

Approval Chart for Curriculum Changes

A = Approve I= Information Item¹ R= Advise & Respond²

*College of Arts
and Sciences*
FEB 13 19
Dean's Office

Course Number BIOL 353 or Degree Plan(s) _____

State the requested change and reason. A memo may be attached if more space is necessary.

BIOL 353 General Microbiology currently does not have appropriate prerequisites. This course requires a sufficient background in chemistry for students to be successful.

BIOL 353 General Microbiology

Former: Concurrent enrollment in BIOL 354 required.

Proposed: Concurrent enrollment in BIOL 354 required. Prerequisites: CHEM 113 or CHEM 114 or CHEM 133 or BIOL 112

Circle the number that corresponds to the requested change. Degree plan changes are on the second page.

				COUNCIL ³						
	Change to a Course	Dept./School	College Academic	Deans	TEC	UGEC	UAC	GRAD	Provost	President
1.	Title (description unchanged)	A	A	A	I				I	I
2.	Description (not affecting content)	A	A	A	I				I	I
3.	Course term(s)	A	I	A	I				I	I
4.	Content (substantive change)	A	A	A	I				A	A
5.	Number of hours (lecture, lab, contact)	A	A	A	A				A	A
6.	Course number within the hundred	A	A	I	I				I	I
7.	Course number beyond the hundred	A	A	A	A				A	A
8.	Prerequisites	A	A	A	I				I	I
9.	Course fee(s)	A	--	A	--				A	I
10.	From U to G <i>or</i> G to U	A	A	A	A				A	A
11.	Cross list with another department: U or G level	A	A	A	A				A	A
12.	Department of record	A	A	A	A				A	A
13.	Open or close a course	A	A	A	A				A	A
14.	New course — See website for application and process. This change includes combining or splitting a course(s).	A	A	A	A				A	A

Note: When an academic unit does not have a council, the UGEC and/or UUAC will serve as its academic council, depending on the nature of the issue.

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					COUNCIL ³							
	Change to a Degree Plan	Dept./School	College Academic	Deans	TEC	UGEC	UAC	GRAD	Provost	Faculty	President	Board of Trustees
1.	University Requirements — Change in approved course content ⁶	A	A	A	A				A	--	A	--
2.	University Requirements — Add or drop a required course from the University Requirements chart ⁶	A	A	A	A				A	A	A	--
3.	University Requirements — Add or drop a course from a menu within the University Requirements ⁶	A	--	--	A				A	--	A	--
4.	University Requirements — Change hours within a menu on the University Requirements chart ⁶	A	A	A	A				A	A	A	--
5.	Major — Revision of major ^{4,5}	A	A	A	A				A	--	A	--
6.	Major — Adopt or change admission requirements	A	A	A	A				A	--	A	--
7.	Major — Add ^{4,5}	A	A	A	A				A	A	A	I
8.	Major – Discontinue (proposed by the department or college)	A	A	A	A				A	A	A	I
9.	Major – Discontinue (proposed by the Provost)	See below.										
10.	GPA — Revise major or cumulative requirement	A	A	A	A				A	A	A	--
11.	Minor — Revise course selection	A	A	A	I				I	--	I	--
12.	Minor — Add	A	A	A	A				A	--	A	--
13.	Minor – Discontinue (proposed by the department or college)	A	A	A	A				A	--	A	--
14.	Minor – Discontinue (proposed by the Provost)	See below.										
15.	Degree — Add	A	A	A	A				A	A	A	I
16.	Degree – Discontinue (proposed by the department or college)	A	A	A	A				A	A	A	I
17.	Degree – Discontinue (proposed by the Provost)	See below.										
18.	Any change to a graduate degree program	A	A	A	A				A	--	A	--

COUNCIL ³										
	Provost-Proposed Change	Provost	Department	Dean	TEC	UAC	Graduate	Faculty	President	Board of Trustees
1.	Major/Graduate Program – Discontinue (proposed by the Provost)	A	R	R	A			A	A	I
2.	Minor – Discontinue (proposed by the Provost)	A	R	R	A			--	A	--
3.	Degree – Discontinue (proposed by the Provost)	A	R	R	A			A	A	I

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COUNCIL³

	Change to the Catalog Information	Dept./School	College Academic	Deans	UGEC	UUAC	GRAD	Provost	Faculty	President
1.	General requirements for graduation including course requirements that are common to all majors for all degrees ⁷	--	--	--		A		A	A	A
2.	Admission requirements	--	--	--		A		A	A	A
3.	Policies governing academic probation and suspension	--	--	--		A		A	A	A
4.	Requirements for graduating with honors	--	--	--		A		A	A	A
5.	Other academic policy changes	--	--	--		A		A	--	A

¹ Councils may request additional information about “Information” items. These items are approved as “Consent Agenda.”

