Mut'ah University
College of Graduate Studies

Health Informatics Competencies Among Senior Nursing Students at Public Jordanian Universities

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Dedication

I dedicate this work first and foremost to my God who has given me the opportunity and the strength to complete the study program and has provided me with the strength and the patience to accomplish this work. I would also like to dedicate this work to my father, Professor Jum’ah Al Najadat, to my mother Widad Daghistani, and to my brothers, Bilal and Muhammad Al-Ameen.

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Abstract

Health Informatics Competencies among Senior Nursing Students at Public Jordanian Universities

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Mutah University, 2022

1. **Aim:** This study aimed at measuring and evaluating three aspects related to health-nursing informatics within the context of public Jordanian universities. First, it aimed at measuring the level of health-nursing informatics competencies among senior students of nursing at the baccalaureate nursing programs of two representative public Jordanian universities, namely Mutah University and Al-Hussein Bin Talal University. Secondly, it aimed at determining whether or not the variables of gender and university setting had any significant difference on the level of health-nursing informatics competencies among the respondents. Thirdly, it aimed at evaluating the status of health-nursing informatics at these universities as reflected in their study plans.
2. **Method:** A correlational cross-sectional method was used to achieve the aim of this study. A convenience sample consisting of a hundred and sixty-eight senior nursing students provided the data used to achieve the study purpose. The primary data collection tool used was The Nursing Informatics Competency Tool (NICAT).
3. **Results:** The aggregate mean score of the self-reported assessment of health-nursing informatics competencies among all the respondents was 96.84 (*M*= 96.84) out of 150, or (64.56%) of the optimal score) and the standard deviation was 33.083 (*SD*=33.083). This means that their level of health-nursing competencies was equivalent to the category of *proficient* on the competency scoring interpretation scale.
4. **Discussion:** These results support the findings of several previous studies conducted in numerous other countries, which, to varying degrees, exposed the shortage, and in some cases the absence of health and nursing informatics training in baccalaureate nursing programs.
5. **Implications, Recommendations, and Conclusion:** Based on its results, the study provides several implications, recommendations, and conclusion.

الملخص

مستوى معرفة وتطبيق مهارات المعلوماتية الحاسوبية الخاصة بالمهن الطبية والتمريضية بين طلبة السنة الرابعة في تخصص التمريض في الجامعات الأردنية الحكومية

إعداد: بنان النجادات

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هدف الدراسة: أجريت هذه الدراسة بهدف قياس وتقويم ثلاثة جوانب ذات صلة بقدرات ومهارات المعلوماتية الحاسوبية المستخدمة في المهن الطبية والتمريضية. الجانب الأول هو تحديد مستوى معرفة طلبة تخصص التمريض في السنة الرابعة في الجامعات الأردنية الحكومية، ممثلة بجامعة مؤته وجامعة الحسين بن طلال بمهارات المعلوماتية الحاسوبية المستخدمة في المهن الطبية والتمريضية. الجانب الثاني هو تحديد مدى تأثير عاملي النوع البشري والجامعة التي ينتمي اليها أفراد عينة الدراسة على مستوى قدراتهم ومهاراتهم في مجال المعلوماتية الحاسوبية المستخدمة في المهن الطبية والتمريضية. الجانب الثالث هو تحديد أهمية المعلوماتية الحاسوبية المستخدمة في المهن الطبية والتمريضية من خلال ما يعكسة محتوى الخطط الدراسية المعتمدة في هذه الجامعات.

منهجية الدراسة: تم استخدام أسلوب الترابط بين المتغيرات والتصميم المبني على العينة المقطعية في تحقيق أهداف الدراسة. وجمعت المعلومات المستخدمة لتحقيق أهداف الدراسة باستخدام عينة مختارة بشكل مخصوص شملت مائة وثمان وستون طالبة وطالب في مستوى السنة الرابعة من جامعة مؤته وجامعة الحسين بن طلال. وتم جمع المعلومات من خلال تطبيق أداة قياس معرفة مهارات المعلوماتية الحاسوبية للتمريض التي صممت خصيصا لهذه الغاية. وتم تحليل المعلومات باستخدام البرنامج الاحصائي المناسب.

نتائج الدراسة: وأظهرت نتائج الدراسة أن متوسط الدرجات التي تم الحصول عليها بواسطة أداة جمع المعلومات من أفراد العينة هو (150/96.84)، أي ما نسبته (64.56%) من العلامة الكلية لمهارات المعلوماتية الحاسوبية للتمريض. وهذا المتوسط يحدد مستوى معرفتهم وأدائهم في هذا المهارات بدرجة المؤهل على المقياس المستخدم.

مناقشة نتائج الدراسة: أظهرت نتا ئج الدراسة توافق مع نتائج دراسات سابقة أكدت على عدم وجود اهتمام كاف بشمول المعلوماتية الحاسوبية المستخدمة في المهن الطبية والتمريضية في الخطط الدراسية في الجامعات.

الدلالات والتوصيات والخلاصة: بناء على النتائج تقدم الدراسة عدد من الدلالات والتوصيات بالاضافة الى الخلاصة.

Chapter One
Introduction and Theoretical Background

1.1 Introduction

The importance of being competent in health-nursing informatics for nurses, and for other healthcare professionals in general, is too obvious to justify. After all, nurses, who by most estimates constitute the largest segment of the healthcare staff are on the frontlines of the healthcare profession and play a critical role in caring for sick people and in saving lives. As such, nurses are expected, and must be required to master all the competencies that will be need ed in order to enable them perform their jobs perfectly.

Besides, people all over the world are not generally willing to compromise on the quality of healthcare that they expect to receive in healthcare institutions. It is quite natural to find that people would demand that nurses and all members of the healthcare profession possess the qualifications and the skills that their colleagues in the most advanced countries possess. Yet, there is an obvious gap between expectations and realities when it comes to this issue.

1.2 Background of the Study

In order to describe the theoretical background of this study, it is necessary first to provide an outline of the basic issues in nursing informatics that it aims to investigate. This study was conducted to evaluate three issues pertaining to the status of nursing informatics in public Jordanian universities. These issues are:

a. The level of familiarity with nursing informatics among nursing seniors currently enrolled in baccalaureate nursing programs in Jordanian public universities which are represented by two of the public universities located in the southern region of Jordan.
b. The status of health and nursing informatics in the current study plans of the universities surveyed as reflected in the number of courses allocated for these competencies in these plans.
c. The relationship between the quantity of nursing informatics courses in the study plans of these two universities and the students' level of familiarity with nursing informatics as reflected by the mean scores of their performance on the research tool.

In terms of its method and design, this study fits within the framework of the "descriptive research approach" outlined in (Amar-Singh et al., 2008). Within this framework of research, belongs to the correlational, cross-sectional design as stated earlier. It is primarily designed to evaluate the outcome of existing baccalaureate nursing programs in health-nursing informatics competencies within the Jordanian context. In more specific terms, it was designed to measure the level of health-nursing informatics in two representative public universities sin Jordan, namely, Mutah University and Al-Hussein Bin Talal University. The outcome of these programs is evaluated in the study by measuring the performance of the study sample on the Nursing Informatics Competency Assessment Tool (NICAT) developed by (Rahman, 2015) .

The need for identifying and standardizing the required competencies of nursing informatics globally. Regarding the need for nursing informatics knowledge and skills for future nurses, a universal consensus undoubtedly exists that such knowledge and skills are indispensable for the students of nursing not only to perform their future work properly, but to get a job as a nurse in the first place. In this context, (Cummings et al., 2016) writes: "In rapidly advancing technology-rich environments worldwide, nurses are expected to have proficiency in nursing informatics (NI) knowledge and skills to enable them to provide patients with high quality, safe and cost-effective care." Furthermore, the need for providing future nurses with adequate informatics knowledge and skills is expected to be rewarding in several ways as (Honey et al., 2020) note: "There is a general consensus that people will continue to be at the center of any successful digital health initiative. This is particularly pertinent for nursing because nurses make up the largest component of the health workforce. Focusing and investing in nursing is thought to improve health and gender equality and support the economic growth of a country." Similarly, McNeil & Odom (2000) provide a more detailed description of the ever-increasing need for nursing informatics and the widespread use of it in health-providing institutions. In this context, they allude to the critical importance of health-nursing informatics competencies in dealing with sophisticated medical equipment in hospitals as well as in other types of medical facilities. Besides, they stress the need by nurses for the ability to understand and to interpret the "data generated by sophisticated monitoring systems." Furthermore, of crucial importance to nurses, according to these authors, is the ability communicate nursing information through the use of nursing informatics.

Regarding the shortage or absence of nursing informatics courses in baccalaureate or undergraduate study plans, it can be said that one does not need much effort to discover that undergraduate nursing programs in many countries around the world are not yet designed to provide students with optimal or adequate knowledge and skills in nursing informatics. This gap between the present course requirements of the study plans that students of nursing have to complete in order to qualify for the baccalaureate degree and the desired study plans that will provide students with adequate knowledge and skills in nursing informatics is the reason why this line of research into nursing informatics is gaining more attention worldwide. In more specific terms, the insufficient provision of nursing informatics knowledge and skills to undergraduate students of nursing is considered a problem that researchers have been exposing in order to effect solutions by the concerned parties in various sectors.

This issue has been raised by many authors. (Cummings et al., 2016) writes: "Numerous studies have reported the gap between graduates' knowledge and skills acquired at university and the nursing competencies graduates are expected to demonstrate in practice." Even in the USA which is expected to lead in the area of providing adequate nursing informatics knowledge and training to undergraduate students of nursing (Stevenson, 2020) found an "insufficient number of nursing informatics courses, within the BSN curriculum, in the United States".

In regard to the need for identifying the roles and the competencies in nursing informatics that nurses and students of nursing are globally expected to assume, (Hübner et al., 2018: e30) voices the need for standardizing health and nursing informatics skills on the global level without ignoring the local contexts: "The primary aim of this study is therefore to empirically define and validate a framework of globally accepted core competency areas in health informatics and to enrich this framework with exemplar information derived from local educational settings." Simultaneously, (Hübner et al., 2018: e37) proposed what they call "a framework consisting of 24 core competency areas in health informatics and five major roles of nurses." The five roles are:

1. Clinical nursing (direct patient care)
2. Quality management
3. Coordination of inter-professional care
4. Nursing management
5. IT management in nursing.

The "24 core competency areas" referred to here are listed on page e37 of the work by (Hübner et al., 2018)

1.3 Need for the study:

This study is needed for at least two reasons. First, despite the growing interest in promoting health and nursing informatics in several of the technologically advanced countries around the world, these concepts, and their applications to baccalaureate nursing programs, and to the healthcare sectors within the Jordanian context in particular are likely to be behind to say the least. Thus, if not for anything else, studies such as this one are needed to amplify the call for providing nursing students and registered nurses with proper health and nursing informatics. Secondly, the body of literature on the topic of health informatics and nursing informatics in Jordan and is relatively small compared to other regions. Therefore, there is still a substantial need for more studies on this issue within Jordan and the region where it is located.

1.4 Purpose of the study:

The main purpose of this study is to explore and to put into proper perspective an issue which has not yet received the attention that it deserves from universities and from the administrations of healthcare institutions within the Jordanian context. Additionally, this study is an attempt to contribute to the on-going effort to promote the adoption and the promotion of health-nursing informatics in baccalaureate nursing programs, particularly in Jordanian universities. Likewise, it is an attempt at amplifying the collective effort globally underway to acquaint decision makers and healthcare professional in general with the crucial importance of health-nursing informatics. Needless to say, this study is intended to enrich the currently small body of literature on health-nursing informatics in Jordan and in the turbulent region in which it is located.

1.5 Significance of the Study:

The significance of this study mainly derives from its investigation of an issue that should become of prime importance to educators, to administrators of healthcare organizations, as well as to students of nursing in Jordan. Its significance also emanates from its exposure of an important issue within the context of a country and a region which is still inadequately covered in current research on nursing and health informatics. Besides contributing to the academic research into health informatics, and in particular, to nursing informatics, this study is intended as a means of creating more interest in nursing informatics at the local level in Jordan and stimulating more thinking and more action which is geared towards making the education and training into nursing informatics available to students, particularly those enrolled in baccalaureate nursing programs at Jordanian universities.

Based on the mean scores obtained by the study sample on the (NICAT), the study will formulate recommendations that will underscore the need for promoting "competency-based nurse education," which implies providing undergraduate students of nursing with adequate knowledge and skills in the area of nursing informatics in order to make them ready for their future jobs. Besides, this line of research has aimed at exposing the gaps and the inadequacies of nursing informatics preparation in baccalaureate nursing programs worldwide and its negative impact on the nurses and the patients. In more specific terms, this study aims at evaluating the effect and the level of contribution of existing baccalaureate nursing programs to the acquired knowledge and the skills of senior students of nursing at public universities in the area of nursing informatics, the gaps that exist in these programs with respect to nursing informatics, and the proposed revisions and reforms that are needed to bridge these gaps for the purpose of turning out graduates who are ready for their future jobs.

