.6 Progress Notes
- 24.7 Evaluation Reports

25. Master Plumber

- 25.1 Application
- 25.2 Application for Water and Sewer Connection
- 25.3 Final Plumbing or Occupancy Permit
- 25.4 Renovation or Alteration for Projects
- 25.5 PRC – Application for Examination Form (Validation and/or certification)

26. Sanitary Engineer

- 26.1 Plans, Specifications, Designs, Report (investigation, valuation, technical)
- 26.2 Layouts

27. Veterinarian

- 27.1 Prescriptions, including dangerous drugs

28. Interior Designer

- 28.1 Plans, Drawings, Specifications, Permits
- 28.2 Contract Document, Proposals, Estimates

29. Landscape Architect

- 29.1 Plans, Drawings, Specifications, Permits

30. Social Worker

- 30.1 Social Case Study Report
- 30.2 Social Development Plan

31. Deck Officer

- 31.1 Certificate of Service (PRC Form)

32. Engine Officers

- 32.1 Certificate of Service (PRC Form)

Appendix E.1

Readiness of Filipino Professionals: Responses of Key Informants on Category of Professionals Hired by Company

Company	Professionals											
	A	B	C	D	E	F	G	H	I	J	K	L
1. Serrano Dental Services					1							
2. Data Sphere Philippines						1						
3. J. Reyes Medical Center	1						1	1		1		4
4. Phil. Aluminum Wheels	1			1								1
5. Nestle Phils.	1										1	3
6. Health Infra Services		1		1		1						
7. St. Lukes Hospital	1						1	1		1		4
8. Practitioners	1											
9. Asia Konstruct	1	1										1
10. Adamson	1	1	1	1		1			1		1	
11. Punong Bayan	1											
12. Punong Bayan	1											
13. KPMG Laya Mananghaya	1										1	
14. AMMDA												1
15. AMMDA												1
16. MEOA												1
17. Mandarin Credit	1											
18. POEA	1										1	

LEGEND:

A. Accountant	D. Civil Engineer	G. Midwife	J. Physician
B. Architect	E. Dentist	H. Nurse	K. Lawyer
C. Chemical Engineer	F. Electrical Engineer	I. Pharmacist	L. Others

Appendix E.2

Readiness of Filipino Professionals: Responses of Key Informants on Performance, Competence and Training of Newly Hired Professionals

Company	Performance Rating	Technical Competence	Adequacy of Training	Adequacy of Course Offering	Areas of Improvement
1. Serrano Dental Services	4	3	0	4	1,3,4
2. Data Sphere Philippines	3	3	1	2	
3. J. Reyes Medical Center	3	3	1	1	
4. Phil. Aluminum Wheels	3	3	1	4	
5. Nestle Phils.	5	5	0	4	1
6. Health Infra Services	4	4	1	4	
7. St. Luke Hospital	4	4	1	3	
8. Practitioners	4	4	1	4	
9. Asia Konstruct	4	4	1	4	
10. Adamson	3	3	0	4	
11. Punong Bayan	4	4	1	4	
12. Punong Bayan	5	5	1	3	3
13. KPMG Laya Mananghaya	4	4	1	3	
14. AMMDA	3	3	0	3	4
15. AMMDA	3	3	0	3	4
16. MEOA	3	3	0	3	1,2,3,4
17. Mandarin Credit	3	3	0	4	1
18. POEA	3	3	1	4	1,2,3,4
Average	3.61	3.56		3.33	

LEGEND:

- 1- Needs Improvement
- 2- Fair
- 3- Satisfactory
- 4- Very Good
- 5- Excellent

- Adequate Y = 1
- Not Adequate N = 0

LEGEND:

- Technical Know-how - 1
- Computer Literacy - 2
- Communication Skills - 3
- Current Trends in the field - 4

Appendix E.4

Readiness of Filipino Professionals: Responses of Key Informants on Training for Newly-Hired Professionals

	A	B	C	D	E
Company	Provide trainings for newly hired professionals	Types of specialized trainings provided by companies	Undertake CPE trainings	Forms of CPE training supported by companies	Companies allow their professionals to work with their affiliate office abroad
1. Serrano Dental Services	1	1	1	1,2,3,4,5	0
2. Data Sphere Philippines	1	1	1	1,5	0
3. J. Reyes Medical Center	1	1	1	1,2,3,4	0
4. Phil. Aluminum Wheels	1	1	1	1,2,5	1
5. Nestle Phils.	1	1,3	1	2,3,5	1
6. Health Infra Services	1	3	1	1,2,3,5	0
7. St. Luke Hospital	1	2,3	1	1,2,3	1
8. Practitioners	1	1	1	1,2	-
9. Asia Konstruct	1	3	1	5	1
10. Adamson	1	3	1	1,2,3,4,5	1
11. Punong Bayan	1	1,2	1	1,2,3,4,5	1
12. Punong Bayan	1	1,2,3	1	1,2,3,4,5,6	1
13. KPMG Laya Mananghaya	1	1,2,3	1	1,2,3,4,5	1
14. AMMDA	1	1	1	2	0
15. AMMDA	1	1	1	-	0
16. MEOA	1	1	1	5	1
17. Mandarin Credit	0	-	0	2	0
18. POEA	-	-	-	-	-

A	B	C	D	E
NO - 0	New Trends and development in the field - 1	YES - 1	In House seminar - 1	Y - 1
YES - 1	Adjustment to new working condition - 2	NO - 0	Attendance in Outside Seminar - 2	N - 0
	Others - 3		Enrollment in Local Graduate Program - 3	
			Enrollment in Foreign Graduate Program - 4	
			Internal Training Program - 5	
			Others - 6	