² The Dean and Department should respond to the Provost’s recommendation to close a program in writing. Advise & Respond (R) requires that the voting body should receive the written responses at least one week prior to the vote.

³ All courses that meet University Requirements for general education must go through UGEC. Courses or degrees offered only to students seeking teacher certification must go through the Teacher Education Council. All undergraduate changes must go before the UUAC. All graduate degree plan changes must go through the Graduate Council.

⁴ A minimum of 30 hours is required for a major. A maximum is specified for each degree (e.g., BA, BS). The university minimum for elective hours is 6, unless the requirements of external accrediting bodies make it impossible.

⁵ Program or course changes that apply to any major that includes Teacher Certification will be reviewed by the college, the Teacher Education Council (TEC), and then the UUAC.

⁶ Courses that satisfy ACU’s University Requirements (General Education) will normally have lower-level numbering, be free of prerequisites and co-requisites, appeal to more than one or two majors, and “not narrowly focus on those skills, techniques, and procedures specific to a particular occupation or profession” (SACS 2.7.3). Departments may request exceptions to the first three criteria.

⁷ The UUAC approved the clarification that “general requirements for graduation” means the enumerated items in the “General Requirements for Bachelor’s Degrees” section of the catalog.

Revised 3-8-17

Curriculum/Catalog Changes Signature Page

Department/School Chair(s)	
 Signature	31 Jan. 2019 Approval date
 Signature	1/30/19 Approval date

College Academic Council(s)	
 Signature	3-25-19 Approval date
_____ Signature	_____ Approval date

Dean(s)	
 Signature	3/26/19 Approval date
_____ Signature	_____ Approval date

Teacher Education Council	
_____ Chair's signature	_____ Approval date

General Education Council	
_____ Chair's signature	_____ Approval date

Undergraduate Academic Council	
_____ Chair's signature	_____ Approval date

Graduate Council	
_____ Chair's signature	_____ Approval date

Provost	
_____ Signature	_____ Approval date

Faculty	
_____ Chair of faculty senate	_____ Approval date

President	
_____ Signature	_____ Approval date

After much thought, consultation with our advisor, and consideration of the difficulty and complexity of getting all of our prerequisite courses completed in the first two years, I am sorry but I cannot support your decision to add a chemistry or biology as a prerequisite course to microbiology. It is my understanding that most of our students do take chemistry 113 before entering microbiology so I would think that asking the advisors to as much as possible have students Chemistry first, would increase this even more.

Exceptions that have occurred for nursing students are the following:

- 1) Chemistry 113 fills up before the student is allowed to register and sometimes microbiology is the only science prerequisite left with seats for our students to take.
- 2) Chemistry and multiple other courses that our students need are taught at the exact same time so they cannot always get into chemistry.
- 3) The student brings in multiple courses that do not include chemistry or biology but they need to take courses that are needed for the major and may be need to take chemistry and microbiology at the same time.
- 4) There are limited seats available in semesters other than the fall for Chemistry 113 so if a student cannot get into the fall class they may not get into spring either and with no Chemistry 113 in the summer this could draw out their degree to 5 plus years, which makes for excessive debt for our students.
- 5) This is similar to the above scenario-- students who change their major and have almost all their classes needed except the sciences.

This decision could limit the students ability to be part of a semester long study abroad, joining a club, doing mission trips, etc. (Activities that make ACU distinctive). Or students will take Chemistry and/or Microbiology at other institutions to keep this from causing difficulties for their progression and goals. In addition, Texas law has changed recently to allow community colleges to offer baccalaureate degrees in nursing; therefore, if our students cannot participate in ACU's value added benefits, I fear that the program will suffer for lack of students which in turn will affect the number of students at ACU since nursing at this time is the largest single under-graduate program.