1.6 Research questions:

Since the aim of this study is to assess the level of nursing informatics competency among baccalaureate nursing students at public universities in Jordan, this study will attempt to answer the two following questions:

1. What is the level of health-nursing competency among the senior (fourth-year) students enrolled at the baccalaureate nursing programs at representative public Jordanian universities?
2. Did the variables of gender and university affiliation have any statistically significant influence on the subjects' performance on the research tool?
3. What is the number and the credit weight of courses in the study plans of the universities examined which are specifically designed to teach health and nursing informatics to students of nursing?

1.7 Definition of Terms:

The terms health informatics and nursing informatics have been defined by (Honey et al., 2020). According to this definition, the two terms are closely interrelated: "Health informatics is defined as the discipline focused on the acquisition, storage, and use of information in a specific setting or domain, in this case health care. Within nursing, the term nursing informatics is preferred, and this is defined as a "science and practice [which] integrates nursing, its information and knowledge, and their management, with ICT to promote the health of people, families, and communities worldwide". Or more simply, we are talking about the use of computers and ICT to support health care.

1.8 Organization of the Remainder of the Study:

Chapter one has provided an introduction to the study topic, background of the study, need for the study, purpose of the study, significance of the study, research questions, definition of terms, and research design.

Chapter two, literature review, surveys previous studies on the issue investigated in this study. Previous studies surveyed in this chapter are grouped into four groups: 1. research works aimed at promoting local and universal recognition of the value of nursing informatics for nurses. 2. works documenting the insufficient emphasis on nursing informatics and highlighting the lack of proper attention to this competency in many baccalaureate nursing programs worldwide. 3. research works, and official documents issued by governmental and professional organizations identifying and detailing the informatics skills that nurses need on their job. 4. research works investigating nursing informatics within Jordan and the neighboring countries.

Chapter three includes the following sections: introduction, study design, study population and study sample, settings, inclusion and exclusion criteria, data collection, validity of the study tool, stability of the study instrument, reliability, pilot test, data collection procedures, sstatistical processing, and an assessment of the proportion of nursing informatics courses in the study plans of the baccalaureate nursing programs examined in the study.

Chapter four, Presentation of Data and Results of the Analysis, includes an introduction, results of the subjects' self-reported evaluation of their competency levels on the Nursing Informatics Competency Assessment Tool (NICAT), and an assessment of the proportion of informatics courses in the study plans of the baccalaureate nursing programs examined in the study. Chapter five, discussion, implication, and recommendations, provides a summary of the results, discussion of the results, conclusions based on the results, a comparison of findings with theoretical framework and previous literature, interpretation of the findings, limitations, implications for practice, recommendations for further research, and conclusion.

Chapter Two
Review of Literature

2.1 Introduction:

This chapter surveys published work on nursing informatics that are closely related to the topic investigated in this thesis. For convenience, and based on the main issues addressed in them these works will be discussed under four headings:

A. Literature focused on promoting local and universal recognition of the importance of nursing informatics.
B. Literature documenting inadequate emphasis on nursing informatics in baccalaureate nursing programs.
C. Literature detailing nursing informatics competencies needed by nurses.
D. Literature investigating nursing informatics within Jordan and its neighboring countries.

A. The importance of nursing informatics.

The value of nursing informatics education for future nurses in particular has been stressed by numerous authors. In this context, (Cummings et al., 2016) writes: "In rapidly advancing technology-rich environments worldwide, nurses are expected to have proficiency in nursing informatics (NI) knowledge and skills to enable them to provide patients with high quality, safe and cost-effective care". This view is supported by (Harerimana et al., 2021) who lists numerous benefits for providing nursing students with adequate nursing informatics education as part of their study and training programs: "Integrating NI into undergraduate nursing education is instrumental in producing competent nurses who are capable of using technology to provide high-quality care. In addition, NI has been reported to promote evidence-based practice, improve documentation, and reduce medical errors."

Likewise, (McNeil & Odom, 2000) share this view of the importance of nursing informatics for the nursing profession: "The nursing practice arena, whether it be hospital or community based, requires that nurses have an ever-increasing level of competency in nursing informatics (NI). From the use of bedside computers to the interpretation of data generated by sophisticated patient monitoring systems, the importance of accessing, using, and communicating nursing information through the application of nursing informatics is escalating within all areas of nursing practice." More benefits for nursing informatics including its role in research are outlined by (Mohamed & Abouzaied, 2021):

In the healthcare system, NI supports nurses, consumers, patients, interprofessional healthcare teams, and other stakeholders in their decision-making in all roles and settings to achieve the desired outcomes (ANA, 2016). The use of informatics in the nursing profession affects learning environments, clinical practice, interprofessional cooperation, strategic planning, workflows, decision-making, budget tools, and patient satisfaction in healthcare settings. Furthermore, it enhances the virtual teaching and learning environment associated with educational outcomes, and the paradigm shift from bringing the library to the student virtually in nursing education (Hill et al., 2014); (Pordeli, 2017) ; (Hübner et al., 2018). Factually, NI can also facilitate and support nursing research through the assessment of patient outcomes, evidence-based practice, standardized terminology, and virtual knowledge base (Hill et al., 2014) ; Godsey, 2015).

Moreover, commenting on the insufficient coverage of nursing informatics in nursing programs and the shortage specialists in this field,(Delaney et al., 2022) writes:

In an environment where nurses may not receive informatics education during their pre- or post-licensure education, and where a limited number of nursing informatics specialists are available, the importance of informatics education and competency for all nurses cannot be understated.

Based on their examination of the relationship between "nursing informatics competency and the quality of information processing", (Al-Hawamdih & Ahmad, 2018) conclude that "Nurses must be competent in NI to provide high-quality healthcare services to patients with complex health problems" and they (Al-Hawamdih & Ahmad, 2018) add: "When nurses are competent in informatics, speed and accuracy of nursing documentation improve; therefore, the healthcare provider will have better access to nursing notes and can enhance decision-making about patient care.

(Farzandipour et al., 2021) expresses a similar view on the crucial need for nursing informatics among nurses, particularly because of their crucial rule and their significant presence in the healthcare sector: "Since nurses are regarded as the largest part of the healthcare workforce and the major users of clinical information systems, nursing informatics competencies are important for the successful use of clinical information systems and improving patient safety in computerized environments." Regarding the need for providing nursing students with informatics knowledge and training prior to graduation, (Baker, 2021) writes: "There is a growing demand for nurses to be competent in utilizing various forms of nursing informatics, and the demand is higher for nursing students to have exposure to these same forms of technology during their undergraduate studies

B. Inadequate emphasis on nursing informatics in baccalaureate nursing programs:

This type of literature focuses on the insufficient emphasis on nursing informatics and highlighting the lack of proper attention to this competency in many nursing programs worldwide. The lack of providing students of nursing with nursing informatics education has been noted by (Travis et al., 1991) who observes that "Preparation of nurses to face the 21st century rests on educational programs well-grounded in the sciences that support nursing. In addition to the traditional physical, biological, and social sciences, information sciences provide foundational support for nursing practice. Yet rarely is information science formally integrated into a baccalaureate curriculum in nursing."

Furthermore, in their assessment of the coverage of nursing informatics in university nursing preparation programs in New Zealand (Honey et al., 2020) write: "Although historically New Zealand was an early leader in considering how to prepare nurses to work with technology, nursing informatics has not been consistently addressed in nursing curricula across the country's 17 schools of nursing, meaning that New Zealand nurses may not be well prepared in this area." Similarly, in the USA a substantial number of registered nurses do not yet possess a satisfactory level of knowledge and training in nursing informatics because they graduated from nursing colleges without receiving any significant training in this area as noted by (Delaney et al., 2022) :

… in the United States, of the workforce of almost 4 million nurses, almost half attended nursing school prior to the incorporation of HIT into nursing practice (Zhang et al., 2018), resulting in a large segment of the nursing workforce that did not obtain informatics education in their academic programs, creating a knowledge and competency gap (Furst et al., 2013; Kinnunen et al., 2019).

(Honey et al., 2020) provides revealing statistics about the low coverage of health and nursing informatics courses in the study plans of nursing programs in some countries that are typically considered advanced in their healthcare institutions: "A survey of medical schools in the United Kingdom identified that 17% of the 76% of medical schools that responded had little or no health informatics included in their curricula, and this is despite the General Medical Council's curriculum requirements. (Condor et al., 2018) assessed the volume of nursing informatics besides health informatics and ICTs in the study programs of sixty-two undergraduate nursing university programs in Peru and concluded that only a small number of these programs contain such courses: "Within the explored curricula, few universities (24%, 15/62) offer specific courses in health informatics, nursing informatics, or ICTs for nursing care." Based on these findings, they recommend updating "the universities' curricula and they

encourage universities to collaborate in identifying the aims that should be achieved in nursing informatics education: “It is necessary to update the curricula of the universities according to the recommendations that IMIA proposes in health informatics educational programs. In addition, universities need to work collaboratively to develop and determine objectives for nursing informatics education.”

In Australia, a country of special relevance to nursing informatics because of the numerous experiments with nursing informatics, and the abundant publications about its implementation of nursing informatics models, there still seems to be much to desire in terms of incorporating nursing informatics into undergraduate programs in nursing nationwide. This situation is outlined by (Cummings et al., 2016) who writes: “Whilst nursing informatics has been taught at post graduate levels for many years, the integration of it into undergraduate studies for entry level nurses has been slow. This is made more complex by the lack of explicit nursing informatics competencies in many countries. Australia has now mandated the inclusion of nursing informatics into all undergraduate nursing curricula but there continues to be an absence of a relevant set of agreed nursing competencies. There is a resulting lack of consistency in nursing curricula content nationally.”

(Harerimana et al., 2021) report that the integration of nursing informatics in nursing programs in Africa is still far from being satisfactory:

In Africa, the integration of informatics in nursing education is in the early stage (Achampong, 2017) ;(Harerimana & Mtshali, 2017).There are challenges which hinder the proper integration of NI in undergraduate nursing education in Africa, including lack of infrastructure and ICT tools, inadequate ICT literacy among nurse educators and students, resistance to change and the lack of policies and guidelines (Achampong, 2017); (Bello et al., 2017); (Harerimana & Mtshali, 2017); (Murgor, 2015). Furthermore, there is a low presence of NI in the undergraduate curriculum, and a lack of standardization of NI competencies to be included in undergraduate nursing education.

This view is also shared by (Tubaishat, 2014) who depicts a similar situation in Jordan with respect to the inadequate attention to nursing informatics, for which he uses the term “technology” in nursing preparation programs, and by implication among nurses in Jordan: “The inadequacy of FET (Formal Education in Technology) in Jordan is likely attributable to two factors: (a) the nursing curriculum is not supported with technology components, and (b) students choose not to take technology application courses.”

Likewise, in their study of the Jordanian and Palestinian contexts, (Jabareen et al., 2020) correspond to this view and support these findings: "although the majority of health care professionals in both setting believed that it was important to have HI system in their institutions, obstacles to implementing HIT still exist. To overcome the challenges related to the use of HIT by health professionals in Jordan and Palestine, medical and health curricula need to be revised to include and integrate HIT, and new programmes in HI need to be developed. (O'Connor et al., 2016)" examined the situation in Malawi with respect to the implementation of nursing informatics and reports that "The capacity for implementing NI in developing countries is limited." In the Middle East in general, (Ahmad, 2015) believes that one of the major obstacles to advance nursing informatics is its being a new field: "Efforts toward implementing the health informatics role in general (and the nursing informatics role in particular) are lacking, in part because this science is still new in the Middle East.

C. Nursing competencies needed by nurses:

This type of literature investigates the set of nursing informatics skills that should be taught to nursing students and those required for the job in different countries around the world has stressed the lack of consensus in this area. In this regard, (Stevenson, 2020) writes:

"The TIGER Initiative recommended that practicing nurses and nursing students possess and demonstrate three essential informatics competencies: basic computer competency, information literacy, and information management to provide safe and competent care in a technical and digital environment (The TIGER Initiative, 2007). According to the TIGER Initiative, basic computer competencies, also known as computer literacy, are defined as a user's ability to operate a computer, use telecommunication tools, and browse the World Wide Web."

In their (2018: TIGER Initiative: e30). (Hübner et al., 2018) provide what they claim to be a globally comprehensive set of nursing skills that they consider to be inclusive of all the nursing skills that nurses in their different roles would need. "The primary aim of this study is therefore to empirically define and validate a framework of globally accepted core competency areas in health informatics and to enrich this framework with exemplar information derived from local educational settings. Furthermore, in this initiative the researchers identified five roles that nurses typically assume in healthcare institutions and for each of these five roles the authors list 10 nursing informatics competencies that nurses should possess. The five roles are: "Clinical Nursing (Direct Patient Care), quality Management, Coordination of Inter-Professional Care, Nursing Management, IT Management in Nursing". (ibid: e34).

Within the American context, (Honey et al., 2017) detail the nursing informatics standards for undergraduate and graduate programs in nursing: "The American Association of Colleges of Nursing (AACN) sets standards for nursing education and informatics criteria is written for all levels including Baccalaureate, Master's and Doctorate of Nursing Practice (DNP). For those preparing at the prelicensure level, the Essentials of Baccalaureate Education for Professional delineates competencies related to the use of patient care technologies to support care, the use of decision support systems to guide practice, understand and use standardized terminologies to reflect nursing's unique contribute to patient outcomes, and to ethically manage and process data, information and knowledge to support safe and quality patient care." Honey ibid also provides useful background summary of required nursing skills and competencies required at various levels of nursing education in Canada:

An underlying premise of the competencies is that students entering schools of nursing at the undergraduate level will possess basic computer literacy as it relates to the use of generic applications and devices (e.g., word processing, email, smart phones and computers). The competencies are subsumed by a single over-arching competency statement: Uses information and communication technologies to support information synthesis in accordance with professional and regulatory standards in the delivery of patient/client care. The following three competencies have been identified: 1) Information and knowledge management - Uses relevant information and knowledge to support the delivery of evidence-informed patient care., 2) Professional and regulatory accountability - Uses ICTs in accordance with professional and regulatory standards and workplace policies. 3) Information and communication technologies - Uses information and communication technologies in the delivery of patient/client care.

D. Nursing informatics in Jordan and its neighboring countries:

Within the Jordanian context, research on nursing informatics is still relatively rare and the issues investigated so far are at best limited. Nevertheless, (Al-Hawamdih & Ahmad, 2018) examined the relationship between nursing informatics competency and the quality of information processing among a representative sample of Jordanian nurses, and found that "Nursing informatics competency, including clinical informatics attitude, basic computer knowledge and skills, clinical informatics role, applied computer skills, and clinical informatics, was positively correlated with the quality of information processing…".

These authors observe that their "results support the need for educational and governmental policies that advocate for every nurse to be educated in NI and the quality of information processing. (Tubaishat, 2014) investigated the attitudes of nursing students at one of the major public

universities in towards the use of technology and found a significantly positive attitude among the majority of these students despite the lack of sufficient courses to prepare students in this area: “Study findings show that Jordanian nursing students hold a generally positive attitude toward technology. Despite this positive attitude, participants reported that they received minimal FET during their study at the university.

The positive attitude may suggest that students would welcome more technology-enhanced courses if made available in the curriculum. However, IT is of great value to all disciplines, which should be integrated at different levels and started as early as elementary school.”

Additionally,(Tubaishat, 2014) suggests a remedy to this lack of proper education into nursing informatics for nursing students: “Nursing educators should integrate technologies to improve students’ skills in the informatics field. As a minimum requirement, an introductory compulsory course in nursing informatics should be offered to all nursing students to bridge the gap between nursing students and technology.

Today’s students are the nurses of the future, and it is recommended that nurses today must be able to utilize clinical IT effectively in patient care. Therefore, nursing educators must incorporate IT into the curricula so that students may easily adapt to the technology that they will use throughout their careers.” (Jabareen et al., 2020) report similar findings and recommend providing healthcare professionals in general with health informatics which implicitly includes nursing informatics: health professionals in Palestine and Jordan are in need of training in HI and therefore educational programmes in the area of HI are strongly recommended.”

Regarding the adoption and the interest in nursing informatics within the neighboring countries to Jordan, (Elewa & El Guindy, 2017) provide relevant information about the Egyptian context:

Nursing informatics is a new specialty in Egypt. It is becoming an important and integral part of healthcare organizations, it affects nursing outcome and quality of health care. Therefore, involving informatics basic knowledge and skills within a nursing education program is recommended to meet the future challenging trends that globally affect nursing workforce. Based on their results, they provide the following recommendations:

Develop and integrate nursing informatics course specification design based on nursing students' educational needs, support the faculty of nursing with resources and fund to build appropriate infrastructure necessary to apply nursing informatics, provide faculty teachers with an opportunity to learn and develop skills about nursing informatics in order to prepare them to integrate this course within the curriculum and courses they teach.

Regarding the overall policies and attitudes the countries of the Middle East in general, (Ahmad, 2015) provides an optimistic account:

The strength of the Middle East region in terms of informatics lies in its recognition of the importance of implementing state-of-the-art information solutions in healthcare. Many initiatives are underway to promote Health Informatics in governmental and non-governmental organizations that will upgrade the entire healthcare system. There is political willingness to use state-of-the-art information systems in health settings.

Despite this optimism, (Ahmad, 2015) identifies some gaps in the Middle Eastern countries and calls for adopting a list of American solutions. Among these solutions, she recommends developing certain "initiatives" for providing "informatics training to health professionals" such as "the TIGER initiative, American Medical Informatics Association (AMIA) 10X10 virtual courses and the Nursing Informatics Boot Camp"

The literature review presented thus far indicates that nursing informatics is an issue that still preoccupies the attention of numerous authors and it still occupies a major concern for a wide range of governmental and non-governmental bodies. Nevertheless, and despite this widespread interest in nursing informatics and the recognition of its importance, there are still certain areas that need to be addressed for the purpose of enriching the debate over the best ways to enhance the process of initiating effective programs for providing nursing students, and nurses in general, with the required skills and competencies of nursing informatics. In particular, for the purpose of broadening the scope of research into nursing informatics so that it covers all the regions of the world and all the questions that are still in need for answers, we still need further research into this area. It is in this context that this study has been envisaged. Its principal aim is to bring into proper perspective the current status and the level of familiarity with nursing informatics among senior Jordanian students of nursing using an evaluation test proposed by current research. The study is definitely a useful and a timely contribution to the literature on nursing informatics within the Jordan context which is still minimal compared to the literature about other areas of the world. Besides the study highlights the status of nursing informatics in baccalaureate nursing programs in Jordan, an area which has not yet been closely investigated. Last but not least, the researcher who conducted this study is herself a registered nurse with a seven-year first-hand experience in The Royal Medical Services in Jordan; an institution which is considered the leading healthcare provider in Jordan. As such she, is conveniently situated to understand the value of nursing informatics for nurses.

2.2 Conclusion:

The review of the related literature presented thus far clearly shows that health and nursing informatics is an area of prime importance to researchers from various disciplines. The wide interest that this area of research has attracted is a strong indicator of the crucial need for providing students of nursing in particular, and nurses in general with knowledge and training in competencies related to health and nursing informatics. The growing interest in this area also signals that despite the importance of informatics competencies for nursing in particular, and health professions in general, there are still tremendous obstacles facing attempts to promote its teaching world-wide. This perhaps is the main reason why researchers will continue to address this issue from various angles. Finally, it is quite obvious from this survey of previous research that various issues will continue to emerge which will need to be addressed and highlighted by researchers.

Chapter Three
Design and Methodology

3.1 Introduction:

This chapter provides an overview of the research methodologies used in the study. It contains information on the participants, such as the study's inclusion and exclusion criteria, who the participants were, and how they were sampled. The researcher discussed why she adopted the research design she used for this study. The instruments that were used to gather data are also detailed, as are the methods that were followed to conduct this investigation. The methods used to analyze the data are also discussed by the researcher. Finally, the ethical considerations that were taken into account during the procedure are highlighted.

3.2 Study design:

This study is a quantitative study adopting a cross-sectional correlation design used to answer the study's research questions. This research design is appropriate for this study because it aims at investigating the intended research problem at a single point in time as (Polit & Beck, 2020) observe. (Amar-Singh et al., 2008) recommend this research design for this type of study. As for the analytical field research, a comprehensive reconnaissance survey was conducted and all the students' responses to the questions contained adopted and in the questionnaire by the study were analyzed in order to answer the study questions.

3.3 Study Tool:

The Nursing Informatics Competency Assessment Tool (NICAT) was used to assess the participants' knowledge and level of competency in nursing-health informatics. This tool is adopted from (Rahman, 2015) because it has been found quite suitable for collecting the data that would answer the research questions that this study aims to answer. The Nursing Informatics Competency Assessment Tool (NICAT) is a thirty-item evaluation questionnaire. For each of the thirty questions about nursing informatics, the respondents are asked to rate the level of their competency on a 1-5 scale. On this scale, the numbers from 5 to 1 are equated with the following degrees of competency:**5 Expert, 4 Proficient, 3 Competent, 2 Somewhat Competent, 1 Not Competent**

It is based on recommendations from the TIGER Initiative and ANA. The theoretical framework that guided the NICAT tool was the Dreyfus model of skill acquisition. Each participant assessed their knowledge and display of three fundamental informatics competencies which are:

Computer Literacy Assessment, which is measured by Paragraphs (1-10): Total Score:50

Informatics Literacy which is measured by Paragrphs (11-23): Total Score: 65

Informatics Management Skills which is measured by Paragraphs (24-30): Total Score 35.

The Computer Literacy Competency assesses the students' basic computer abilities. The informatics Literacy Competency part includes questions designed to assess the respondents' knowledge and skills in informatics. The Informatics management Skills part assesses the respondents' informatics management skills.

Table (1) shows the nursing competency scoring and their interpretation which is adopted by (Rahman, 2015) and is applied in this study.

Table 1: Nursing Informatics Competency Scoring and interpretation

Categories	Scores	Total Scores
Computer Literacy	50	
Informatics Literacy	65	
Informatics Management Skills	35	
Nursing informatics Competency Score total		150

Scoring interpretation: Novice: 30. Advanced Beginner: 31-59. Competent 60-89. Proficient: 90-119. Expert 120-150.

3.4 Validity of the study tool:

Nursing Informatics Competency Assessment Tool (NICAT):

The principal data recommendation tool used to achieve the purpose of this study is the Nursing Informatics Competency Assessment Tool (NICAT). This tool was introduced and recommended by Rahman 2015. The content and the evaluation guidelines proposed in this tool are based on the following sources:

American Nurses Association (ANA) standards (2008).

Technology Information Guiding Education Reform) TIGER (recommendations (2009).

Benner's Dreyfus model of skill acquisition (1984).

To ensure the validity of the study tool, i.e. to ensure its validity to measure what it was developed to measure, it was presented to a jury of experts consisting of arbitrators from the faculty of Nursing and The Faculty of Medicine at Mut'ah University. The jury members have had long experience and certified competence in the subject matter of the study to verify the appropriateness of the questionnaire paragraphs for the objectives that the study seeks to achieve. All opinions and suggestions submitted by the arbitrators were taken into consideration. The final version of the questionnaire was revised and modified in accordance with the feedback from the jury members.

3.5 Stability of the study instrument:

The stability coefficient was extracted according to Cronbach's alpha equation to ensure the internal consistency in its total final form and for each variable in all its dimensions. The value of the total stability coefficient was (0.970), and this ratio is considered high and indicates the stability and consistency between the paragraphs of the tool, Table Number Two shows the values of the stability coefficients for the fields of study:

Table 2: The value of the reliability coefficient for the internal consistency of the fields of study

Paragraph numbers	The name of the dimension	Stability Factor (Cronbach Alpha)
1-10	Level of the computer literacy of the participants.	0.976
11-23	Level of literacy in the use of nursing informatics.	0.969
24-30	Participants' nursing informatics management skills.	0.972
1-30	**The tool as a whole.**	**0.970**

3.6 Reliability:

To establish reliability, the self-administered questionnaire was first written in English, also translated into Arabic, the native language, and finally returned to English by translation specialists. The questionnaire used to collect data from all participants was written in Arabic, the native language. The research supervisor was in charge of the whole data collection process. In this study, eleven nursing students pretested the questionnaire to determine sensitivity, consistency, acceptability, and any difficulty in the questions.

3.7 Pilot test:

The completed questionnaire was pilot tested with a convenience sample of eleven students. These eleven students were not included in the study. They were asked to complete the draft questionnaire and to provide written and verbal comments on its ease and comprehensibly of instructions and format. Based on students' and experts' responses and feedback, the items that were reported to be insufficiently clear were modified.