If you feel you must have a prerequisite to this course the following would be my suggestions:

- 1) balance the seats in the long semesters of Chemistry 113 and add summer Chemistry 113 classes,
- 2) consider staggering when science, statistic, and developmental psych courses are taught (this would require that faculty collaborate and determine what could be changed for the good of students),
- 3) allow A & P I to be in the prerequisite menu,
- 4) allow a certain number of courses either being transferred in or taken at ACU to be part of the prerequisite menu.

Thank you for your consideration. Blessings, Becky

Survey of Prerequisites for Microbiology Courses Designed for Nursing and Allied Health at Selected Texas Universities

Program/University	Course Number	Course Name	Catalog Description
Abilene Christian University	BIOL 353	General Microbiology	Principles of general microbiology including immunology, pathogenic microbiology, environmental, and industrial microbiology. Corequisite: BIOL 354. For non-biology majors.
Angelo State University	NUR 2411	Microbiology for Health Professions	The study of infectious disease processes using an organ systems approach. A thorough analysis of infectious disease processes including host-microbe interactions and medical intervention is central to the curriculum. Laboratory focus includes basic microbiological methodology and case studies. Prerequisite: Biology 2423 Anatomy or Health Science Professions 2401 Human Anatomy and Physiology I;
Baylor University	BIO 1302	Introductory Microbiology	Prerequisite(s): Credit for college-level biology or chemistry course (includes AP and/or IB credit) or consent of instructor. Credit or concurrent enrollment in BIO 1102. Introduction to microbiology including the study of microbial growth, control of growth, microbial genetics, virulence factors, epidemiology, and the wide variety of
Hardin Simmons University	BIOL 2405	Public Health Microbiology	Fundamental principles and procedures of bacteriology are emphasized in regard to disease producing organisms. Organism characteristics, culture, and control are also included. May not be counted toward a major or minor in biology. Will not satisfy core
Houston Baptist University	BIOL 1414	Introductory Microbiology	Prerequisite(s): None Corequisite(s): BIOL 1014 A general introduction of microbiology with emphasis placed on public health. Various disease-causing agents are discussed. Procedures used in disinfection and sterilization are demonstrated with consideration given to infection control. Includes one semester hour credit for laboratory sessions. This course cannot be counted for credit
McMurry University	BIOL 3403	Foundations of Microbiology	Prerequisites: One semester of college science or permission of the instructor. Intended for students in the future allied health careers, the Allied Health minor, and the Life Sciences and Life Sciences 8-12 majors. This course will not count for credit for Biology and Biomedical Science majors. A survey of microorganisms with emphasis on their roles in human health and disease including taxonomy, modes of transmission, pathogenesis, and antimicrobial therapy. Laboratory topics focus on sampling, safe handling, microscopic examination,

Program/University	Course Number	Course Name	Catalog Description
Midwestern State University	BIOL 2144	Microbiology	Prerequisite(s): BIOL 1233 or 1234; CHEM 1303, each with a grade of C or better. Introduction to the study of medically important bacteria, protozoa, and fungi.
Sam Houston State University	BIOL 2420	Intro Applied Microbiology	An introduction to microorganisms, their morphology, growth requirements, methods of culture, and the manner in which they affect health. Reactions of the body toward pathogenic organisms and the principles of immunity and chemotherapy are considered. Two-hour laboratory. Fall, Spring. Credit in this course cannot be applied to a major or minor in Biology. Demonstrated college-level readiness in reading, writing, and math. Prerequisite: Minimum grade of C in BIOL 2401 and BIOL 2402, and C or better in CHEM 1411 or CHEM 1406 or a C or better in CHEM 1111
Stephen F. Austin State University	BIO 308	Pre-nursing Microbiology	Nursing majors will study the nature of micro-organisms and their ability to interact with humans. Students also will learn current techniques used to identify, culture and control micro-organisms. Does not meet degree requirements for biology major. Course fee \$15. Prerequisite(s): BIO 238, BIO 239; CHE 111 or CHE 133 with lab
Tarleton State University	BIOL 2420	Microbiology for Non-Science Majors	A survey of the microorganisms, their environments, and their interactions with multicellular organisms, particularly man. The course concentrates on the microorganisms which are pathogenic to man, human diseases, treatments for the diseases, and their prevention. Microorganisms need time to grow and therefore there will be several laboratory assignments throughout the course of the semester where students will be required to return the next day for about 15-45 minutes for culture analysis. Course is appropriate for pre-nursing majors.
Texas A&M University	BIOL 206	Introductory Microbiology	Basic microbiology of prokaryotes and eukaryotes; main topics include morphology, physiology, genetics, taxonomy, ecology, medically important species and immunology; mandatory laboratory designed to give hands-on experience and to reinforce basic principles. Prerequisites: BIOL 101, BIOL 107, BIOL 111, or BIOL 113; CHEM 101 and CHEM 111 or CHEM 103 and CHEM 113. May not be used for credit by biology, molecular and cell biology, microbiology, zoology.