3.8 Study population and study sample:

Study Population:

The population of this study consisted of all the senior (fourth-year) students at Mutah University and Al-Hussein Bin Talal University. The sample was a purposive sample consisting of (168) senior (fourth-year) students enrolled in the baccalaureate nursing programs during the second semester of the academic year 2021-2022 at Mut'ah University and Al-Hussein Bin Talal University

Study Sample:

As shown in the data presented table (3), a total of 168 fourth-year students of nursing provided the data used to achieve the purpose of this study. The convenience sampling technique was used to choose the sample that provided the data of this study. The sample consisted of one hundred and sixty-eight senior students.

Table (3): the distribution of the study sample according to demographic variables.

Variable	Variable categories	Frequency	Percentage
Sex	Male	64	38.1
	Female	104	61.9
	Total	168	100.0
Year	22 - 23 Year	141	83.9
	24 -28 Year	21	12.5
	29 years or more	6	3.6
	Total	168	100.0
	Mut'ah	89	53.0
University	Al-Hussein Bin Talal	79	47.0
	Total	168	100.0

Eighty-nine of these students were from Mut'ah University, and seventy-nine were from Al-Hussein University. A hundred and four of the sample were females and sixty-four were males. Regarding the university variable, the table shows that the surveyed students studying at Mut'ah University constituted (53.0%) of the total sample, compared to (47.0%) studying at Al Hussein University. Again, the disparity in number between the sample members who provided the data from both universities is attributable to the number of nursing students in each of the universities.

The number of female students in the sample was bigger than the number of the male students i.e., a hundred and four females versus sixty-four males. This disparity in number between males and females was dictated by the demographic composition of the student population in both universities, which predominantly consists of more females than males. With regard to the age variable, the data in the previous table showed that the age group (22-23 years) ranked first and constituted (83.9%) of the total study sample, followed by the age group 24-28 years which constituted (10.5%) and in the third-place came the age group 29 years or more making up 3.6% of the sample.

3.9 Inclusion and exclusion criteria:

Inclusion criteria: The inclusion criteria for the sample are listed below:

A. University level: seniors/fourth-year students of nursing: All the senior (fourth-year) students enrolled in the baccalaureate nursing programs at Mut'ah University, Al-Hussein Bin Talal University are included as part of the study population.
B. Gender/ demographics: males and females.
C. Age-group: determined by the age of the youngest and the age of the oldest students who will volunteer to participate in this study.
D. Linguistic background: all participants are expected to be native speakers of Arabic
E. Willingness to participate in providing data for the study.

Exclusion Criteria: The exclusion criteria include the following:

A. University level: Freshman students of nursing, sophomores of nursing, juniors (third-year) students of nursing, and graduate students of nursing were excluded.
B. Employment status: On-job-nurses, including part-time and full-time employed nurses were excluded from the sample.

3.10 Settings:

This study was conducted at two of the public Jordanian universities:

1. The Faculty of Nursing at Mutah University, located a hundred and forty kilometers south of the Jordanian capital, Amman
2. The Faculty of Nursing at Al-Hussein Bin Talal University in the city of Ma'an, located two hundred kilometers to the south of the Jordanian capital Amman.

3.11 Data collection

The data used to achieve the purpose of this study were collected through the Nursing Informatics Competency Assessment Tool which was designed and proposed by (Rahman, 2015). The study plans that were applied at Mutah University and Al-Hussein Bin Talal University at the

time of the study were surveyed to determine if they contained any courses on health and nursing informatics to the students enrolled in the baccalaureate nursing programs. The purpose of this procedure was to provide a more comprehensive assessment of the status of health and nursing informatics among the senior students of the baccalaureate nursing programs in the surveyed public Jordanian universities.

Data collection procedures:

The data collection procedures implemented by the researcher are described for each of the data collection instruments in the sections that follow. The data collection instrument was prepared in the Google Forms, and a pilot test was conducted. As previously mentioned, the link to the google form was distributed to the sample electronically using Facebook and WhatsApp (https://forms.gle/B7GkB2C493rSFpES9), by clicking the link, the participants were directed to the page displaying an introduction about the questionnaire that explains the study and its purpose, and assurance of the confidentiality of data and the section where to response for. The participants' response was automatically recorded and stored in Google Drive, downloaded as excel file for data cleaning and then analyzed. As pointed out earlier, the data collection instrument was used for the purpose of measuring and determining the extent of their abilities to use nursing informatics.

3.12 Data Analysis:

To answer the study questions, descriptive and analytical statistical methods were used. More specifically, the statistical package (SPSS.23) was used to analyze the responses for the items included in the Nursing Informatics Competency Assessment Tool (NICAT), the main tool that was used to collect data. The descriptive statistics used to establish the results of the responses obtained from the sample to the items included in this tool consisted of frequencies, percentages, mean scores, and standard deviations.

1. Frequencies and percentages describe the characteristics of the study sample according to their personal and functional variables.
2. The mean scores and standard deviations identify the average answers of the respondents to the items that measure the level of nursing informatics competency among the sample of the study.

Assessment of nursing informatics courses proportion in the study plans of the baccalaureate nursing programs: The study plans for the baccalaureate degree which are currently in place at Mut'ah University, Al-Hussein Bin Talal University, (representing public Jordanian universities) were analyzed for the purpose of measuring their weight in the programs relative to the total number of courses in the plans. This was followed by a comparison of these study plans with the study plans applied in selected

universities known for their interest in promoting nursing informatics in their study plans. The American universities chosen for comparison are: The Truett McConnell University Rielin & Salmen School of Nursing and Georgia southwestern state university.

3.13 Conclusion:

The review of the related literature presented thus far clearly shows that health and nursing informatics is an area of prime importance to researchers from various disciplines. The wide interest that this area of research has attracted is a strong indicator of the crucial need for providing students of nursing in particular, and nurses in general with knowledge and training in competencies related to health and nursing informatics. The growing interest in this area also signals that despite the importance of informatics competencies for nursing in particular, and health professions in general, there are still tremendous obstacles facing attempts to promote its teaching world-wide. This perhaps is the main reason why researchers will continue to address this issue from various angles. Finally, it is quite obvious from this survey of previous research that various issues will continue to emerge which will need to be addressed and highlighted by researchers.

Chapter Four
Presentation of Data and Results of the Analysis

4.1 Introduction:

This chapter presents the data collected and the results of the study which mainly consist of the level of knowledge of nursing informatics competencies among the senior (fourth-year) students of nursing at the three universities represented in the sample of this study. This level is measured by the mean scores achieved by the study sample on the three nursing competency categories included in the Nursing Informatics Competency Assessment Tool (NICAT) designed by (Rahman, 2015). Besides, because of the crucial role that the study plans are expected to play in providing students with the competencies that are deemed to be of prime importance to their future nursing careers, the study plans currently applied in the two universities surveyed for the purpose of identifying the number and the weight of nursing informatics courses included in them. The results of this scan are outlined in this chapter.

4.2 Nursing Informatics Competencies

This section presents the results of the subjects' self-reported evaluation of their competency levels on the Nursing Informatics Competency Assessment Tool (NICAT). The analyses performed on the data collected to achieve the purpose of this study enabled the researcher to answer the research questions of this study. At this point, it is useful to recall that the principal measurement tool used in the study to assess the level of nursing competency among the senior level nursing students was the Nursing Informatics Competency Assessment Tool (NICAT) introduced by (Rahman, 2015).

As shown in table (4) the total mean score of the self-reported assessment of nursing informatics competency level among the sample was 96.84 out of 150, which represents (64.56%) of the optimal score).

Table 4: Mean Scores and standard deviations achieved by all the respondents on each of the three nursing informatics competencies.

Nursing Informatics Competencies	N	Minimum	Maximum	Sum	Mean	Std. Deviation
Computer Literacy Assessment	168	10	50	7164	42.64	9.855
Informatics Literacy Assessment	168	13	65	6011	35.78	14.707
Informatics Management Skills	168	7	35	3094	18.42	8.521
Valid N (listwise)	168					

The total mean score is the sum of the mean scores achieved by the respondents on the three areas or divisions of nursing informatics included in NICAT as listed below:

1. Computer Literacy Assessment: 42.64 out of 50
2. Informatics Literacy Assessment: 35.78 out of 65
3. Informatics Management Skills: 18.42 out of 35

In other words, the total mean score is the sum of the mean scores achieved on the three competencies of nursing informatics subsumed under the broader term nursing informatics. And based on Rahman's interpretation of competency scoring, as previously shown, this mean score indicates that the performance of the respondents on (NICAT) fits into the proficient level. In other words, the level of their performance is one level below the optimal level on the five-level scale proposed by Rahman, which is the 'expert" level.

Table (5) shows the mean scores achieved by the female respondents as opposed to the mean scores achieved by the male respondents on all three categories of nursing informatics competency.

Table 5: Gender-based scores

Sex		Computer Literacy Assessment	Informatics Literacy Assessment	Informatics Management Skills
Male	Mean	42.73	29.78	15.03
	N	64	64	64
	Std. Deviation	11.752	14.708	7.896
Female	Mean	42.59	39.47	20.50
	N	104	104	104
	Std. Deviation	8.544	13.500	8.252
Total	Mean	42.64	35.78	18.42
	N	168	168	168
	Std. Deviation	9.855	14.707	8.521

As shown in table (6). An independent-samples *t*-test was conducted to compare the influence of the variable of gender on the performance of the male respondents and the female respondents on the three sub-competencies of NICAT.

Table 6: Independent Samples T-Test of the subjects mean scores grouped by the gender variable.

		Levene's Test for Equality of Variances		t-test for Equality of Means				
		F	Sig.	t	df	Significance One-Sided p	Two-Sided p	Mean Difference
Computer Literacy Assessment	Equal variances assumed	5.728	.018	.094	166	.463	.925	.148
	Equal variances not assumed			.087	103.927	.465	.931	.148
Informatics Literacy Assessment	Equal variances assumed	.081	.776	-4.366	166	<.001	<.001	-9.690
	Equal variances not assumed			-4.277	124.748	<.001	<.001	-9.690
Informatics Management Skills	Equal variances assumed	2.655	.105	-4.240	166	<.001	<.001	-5.469
	Equal variances not assumed			-4.285	138.013	<.001	<.001	-5.469

On the first sub-competency of NICAT, (Informatics Literacy Assessment) there was not a significant difference between the males (*M*= 42.73, *SD* =11.752) and the females (*M*=42.59, *SD*= 8.544), *t* (166) = .094, *P*= .463. By contrast, on the second sub-competency of NICAT i.e., Informatics Literacy Assessment, there was a significant difference between the males (*M*=29.78, *SD*=14.708) and the females (*M*=39.47, *SD*=13.500), *t* (166) = 4.366, *P*= <.001. The significant difference was in favor of the females. The possible causes for this significant difference between the males and the females on the second and third sub-competencies of NICAT are outlined in the Discussion section in chapter five. Likewise, on the third sub-competency on NICAT i.e., Informatics Management Skills, there was a significant difference between the males (M=15.03, SD= 7.896) and the females (*M*=20.50, *SD*=8.252), *t* (166) = 4.240, *P*=<.001.

Table (7) shows the mean scores and standard deviations of the respondents' self-reported levels of health-nursing competency on NICAT

Table (7): mean scores and standard deviations of the respondents' self-reported levels of health-nursing competency on NICAT

Name of University		Computer Literacy Assessment	Informatics Management Skills	Informatics Management Skills
Mut'ah University	Mean	43.99	36.65	19.61
	N	89	89	89
	Std. Deviation	8.799	13.829	8.555
Al-Hussein Bin Talal	Mean	41.13	34.80	17.08
	N	79	79	79
	Std. Deviation	10.780	15.668	8.334
Total	Mean	42.64	35.78	18.42
	N	168	168	168
	Std. Deviation	9.855	14.707	8.521

Furthermore, as shown in table (8), an independent-samples t-test was conducted to compare the influence of university affiliation on the performance of the respondents on the three sub-competencies of NICAT.

Table 8: *t*-Test of subjects' mean scores grouped by the university attended.

		Levene's Test for Equality of Variances		t-test for Equality of Means					
						Significance One-Sided	Significance Two-Sided		
		F	Sig.	t	df	p	p	Mean	Std. Error
Computer Literacy Assessment	Equal variances assumed	1.975	.162	1.893	166	.030	.060	2.862	1.512
	Equal variances not assumed			1.871	150.788	.032	.063	2.862	1.530
Informatics Literacy Assessment	Equal variances assumed	.724	.396	.815	166	.208	.416	1.854	2.276
	Equal variances not assumed			.809	156.736	.210	.420	1.854	2.293

Informatics Management Skills	Equal variances assumed	.630	.428	1.937	166	.027	.054	2.531	1.307
	Equal variances not assumed			1.940	164.553	.027	.054	2.531	1.304

Regarding the first sub-competency, namely, Computer Literacy Assessment, there was not a significant difference between the nursing students attending Mutah University (*M*= 43.99, *SD*= 8.799) and, and the nursing students attending Al-Hussein Bin Talal University (*M*= 41.13, *SD*=10.780), t (166)= 1.893, *P*= .030.

As to the second sub-competency of NICAT, Informatics Literacy Assessment, there was not a significant difference between the nursing students from Mutah University (*M*= 36.65, *SD*= 13.829) and students from Al-Hussein Bin Talal University (M= 34.80, *SD* =13.829), *t* (166) = .815.

On the third sub-competency of NICAT, Informatics Management Skills, there was not a significant difference between the nursing students from Mutah University (*M*= 19.61, *SD*= 8.555) and students from Al-Hussein Bin Talal University (M=17.08, SD=8.334), *t* (166) = 1.937, *P*= .027

4.3 Informatics in the Nursing Curriculum:

Proportion of Nursing Informatics in the Study plans of the baccalaureate nursing programs:

The study plans for the baccalaureate degree currently in place at Mut'ah University and Al-Hussein Bin Talal University were analyzed for the purpose of measuring their proportion relative to the total number of courses in these plans. This was followed by a comparison of these study plans with the study plans applied in selected universities recognized for their role in promoting nursing informatics competency. The American universities chosen for comparison are:

1. The Truett McConnell University Rielin & Salmen School of Nursing
2. Georgia southwestern state university

Both Mutah University and Al Hussein Bin Talal University do not offer any courses explicitly designed to teach nursing informatics as shown in Table (10) below.

Table (9): Credit hours allocated to nursing informatics of the baccalaureate nursing programs at Mutah University and King Hussein University.

University	Credit hours allocated to informatics in the study plan	Total credit hours required for completion of the program
Mutah University	0	140
King Hussein University	0	135

Sources:

1. Al-Hussein Bin Talal University: https://www.ahu.edu.jo/Admin_Site/Files/PDF/6d7b3eaf-79d9-4ef9-9950-7cb9a1c77134.pdf. (Talal, 2018)
2. Mutah University: https://www.mutah.edu.jo/ar/nursing/StudyPlans/studyPlan_Nursing_en.pdf. (Mutah, 2018)

In the study plans of the two American universities selected for comparison, nursing informatics is present as shown in table 10

Table10: Credit hours allocated to nursing informatics of the baccalaureate nursing programs at The Truett McConnell University Rielin & Salmen School of Nursing and Georgia Southwestern State University in The United States of America.

University	credit hours allocated to informatics in the study plan	Total credit hours required for completion of the program
The Truett McConnell University Rielin & Salmen School of Nursing	2	130
Georgia Southwestern State University	2	130

Sources:

Georgia Southwestern State University: https://www.gsw.edu/college-of-nursing-and-health-sciences/school-of-nursing/traditional-bsn-program.(State, 2022-2023)

The Truett McConnell University Rielin & Salmen School of Nursing: https://qypgj1rh5cl302trg2mf26v1-wpengine.netdna-ssl.com/wp-content/uploads/2016/06/2020-2021-Nursing-Curriculum.pdf. (McConnell, 2020-2021)

Though, the number of nursing courses in these universities is still at minimum level, the mere fact that they allocate two-credit hours in their study plans for nursing informatics is a positive step. It indicates a progressive level of awareness and interest in providing nursing informatics knowledge and skills to nursing students in these two universities.

4.4 Conclusion:

This chapter reported the results of the study. These results show that the senior (fourth-year) students of the baccalaureate nursing programs at public Jordanian universities, represented by Mutah University and Al-Hussein Bin Talal University, are proficient in nursing informatics during the period of this study. However, the curricula of these nursing programs lack courses which are designed to provide the nursing students with knowledge and training in health-nursing informatics. The next chapter will discuss the results of this study within in connection with previous research.

4.5 Discussion and Conclusions

4.5.1 Introduction:

This chapter provides a discussion of the study results and outlines the conclusions derived from these results.

The results presented in the previous chapter have shown that the level of nursing informatics competency among the students surveyed falls within the category of proficient on the scale used in the study. This is because the mean score they achieved on nursing informatics competency belongs to the category of competent on the competency scoring interpretation scale used with NICAT (Nursing Informatics Competency Assessment Tool). This level is based on the mean score achieved by the subjects on nursing informatics competency, which is (96.84 /150). This mean score represents the total of the mean scores that the sample obtained on the three areas of nursing informatics competencies assessed through NICAT which are: Computer Literacy Assessment: 42.64, Informatics Literacy Assessment: 35.78, and Informatics Management Skills: 18.42.

In terms of the gender variable, the results did not reveal any significant difference between the mean scores achieved by the female and those achieved by the male subjects within the first competency on NICAT i.e. “Computer Literacy Assessment”. By contrast, in the second competency, namely “Informatics Literacy Assessment” and the third competency i.e., “Informatics Management Skills”, there was a statistically significant difference in favor of the female subjects mean scores.

As to the variable of the university that the subjects represented, no statistically significant difference was found between the mean scores achieved by the two independent groups of subjects as shown by the results of the t-Test of the Independent groups. Contrary to expectations, the inspection that was performed by the author of the study plans being executed in both universities represented by subjects in this study showed no specific courses designed to prepare the students of nursing in both universities in nursing informatics competency. These results support the findings of many previous studies which documented the shortage of courses on health and nursing informatics in the study plans of nursing colleges and have exposed lack of knowledge and training in this competency.

4.5.2 Discussion of the Results:

The results presented in the previous chapter provided answers to the research questions that this study aimed to answer. several interpretations. First, the results of the subjects' self-reported evaluation of their nursing informatics competency as measured by NICAT, which revealed that the subjects are on average proficient in nursing informatics. This is clear from the mean score of their self-evaluation on NICAT, which is classified as 'proficient' on the Nursing Informatics Scoring and Interpretation scale. This level is higher than what was expected, particularly, given the fact that courses on nursing informatics of the study plans of the universities surveyed were nonexistent. A possible explanation for this relatively high level of competency in nursing informatics despite the lack of courses in the study plans is the students' self-teaching initiatives which could be motivated by their realization of the importance of these competencies and their desires to compete in the job market after graduation.

Secondly, despite the relatively high level of competency achieved by all the subjects, there was a statistically significant difference in the mean scores in favor of the female subjects on the competency of Informatics Literacy Assessment and the competency of Informatics Management Skills. This means that the female subjects had a higher level of competence in these two categories. There is no obvious explanation for this disparity in the level of competence in these two areas of nursing competence except to assume that it may be a factor of more interest in these two competencies on the side of the females and possibly more time devoted by them to improve their level of competencies. Thirdly, no statistically significant difference was found between the mean scores of the subjects' related to the university attended by the subjects. This means that the subjects from the two universities surveyed exhibited the same level of nursing informatics competence. This may mean that the students'

intakes in both universities may be highly similar, and the content of their courses and their study plans is highly similar.

Finally, the study plans of both universities do not contain any courses that are explicitly designed to teach nursing informatics. This may be the result of several causes. It may be the result of a lack of knowledge about the crucial value of nursing informatics for nurses on the part of decision makers, or a lack of interest in reforming the study plans by those in charge, or it could simply be the result of the lack of financial resources to purchase the equipment needed to teach nursing informatics at nursing colleges in these universities. A substantial number of the previous studies on nursing and health informatics, including (Delaney et al., 2022), (Honey et al., 2020),(Harerimana et al., 2021), (Cummings et al., 2016), (O'Connor et al., 2016) , (Ahmad, 2015) , and (Tubaishat, 2014) agreed that the adoption and implementation of nursing informatics in nursing programs and in healthcare institutions around the world are still far from the level desired by all stakeholder in societies at large. These studies have also exposed varying degrees of deficiency with respect to nursing informatics competency and the equipment needed for its application. The present study supports previous findings as evidenced by the lack of proper courses on nursing informatics in the study plans of the universities investigated in this study, which is definitely expected to negatively affect the students' level of readiness for their future jobs as registered nurses. The fact that the mean score obtained by all the subjects was one level below the highest level on the scale of competency scoring used with NICAT (which is the 'Expert' level) is another indication that the level of implementing nursing informatics in theory and in practices is far from being satisfactory within the context of public universities in Jordan, and by implication, healthcare institutions in this country.

The absence or exclusion of courses designed specifically for teaching nursing informatics that is obvious in the study plans of both universities may be the result of several causes. It may be the result of a lack of knowledge about the crucial value of nursing informatics for nurses on the part of decision makers, or a lack of interest in reforming the study plans by those in charge, or it could simply be the result of the lack of financial resources to purchase the equipment needed to teach nursing informatics at nursing colleges in these universities. The present study supports previous findings as evidenced by the lack of proper courses on nursing informatics in the study plans of the universities investigated in this study, which is definitely expected to negatively affect the students' level of readiness for their future jobs as registered nurses.

4.5.3 Interpretation of the Findings:

The major findings of this study consist of the following:

1. The overall level of nursing informatics competency among the senior students of nursing enrolled in the baccalaureate nursing programs at public universities in Jordan represented by Mutah University and Al-Hussein University is within the proficient level on the scale used with the measurement tool used in the study.
2. The study plans of the baccalaureate nursing programs at public universities sin Jordan are not designed to provide students of nursing with adequate knowledge and training in nursing and health informatics competencies.

These findings indicate that whatever level of knowledge and skills in nursing and health informatics competencies that the students currently possess is the product of self-teaching and personal effort. These findings also mean that, at present, there is an obvious lack of the desire and the will to change the status quo on the part of decision makers within the sectors and the institutions concerned.

4.5.4 Assumptions:

Since assumptions can negatively affect the transparency and overall objectivity of the research work, the author of this study took the required precautions to neutralize any influence that can be ascribed to her assumptions about the research. This was done through proper random selection of the sample and through the use of a standardized tool that can accurately measure the subjects' self-reported estimation and evaluation of their nursing informatics competency. The author's assumptions have also been neutralized through the selection of an appropriate statistical analyses program and the application of standard procedures to systematically determine the study results.

4.5.5 Limitations:

The effects from a researcher's assumptions have been analyzed by many authors including (Baker, 2021) and (Helmich et al., 2015). Similarly, the need for acknowledging the limitations of a research study has been stressed by authors such as (Kilicoglu et al., 2018) who writes: "It is important for researchers to acknowledge potential problems and biases as limitations and discuss their magnitude when publishing their findings." One of the limitations in this study is the disparity in the study sample between the number of males and the number of females. In other words, the number of the females in the sample was significantly bigger than the females. This disparity was dictated by the demography of the students' population at Mutah University and Al Hussein University, where the

female students outnumbered the males. Moreover, this study examined the level of nursing competency among senior (fourth-year students of nursing enrolled at Mutah University and Al-Hussein University, which are two of the public (government-controlled) universities in Jordan. The results of the study are therefore generalizable only to fourth-year students enrolled in similar baccalaureate programs and similar public universities within the Jordanian context.

4.5.6 Implications for Practice:

Based on the results of the study presented thus far support the following implications:

1. There is an obvious need to revise the study plans of the baccalaureate nursing programs at Jordanian universities so that they include an adequate number of courses designed to provide nursing students with nursing informatics competency so that they can become ready for their future careers as registered nurses.
2. The results imply that there is an urgent need to provide intensive training programs for students in the field of information technology, particularly in nursing informatics, including increasing the ability to deal with electronic medical records and other electronic systems in the same field.
3. A higher level of cooperation and coordination is needed between colleges of nursing and healthcare institutions locally and internationally. This is needed to help the administrative staff, the teaching faculty, and the students stay informed about the positive scientific and technological developments in the area of nursing informatics. It is also needed to help them keep in touch with other related areas of competence that nurses should be taught in order to perform their jobs effectively.

4.5.7 Recommendations for Further Research:

Given the dearth of literature on nursing informatics within the Jordanian context, and the fact that nursing informatics education has not yet received the attention it deserves at the universities of Jordan, future researchers may further explore this issue in other Jordanian institutions of higher education. Future research may also explore other areas of deficiency in current nursing programs that are in need of reform. Finally, more studies are needed on other populations within the Jordanian healthcare institutions to further explore the study plans and curriculum, the achievements, and the obstacles that still hinder the dissemination of nursing informatics knowledge and skills among their staff, particularly nurses.

4.5.8 Conclusion:

This study aimed at answering two main questions. The first question was: What is the level of health-nursing competency among the senior (fourth-year) students enrolled at the baccalaureate nursing programs at representative public Jordanian universities? In response to this question the study results have shown that the mean score of the subjects' level of nursing informatics competency was (96.84) out of 150. In other words, the subjects' level of nursing informatics competency equals (64.56%) of the optimal level of nursing informatics competency, which would be a 150/150 grade on NICAT. This level of performance is equivalent to the category of *proficent* on the Nursing Informatics Competency Scoring and Interpretation used on NICAT. It should be noted that this level is based on the self- reported evaluation of the level of nursing informatics competency provided by the respondents. The second research question was "What is the number and the credit weight of courses in the study plans of the universities examined which are specifically designed to teach health and nursing informatics to students of nursing, and what do they mean? The answer to this question is that based on the inspection of the study plans currently in use at nursing colleges at public universities in Jordan, there are no courses specifically designed to teach health and nursing informatics.

This study has attempted to highlight an issue of crucial importance to students of nursing currently studying to become future registered nurses in Jordan. The study has revealed an obvious gap in the study plans of the universities surveyed, which is evidenced by their lack of any courses exclusively designed to teach informatics skills. The study has also shown that colleges of nursing and baccalaureate nursing programs at Jordanian universities still have a long way to go before they reach the level of adequacy in their provision of nursing informatics skills to their students.

Several conclusions can be extracted the results of this study. First, despite the lack of specific courses in the study plans of the universities investigated in this study, the majority of the nursing students as their mean scores indicate exhibit relatively high level of nursing informatics competency. This can be viewed as an indication that the sample and the target population of this study are significantly aware of its value for future careers in the nursing field. This can also be taken as an indication that the level of computer literacy among the students surveyed is high and as such may have positively contributed to their overall nursing informatics competency. Secondly, the public universities in Jordan and more specifically, those in charge of designing and delivering the study plans of the baccalaureate nursing programs are still lagging in their adoption of nursing informatics in these programs.

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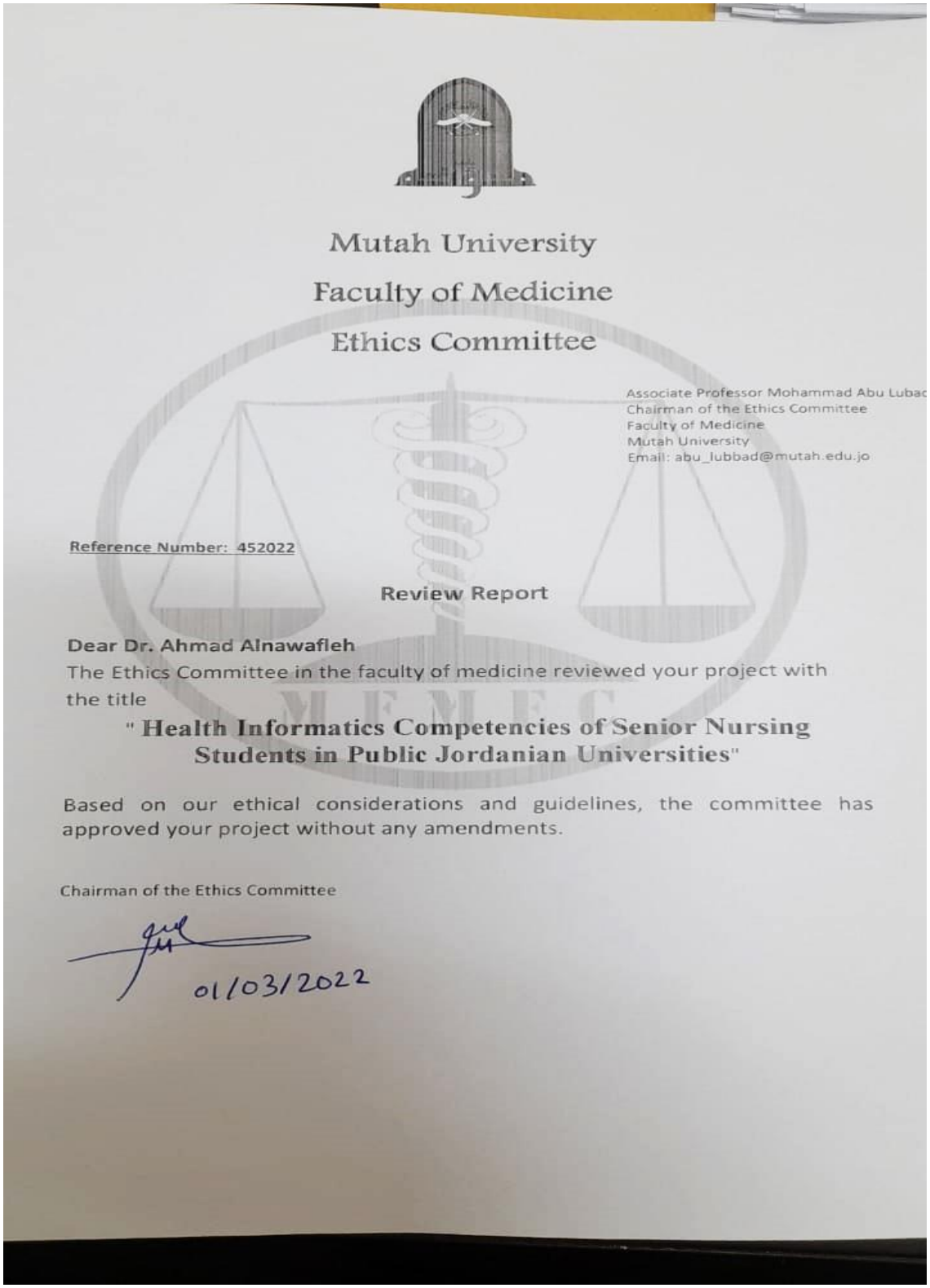
Appendices

Appendix I
Ethical clearance



Mutah University

Faculty of Medicine

Ethics Committee

Associate Professor Mohammad Abu Lubad
Chairman of the Ethics Committee
Faculty of Medicine
Mutah University
Email: abu_lubbad@mutah.edu.jo

Reference Number: 452022

Review Report

Dear Dr. Ahmad Alnawafleh

The Ethics Committee in the faculty of medicine reviewed your project with the title

" Health Informatics Competencies of Senior Nursing Students in Public Jordanian Universities"

Based on our ethical considerations and guidelines, the committee has approved your project without any amendments.

Chairman of the Ethics Committee

01/03/2022

Appendix II

Letter from The Dean of The College of Graduate Studies to Al Hussein University to facilitate the collection of data for the study

MUTAH UNIVERSITY
College ofGraduate Studies

جامعة مؤتة
كلية الدراسات العليا

الرقم :ك.د.ع/ ١٦٢ /٩٩/ ١٠

التاريخ : ..... هـ

الموافق: ١٤/ ١/ ٢٠١٤ م.

Re.....

Date:.....

السادة جامعة الحسين بن طلال المحترمين

تحية طيبة وبعد،،،

فارجو التكرم بالموافقة والايعاز بتسهيل مهمة الطالبة بنان جمعه النجادات والتي تدرس في جامعة مؤتة ماجستير / تخصص إدارة الصحة العامة الرقم الجامعي (620201502014) وذلك من اجل الحصول على المعلومات والبيانات اللازم لاعداد دراستها والموسومة بـ" **Health Informatics Competencies of Senior Nursing Students in Public Jordaninan Universities**" والتي تقوم بها استكمالاً لمتطلبات الحصول على درجة الماجستير.

شاكرين لكم اهتمامكم وحرصكم على التعاون مع جامعة مؤتة ، ودعمها لتحقيق أهدافها في خدمة هذا الوطن في ظل حضرة صاحب الجلالة الهاشمية الملك عبدالله الثاني ابن الحسين المعظم يحفظه الله ويرعاه.

وتفضلوا بقبول فائق الاحترام ،،،،

جامعة مؤتة
كلية الدراسات العليا

عميد كلية الدراسات العليـــا

أ.د. مخلد سليمان الطراونه

ن س / تسهيل مهمه

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Appendix III

Letter from The Dean of The College of Graduate Studies to The Dean of The College of Nursing at Mutah University to facilitate the collection of data for the study

MUTAH UNIVERSITY
College ofGraduate Studies

جامعة مؤتة
كلية الدراسات العليا

الرقم :ك.د.ع/د.د/١٦٢/٩٩
التاريخ : ..... هـ
الموافق: ٤/١٠/٢٠١٤ م.

Re.....
Date:.....

الأستاذ الدكتور عميد كلية التمريض المحترم

تحية طيبة وبعد،،،

فارجو التكرم بالموافقة والايعاز بتسهيل مهمة الطالبة بنان جمعه النجادات والتي تدرس في جامعة مؤتة ماجستير / تخصص إدارة الصحة العامة الرقم الجامعي (620201502014) وذلك من اجل الحصول على المعلومات والبيانات اللازم لاعداد دراستها والموسومة بـ" **Health Informatics Competencies of Senior Nursing Students in Public Jordaninan Universities**" والتي تقوم بها استكمالاً لمتطلبات الحصول على درجة الماجستير.

وتفضلوا بقبول فائق الاحترام ،،،،

عميد كلية الدراسات العليـــا

أ.د. مخلد سليمان الطراونه

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ن س / تسهيل مهمه

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Appendix IV

Nursing Informatics Competency Assessment Tool (NICAT)

For each statement, report your perceived competency on a scale of 1 to 5.	**Scale: 1-5**				
Self-Competency Assessment	Not Competent	Somewhat Competent	Competent	Very Competent	Expert
I. Computer Literacy Assessment					
1. Recognize the basic components of the computer system such as a mouse, screen, and workstation.	1	2	3	4	5
2. use of telecommunication tools such as electronic mail and facsimile (fax).	1	2	3	4	5
3. Use of remote communication tools such as adobe connect, Skype, and Lync.	1	2	3	4	5
4. Create, rename, move, and delete files using computer operating systems such as Microsoft Windows.	1	2	3	4	5
5. Use word processing functions such as	1	2	3	4	5

save, categorize documents, copy, paste, and delete.					
6. Navigate computer operating systems to access installed applications and choose an active printer.	1	2	3	4	5
7. Use software to create presentations such as Microsoft PowerPoint.	1	2	3	4	5
8. Use external devices such as a USB flash drive, digital camera, CDROM	1	2	3	4	5
9. Perform basic computer troubleshooting such as checking the power source, rebooting the computer, and printing.					
10. Manage computer systems security to protect data, devices, and passwords.	1	2	3	4	5
Total					
Computer Literacy Total Scores (Out of 50)					

II. Informatics Literacy Assessment					
11. Use the Internet to locate and download items of interest.	1	2	3	4	5
12. Navigate the electronic health record.					
13. Review and acknowledge patient orders in the electronic health record.	1	2	3	4	5
14. Develop and document a care plan in the electronic health record.	1	2	3	4	5
15. Review point of care data such as urine dipstick, glucose check, and hemoglobin meter to make timely decisions	1	2	3	4	5
16. Respond appropriately to alerts from clinical decision-making tools such as algorithms, and best practice alerts.	1	2	3	4	5
17. Conduct literature searches in accessible proprietary database systems such as CINAHL, EBSCO, etc.	1	2	3	4	5

18. Use medication administration tools such as barcode medication verification and scanning.	1	2	3	4	5
19. Use of medication dispensing systems such as Pyxis and Omni cell.	1	2	3	4	5
20. Collect and document patient data relevant to care such as vital signs, height, and weight.	1	2	3	4	5
21. View trended electronic documentation to understand the effectiveness of nursing interventions.	1	2	3	4	5
22. Use systems to assist with the admission and discharge process.	1	2	3	4	5
23. Continue patient care documentation and patient identification when computer system is down.	1	2	3	4	5
Total					

Informatics Literacy Total Scores (out of 65)					
III. Informatics Management skills Assessment					
24. Protect confidential patient data by logging out, suspending sessions, and password protection	1	2	3	4	5
25. Use information technology as a primary means of patient safety such as bedside laboratory verification, barcode scanning, etc.	1	2	3	4	5
26. Use electronic health record and other clinical information system as per organizational policy for documentation.	1	2	3	4	5
27. Use electronic communication with colleagues, patients, or other departments	1	2	3	4	5
28. Find information stored in the clinical information system to guide	1	2	3	4	5

patient care such as standardized care plans and guidelines.					
29. Use nursing data for improving practice and for clinical decision-making.	1	2	3	4	5
30. Use data and statistical reports for unit-based quality improvement initiatives and practice evaluation.	1	2	3	4	5
Total					

Appendix V
Nursing Informatics Competency Assessment Tool (NICAT) Arabic form.

يسم الله الرحمن الرحيم

استبانة القدرات الشخصية في استخدام المعلوماتية التمريضية

اعزائي الطلبة: تحية وبعد،

هذه الاستبانة تهدف الى جمع بيانات لقياس وتحديد مدى قدراتكم في استخدام المعلوماتية التمريضية. وهي جزء من دراسة لدرجة الماجستير في ادارة الصحة العامة/ قسم الصحة العامة/ كلية الطب/ جامعة مؤتة.

وتتكون هذه الأداة من جزئين: الجزء الأول يحتوي على أسئلة حول معلومات ذات طبيعة شخصية. أما الجزء الثاني فيحتوي على ثلاثين فقرة تصف كل منها قدرة محددة في مجال المعلوماتية التمريضية. والمطلوب من حضراتكم تحديد مدى تمكنكم من هذه القدرة ومقدرتكم على استخدامها بشكل عملي.

مع العلم ان هذه الدراسة تم الموافقة عليها من لجنة البحث العلمي في جامعة مؤتة بالاضافة لموافقة الجهات الرسمية في الجامعات المستهدفة لجمع البيانات منها.

في حال اي استفسار الرجاء المراسلة على ايميل المشرف على الرسالة د. احمد النوافلة على الايميل التالي:

alanawafleh@mutah.edu.jo

وشكرا على وقتكم الثمين وتعاونكم .

الجزء الأول: المعلومات الشخصية

الجنس	**(أ) ذكر**	**(ب) أنثى**		
العمر	**(1) 21 سنة او اقل**	**(2) 22-23 سنة**	**(3) 24-28 سنة**	**(4) 29 سنة او اكثر**
السنة الدراسية	**(1) السنة الثالثة**	**(2) السنة الرابعة**		
اسم الجامعة التي تدرس فيها	**(1) جامعة مؤته**	**(2) جامعة الحسين بن طلال**		

الجزء الثاني: القدرات الشخصية في (مجال) استخدام المعلوماتية التمريضية

ارجو تحديد مستوى كفاءات المعلوماتية التمريضية الخاصة بك على المقياس 1-5 الموجود بجانب كل فقرة من الفقرات الثلاثين التي تصف القدرات مع مراعاة بأن الرقم 1 على المقياس يدل على أدنى مستوى بينما الرقم 5 يدل على أعلى مستوى.

	المقياس من 1-5				
	لا تنطبق علي	تنطبق علي قليلا	تنطبق علي	تنطبق علي كثيرا	تنطبق علي تماما
التقدير الذاتي للقدرات في مجال المعلوماتية التمريضية	**1**	**2**	**3**	**4**	**5**
الفئة الأولى من القدرات: قياس مستوى الأبجدية الحاسوبية للمشاركين					
1. امتلك القدرة على التعرف على المكونات الرئيسية لجهاز الحاسوب مثل الفأرة وشاشة العرض.	1	2	3	4	5
2. امتلك القدرة على استخدام أجهزة وادوات الاتصال عن بعد مثل البريد الإلكتروني والفاكس.	1	2	3	4	5
3. امتلك القدرة على استخدام تطبيقات اتصال عن بعد مثل تطبيقات أدوب كونكت، Teams, WhatsApp, Zoom.	1	2	3	4	5
4. لدي القدرة على فتح الملفات وإعادة تسميتها وتغيير مكان تخرينها وحذفها باستخدام انظمة تشغيل مثل مايكروسوقت	1	2	3	4	5

ويندوز.					
5. لدي القدرة على استخدام برنامج اختزال الكلمات (الطباعة) ورد Word بما في ذلك أوامر حفظ وتصنيف المستندات وكذلك وامر النسخ واللصق والحذف للملفات.	1	2	3	4	5
6. لدي القدرة على البحث في أنظمة تشغيل الحاسوب مع الطابعة المتصلة به والجاهزة للإستخدام.	1	2	3	4	5
7. امتلك القدرة على استخدام برامج الحاسوب لإنشاء عروض تطبيقية مثل عروض مايكروسوفت بوربوينت.	1	2	3	4	5
8. استطيع استخدام أجهزة تخزين المعلومات الخارجية مثل محرك فلاش (USB drive) والكاميرا الرقمية ، والقرص الخارحي Hard Disk .	1	2	3	4	5
9. امتلك القدرة على التعامل مع الأخطاء والأعطال الفنية البسيطة لجهاز الحاسوب مثل التأكد من مصدر التيار الكهربائي ووصوله للجهاز، إعادة تشغيل الجهاز، 1والطباعة.	1	2	3	4	5
10. استطيع إدارة حماية أنظمة أجهزة	1	2	3	4	5

الحاسوب وتوفير الحماية للمعلومات المخزنة وللأجهزة المرتبطة بالحاسوب ولكلمات السر.					
المجموع					
مجموع علامات الأبجدية الحاسوبية (من 50)					
الفئة الثانية من القدرات: فئة قياس مستوى الأبجدية في استخدام المعلوماتية التمريضية.					
11. أستطيع استخدام الشبكة العنكبوتية (الإنترنت) للبحث عن المعلومات التي اهتم بها وأحتاجها وأعرف كيفية تنزيلها وحفظها.	1	2	3	4	5
12. استطيع البحث في السجل الطبي الإلكتروني.	1	2	3	4	5
13. أتقن مراجعة واستلام أوامر الأطباء الخاصة بالمرضى والمدونة في السجل الطبي الإلكتروني.	1	2	3	4	5
14. أتقن إنشاء وتوثيق خطة معالجة في السجل الطبي الإلكتروني.	1	2	3	4	5
15. لدي القدرة على مراجعة بيانات الرعاية الصحية مثل فحوصات المختبر كفحص الجلوكوز والهيموجلوبين.	1	2	3	4	5
16. أستطيع الإستجابة	1	2	3	4	5

بشكل مناسب للتنبيهات والتحذيرات الصادرة من أدوات الذكاء الاصطناعي وصنع القرارات السريرية مثل الخوازميات ومصادر تقديم الإرشادات الهادفة لتقديم أفضل مستويات الأداء.					
17. أستطيع القيام بإجراء عمليات بحث عن مصادر ومراجع الابحاث والدراسات في أنظمة قواعد البيانات المتوفرة مثل PubMed, CINAHL وEBSCO وغيرها.	1	2	3	4	5
18. .استطيع استخدام أدوات إلتعامل مع الأدوية مثل التحقق من الدواء من خلال الباركود (الرمز الخاص بالحاسوب barcode medication (verification والمسح الضوئي (scanning).	1	2	3	4	5
19. أستطيع استخدام أنظمة توزيع العلاجات مثل بكسس(Pyxis) وأمنيسل) (Omni) cell	1	2	3	4	5
20. استطيع جمع وتوثيق المعلومات الخاصة بالمرضى ذات العلاقة بالعناية الطبية مثل العلامات	1	2	3	4	5

الحيوية والطول والوزن.					
21. استطيع معاينة مؤشرات التوثيق الإلكتروني لفهم مدى فاعلية التدخلات التمريضية.	1	2	3	4	5
22. استخدام الأنظمة للمساعدة في عمليات إدخال وإخراج المرضى.	1	2	3	4	5
23. استطيع متابعة توثيق الرعاية الطبية للمرضى وتحديد هويات المرضى في حال تعطل أجهزة الحاسوب عن العمل.	1	2	3	4	5
فئة قياس مهارات إدارة المعلوماتية التمريضية للمشاركين:					
24. استطيع حماية المعلومات السرية للمريض من خلال الخروج من النظام أو تعليق جلسات استخدام الحاسوب أو الحماية باستخدام كلمات السر.	1	2	3	4	5
25. . استطيع استخدام تكنولوجيا المعلومات كوسيلة رئيسية لتأمين حماية المرضى مثل استخدام البطاقة الخاصة بالمختبر الموجودة بجانب	1	2	3	4	5

السريرلتحديد هوية المريض ومن خلال هوية الباركود (الشيفرة المخططة) والمسح الضوئي (Scanning).					
26. لدي القدرة على استخدام السجل الطبي الإلكتروني والأنظمة الإلكترونية الأخرى بما يتوافق مع سياسات المؤسسة التي سأعمل فيها بخصوص التوثيق.	1	2	3	4	5
27. استطيع التواصل إلكترونيا مع زملاء العمل والمرضى والدوائر أو الأقسام الأخرى.	1	2	3	4	5
28. أستطيع العثور على المعلومات المخزنة في نظام تخزين المعلومات السريرية لغايات ارشاد وتوجيه الرعاية الصحية للمرضى كما هو في حال تنفيذ خطط وإرشادات الرعاية والمتابعة الإعتيادية.	1	2	3	4	5
29. استطيع استخدام المعلوات التمريضية المتوفرة لتحسين الأداء وللمساعدة في اتخاذ القرارات السريرية.	1	2	3	4	5

30. استطيع استخدام المعلومات والتقارير الإحصائية في مبادرات لتحسين وتطوير نوعية الأداء في القسم الذي سأعمل فيه وفي تقويم الأداء.	1	2	3	4	5

Appendix VI

Study plan of nursing baccalaureate degree.

Mut'ah University

Study plan for the BSc in Nursing

Mut'ah University and the faculty of Nursing follow a certain system numbering the faculty courses in the study plan. The numbering system is explained as follows:

- Numbering system:
  - The course number contains 7 numerical digits
    - The first two digits of the 7 digits number indicate the faculty code.
    - The 3rd and 4th digits indicate the department code.
    - The 5th digit indicates the level.
    - The 6th and 7th digits indicate the serial number.

1	4	0	1	2	0	7
Faculty		department		level	Serial number	

1. Nursing department codes

Number	Department
1	Adult Health Nursing
2	Maternity and child Health Nursing
3	Community and Mental Health Nursing

2. Courses' levels

	Course specialty	Level	Course specialty
1	Fundamental of Nursing	3	Mental Health Nursing
2	Adult Health Nursing	4	Community health Nursing
3	Child Health Nursing	4	Management and Leadership in Nursing
3	Maternal Health Nursing	4	Advance clinical Nursing
3	Critical care Nursing		

3. University Requirements: (27) credit hours

Study plan (BACHELOR'S DEGREE IN NURSING)

The study plan at the Faculty of Nursing enables the student to obtain Bachelor's Degree of Science in nursing by attending (140) credit hours divided by four academic years as follow:

Number	Types	Credit hours
1	University Requirements	27
2	Faculty Requirements	23
3	Compulsory specialization requirements	87
4	Elective specialization requirements	3
	TOTAL	**140**

1. **University Requirements:** (27) credit hours
   A. **Compulsory Requirements:** (12) credit hours

Course number	Course title	Faculty	Credit hours	Evaluation
1801101	Arabic language (1)	Linguistic	3	Mark
1802101	English language (1)	Linguistic	3	Mark
1600105	National education	Social science	3	Mark
0101171	Military science	Military science	3	Mark

B. **Elective courses:** (15) credit hours on the basis of 3 credit hours per course. Students has to choose courses from the first, second and third group as mentioned below with a minimum of one course and a maximum of two courses from each group. (students cannot choose course from the Faculty of Nursing):

Group one: Humanitarian Sciences (6 credit hours)				
Course number	**Course title**	**Faculty**	**Credit hours**	**Evaluation**
0201102	Arabic language (2)	Art	3	Mark
0209101	French language	Art	3	Pass/fail
0209103	Spanish language	Art	3	Pass/fail
0209107	Italian language	Art	3	Pass/fail
0202102	English language (2)	Art	3	Mark
0500100	Islamic culture	Share'a	3	Mark
0500103	Human rights in Islam	Share'a	3	Mark
0706100	Law in our life	Law	3	Mark
0803101	Principles of education	Social sciences	3	Mark
0803103	Environment education	Social sciences	3	Mark
0809101	Introduction to psychology	Social sciences	3	Mark
1301100	Principles of physical education	Physical science	3	Mark

Group two: economic and social sciences: (6) credit hours				
Course number	**Course title**	**Faculty**	**Credit hours**	**Evaluation**
1601104	Introduction to family violence	Social sciences	3	Mark
1602104	Geography of Jordan	Social sciences	3	Mark
1603103	Jordan & Palestine ruins in old history	Social sciences	3	Mark
1604102	Islamic civilization	Social sciences	3	Mark

1604104	Jerusalem in Arab & Islamic history	Social sciences	3	Mark
1605101	Introduction to political sciences	Social sciences	3	Mark
1900100	Work ethics	Business administration	3	Mark
1902101	Introduction to economic	Business administration	3	Mark

Group three: science, technology, agriculture, health (3) credit hours				
Course number	**Course title**	**Faculty**	**Credit hours**	**Evaluation**
0401121	Principles of general electricity	engineering	3	Mark
0402120	Principles of car mechanics	Engineering	3	Mark
0403120	Traffic safety	engineering	3	Mark
1101108	Indoor plants & house garden	Agriculture	3	Mark

2. **Note:** All students should pass Arabic language, English language, and computer competency exams. Student who fails, should register for an additional course (099) outside the study plan
3. **Faculty requirements:** (23) credit hours

Course number	**Course title**	**Credit hours**	**Pre-requisites**	**concurrent**
1402101	Medical terminology & professional writing	2	-	-
0303101	General Chemistry (1)	3	-	-
0305101	General Biological (1)	3	-	-
1403100	Anatomy for nursing	3	0305101	0305101
1403101	Physiology for nursing	3	030510	030510

			1	1
0305301	Biochemistry for nursing	3	0305 101, 0303 101	
0305332	Microbiology for nursing	3	030510 1	
1401201	Pharmacology for nursing	3	030530 1	
Total		**23**		

4 – Specialization requirements: (90) credit hours divided as follows:

A- Compulsory specialization Requirements: (87) credit hours

Course number	Course title	Weekly hours		Credit hours	Prerequisites	Or Concurrent
		theory	clinical			
1401110	Fundamental of Nursing	3	-	3	1403100,1403101	-
1401111	Fundamental of Nursing practical	-	3	3		1401110
1401112	Introduction to clinical nursing practice	-	2	2	1401110	
1401200	pathophysiology	3		3	1401112	
1402250	Nursing Health assessment practical	-	3	3	1401110	1401110
1401224	Adult Health Nursing (1)	3	-	3	1401112,1402250	1402250
1401229	Adult Health Nursing(1)clinical	-	3	3		1401224
1401226	Adult Health Nursing(2)	3	-	3	1401224,1401200	1401200
1401230	Adult health nursing(2) clinical		3	3	1401201	1401226
1402272	Applied nutrition	3		3		

1403324	Disasters and emergency nursing	3	-	3	1401226	1401226
1402301	Child growth and development	3	-	3	1401226	
14102330	الامومه &new born nursing	3	-	3	1401226	
1402331	Maternity &newborn nursing- clinical	-	3	3		1402330
1402340	Pediatric nursing	3	-	3	1402301	1402301
1402341	Pediatric nursing clinical	-	3	3		1402340
1403352	Health education &communication skills	3	-	3	1401226	
1401425	Critical care nursing	3	-	3	1401226	1402330
1401428	Critical care nursing-clinical	-	3	3		1401425
1403452	Community health nursing	3	-	3	1402330, 1402340	

1403456	Community health nursing-clinical	-	3	3		1403452
1403459	Epidemiology and biostatistics	3	-	3	1401224	1401224
1403460	Psychiatric &mental health nursing	3	-	3	1401226	1402340
1403461	Psychiatric &mental health nursing-clinical	-	3	3	1403460	1403460
1403463	Nursing: history, trends and issues	3	-	3	1401226	1401226
1401470	Administration and leadership in nursing	3	-	3	1404425, 1403460	

1401471	Administration and leadership in nursing-clinical	-	1	1		1401471
1402472	Nursing research	3	-	3	1401226	
1401480	Advanced clinical nursing practice	-	4	4	1401470	1401470

- Each credit hour of practical courses equal three hours in the laboratory
- Each credit hour of clinical courses equal four hours in the clinical area (Hospitals)
- Each credit hour of advanced clinical nursing practice courses equal 7 actual clinical hours which equivalent to 40 shifts (7hours/shift) registered in graduation semester

B- Elective specialization requirements: (3) credit hours

Course number	Course title	Weekly hours		Credit hours	prerequisites	concurrent
		Theory	Clinical			
1403301	Palliative care nursing	3	-	3	1401224	
1403302	Nursing gerontology	3	-	3	1401224	
1402201	Current topics in health and nursing	3	-	3	1401224	

Appendix VII

Al-Hussein Bin Talal University

Nursing plan for 2019

جامعة الحسين بن طلال
AL HUSSEIN BIN TALAL UNIVERSITY

Al-Hussein Bin Talal University

Nursing plan for 2019

Admission and Registration Unit

Compulsory university requirements (15 Credit hours)				
No.	**Course Title**	**Credit Hours**	**Prerequisites 1**	**Prerequisites 2**
0205100	National Culture	3		
0202101	English Language	3	0202099	
0201101	Arabic Language	3	0201099	
0100102	Military Science	3		
0100103	Dialogue and community responsibility	3		

University Elective Requirements# (12 Credit hours)

No.	**Course Title**	**Credit Hours**	**Prerequisites 1**	**Prerequisites 2**
Humanitarian Sciences Package				
0206101	Introduction to library science	3		
0204101	French language	3		
0212101	Islamic culture	3		
0202102	English language communication skills	3	0202101	
0201102	Arabic language communication skills	3	0201101	
0201104	The art of writing and expression	3		
0113112	Principles of Psychology	3		

0102141	Principles of Education	3		
0100171	Principles of physical education	3		
economic and social sciences Package				
0412100	Law in our life	3		
0701100	The economy in our life	3		
0217100	Jordan’s contribution to human civilization	3		
0411102	Jerusalem's history	3		
0411104	Management basics	3		
0401105	Leadership and innovation	3		
0701105	Cultural heritage and people	3		
0712107	The art of hospitality and etiquette	3		
0441110	E-commerce principles	3		
0205181	Media and digital education	3		
science, technology, agriculture, health Package				
0507100	Principles of car maintenance	3		
0503100	Principles of public safety	3		
0613100	e-government principles	3		
0302100	History of mathematics	3		
0511100	Introduction to	3		

	information and network security			
0303100	Introduction to astronomy	3		
0112100	Internet and networking skills	3		
0502100	environmental issues	3		
0903100	Radiation Safety and security	3		
0501110	Jordan's natural resources	3		
0306111	Chemistry and the human	3		
0901120	first aid	3		
0901160	public health principles	3		

Faculty requirements: (21) credit hours

No.	Course Title	Credit Hours	Prerequisites 1	Prerequisites 2
0306101	General Chemistry (1)	3		
0304101	General biological (1)	3		
0901102	Science of Anatomy	3		
0902108	Medical terminology	3		
0902166	human body physics	3		
0901215	human physiology	3		
0101320	Epidemiology and statistics	3		

Specialization requirements: (81 credit hours)

No.	Course Title	Credit Hours	Prerequisites 1	Prerequisites 2
0901112	Fundamental of Nursing	3	0901215*	
0901118	Fundamental of Nursing practical	2	0901113*	
0901203	Pharmacology	3	0902281	
0901210	Pathophysiology	3	0901102	
0901212	Nutrition in health and disease	1	0902281	
0901213	Health assessment	3	0901102	
0901214	Health assessment practical	2	0901213*	
0901219	Trends, Issues, and Ethics of Nursing	3	0901222	
0901220\1	Adult Health Nursing (1)	3	0901118	
0901222	Adult Health Nursing (2)	3	0901227	
0901227	Adult Health Nursing (1) clinical	3	0901221*	
0901228	Adult Health Nursing (2) clinical	3	0901222*	
0901222	Growth and Development	3	0901222	
0902255	Microbiology for Nursing	3	0901215	
0902281	Biochemistry	3	0906101	
0909301	communication & Health education	3	0901222	
0901221	Pediatric health	3	0901228	

	nursing			
0901223	Pediatric health nursing-clinical	3	0901331*	
0901342	Maternal Health Nursing	3	0901228	
0901348	Maternal Health Nursing-Clinical	3	0901342*	
0901264	Community Health Nursing	3	0901348	
0901270	Community Health Nursing-Clinical	2	0901264*	
0901421	critical care and emergency nursing	3	0901228	
0901427	critical care and emergency nursing-Clinical	3	0901421*	
0901451	Psychiatric health nursing	3	0901337	
0901458	Psychiatric health nursing-Clinical	2	0901451*	
0901471	Administration in Nursing	2	0901427	
0901475	Administration in Nursing-Clinical	2	0901471*	
0901484	Intensive Clinical Training	5	0901467	

Elective specialization requirements: (6 credit hours)

No.	Course Title	Credit Hours	Prerequisites 1	Prerequisites 2
0901209	Principles of first aid and emergency	3		
0901302	special topics	3	0901222	
0901412	Nursing for the elderly and people with special needs	3	0901342	
0901424	Occupational Health and Safety	3	0901458	
0901481	Scientific research methodology	3	0901222	

(*) denotes the possibility of synchronization with the requirement

(#) The student studies no more than 6 hours of each package

The student studies a total of (135) credit hours as a minimum.

Appendix VIII

Nursing-Curriculum Truett McConnell university

PROGRAM OF STUDY: BSN CURRICULUM COURSES -2020-2021

Sophomore Level Spring Semester

NU 250, Introduction to Professional Nursing	3	3 hours

Junior Level Fall Semester

NU 305, Health Assessment	3	
NU 310, Nursing Fundamentals**	5	
NU 335, Pharmacology & Pathophysiology I	3	
NU 360, Mental Health Nursing**	5	16 hours

Junior Level Spring Semester

NU 345, Pharmacology & Pathophysiology II	3	
NU 350, Maternal Health Nursing**	5	
NU 370, Adult Health Nursing I**	6	
NU 375, Nursing Informatics	1	15 hours

Senior Level Fall Semester

NU 410, EBP & Nursing Research	3	
NU 470, Adult Health Nursing II**	6	
NU 452 Pediatric Health Nursing **	5	14 hours
Elective: NU 460 Gerontologic Nursing	2	

Senior Level Spring Semester

NU 430, Vulnerable Pop. & Global Health Nursing**	5	
NU 440, Leadership in Nursing Practice**	5	
NU 480, Senior Seminar and Nursing Capstone	4	14 hours
	2	

Elective: NU 490 Critical Care Nursing

Total Nursing Hours 62 **Total BSN Hours** **130**

NOTE: **** Denotes approximately 240 Clinical, Lab, Simulation, and/or Capstone Practice Hours each semester. Total of Practice Hours of approximately 960 hours.** Nursing students may need greater than 4 semesters to complete pre-requisites prior to entering the Junior level nursing courses and the nursing program in the fall semester.

Revised 6/30/19

Appendix IX
Georgia Southwestern State University

GSW GEORGIA SOUTHWESTERN STATE UNIVERSITY

B.S. in NURSING (LPN to BSN)

NAME _____ gswID# _____

ADVISOR _____ **Effective Catalog Year: 2021-2022**

AREAS A-F: 60 HOURS

Area A (9 hrs) (Min Grade of C Required)	**Hrs**	**Term**	**Grade**
ENGL 1101 Composition I	3		
ENGL 1102 Composition II	3		
MATH 1001,1101, 1111, 1113, or 1120	3		
Area B (4 hrs)	**Hrs**	**Term**	**Grade**
Select 4 hours from list below:			
CIS 1000(3), COMM 1110 (3), ENGL 2200(3), Foreign			
Lang(2000 level)(3), HIST 2800(3), INTL 2000 (1-3),			
LEAD 2020(2), LIBR 1101(2),POLS 2401(3), SOCI 1200(3),			
SOSC 1101(3), THEA 1110(3), WGSS 2001(3)			
Area C (6 hrs)	**Hrs**	**Term**	**Grade**
ENGL 2111, 2112, 2121. 2122, 2131, or 2132	3		
ARTC 1100, MUSC 1100 or THEA 1100	3		
Area D (11 hrs) Area D Lists	**Hrs**	**Term**	**Grade**
MATH 2204/1401 Elementary Statistics	3		
Select one lab sequence:	8		
BIOL 1107/1108 Essentials of Biology I/II/Lab			
BIOL 2107K/2108K Principles of Biology I/II			
CHEM 1151/1152 Survey of Chemistry I/II/Lab			
CHEM 1211/1212 Principles of Chemistry I/II/Lab			
PHYS 1111/1112 Introduction to Physics I/II			
PHYS 2211/2212 Principles of Physics I/II			
Area E (12 hrs)	**Hrs**	**Term**	**Grade**
POLS 1101 American Government	3	k	
HIST 1111 or 1112 World Civ I or II	3		
HIST 2111 or 2112 US Hist I or II	3		
Select one:	3		

ECON 2105, SOCI 1101, PSYC 1101,			
HIST 1111 OR 1112			
Area F (18 hrs)	**Hrs**	**Term**	**Grade**
BIOL 2030 Anatomy & Physiology I	4		
BIOL 2040 Anatomy & Physiology II	4		
BIOL 2050 Microbiology	4		
PSYC 2103 Human Growth & Development	3		
Free Elective (lower division numbered 1000-2999)	3		

Physical Education (1 hr)	**Hrs**	**Term**	**Grade**
PEDS (Activity)			

Additional Requirements			
_____	GA HISTORY	_____	US HISTORY
_____	GA CONSTITUTION	_____	US CONSTITUTION
_____	UNIV 1000	_____	W2W Requirement

المعلومات الشخصية

الاسم: بنان جمعة النجادات

التخصص: إدارة الصحة العامة

الكلية: الطب

سنة التخرج: 2022