Program/University	Course Number	Course Name	Catalog Description
Texas Christian University	BIOL 20234	Basic Microbiology	Three hours lecture and one laboratory period per week. Microorganisms and the manner in which they affect health; characteristics, growth requirements, methods of transfer, and reactions of the body toward invading organisms and the principles underlying immunity. This course is intended for Nursing, Nutrition, and Secondary Education Life Science majors or majors that require microbiology for professional school. This course cannot be applied to the Biology major and is not intended for pre-health students applying
Texas Tech University	MBIO 3400	Microbiology	Prerequisite: ZOOL 2403 or BIOL 1402, or equivalent; CHEM 1305 or CHEM 1307. Morphology, physiology, and activities of bacteria, fungi, and viruses. Primarily for students of agriculture, food and nutrition, animal science, secondary education, nursing, and others seeking an advanced science elective. Includes a lab. May not be applied to degree requirements for biological sciences majors.
Texas Women's University	BACT 1003	Microbiology	BACT 1003. Microbiology. (TCCN BIOL 2320) Principles, historic concepts, sterility, chemotherapy and antibiotics, immunology, serology, and diseases caused by microorganisms. Co-requisite: BACT 1001. Three lecture hours a week. Credit: Three hours.
University of St. Thomas Houston University of Texas at Austin	BIOL 2333 BIO326M	Introduction to Microbiology Introductory Medical Microbiology and Immunology	Overview of the structure, physiology, culture and control of bacteria Designed primarily for nursing and prepharmacy students. Overview of the structure, function, and genetics of bacteria, viruses, and fungi, with emphasis on the interactions between micro-organisms and the human host. Includes principles of microbial pathogenesis, the host's innate and adaptive immune responses to infection, epidemiology, laboratory diagnosis, and antimicrobial chemotherapy and vaccines. Three lecture hours and one discussion hour a week for one semester. Prerequisite: Biology 311C; Biology 325 or 325H with a grade of at least C-; Chemistry 301 with a grade of at least C-; and one of the following with a grade of at least C-: Mathematics 408C, 408K, 408N, 408R, Statistics and Scientific Computation 302.
University of Texas at Tyler	BIOL 2320	Introduction to Microbiology	Introduction to Microbiology [TCCN: BIOL 2320] - Microbial structure, metabolism, and genetics. Microorganisms of medical importance are stressed. Co-requisite: BIOL2120. Prerequisites: CHEM 1311/1111 or CHEM 1307/1107. May not be used for major in biology. Course fee



Supplemental Materials
for
Microbiology in Nursing and Allied Health (MINAH)
Undergraduate Curriculum Guidelines: A Call to Retain Microbiology
Lecture and Laboratory Courses in Nursing and Allied Health Programs

Lourdes Norman-McKay^{1,*} and the ASM MINAH Undergraduate
Curriculum Guidelines Committee²

¹*Florida State College Jacksonville, Jacksonville, FL 32256*

²*See Appendix 3 for a list of committee members*

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- Appendix 3: Alphabetical listing of the microbiology in nursing and allied health (MINAH) curriculum guidelines committee members

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Microbiology in Nursing and Allied Health (MINAH) Undergraduate Curriculum Guidelines

These recommended curriculum guidelines for undergraduate microbiology in nursing and allied health curricula are aligned to ASM's 2012 Curriculum Guidelines for undergraduate microbiology (<https://www.asm.org/index.php/guidelines/curriculum-guidelines>) as well as the test plan for the National Council Licensure Examination for Registered Nurses published in 2016 (NCLEX-RN; https://www.ncsbn.org/RN_Test_Plan_2016_Final.pdf).

Part 1: Concepts & Statements

Impact of Microorganism in Health and Disease

- 1. The microbiome consists of diverse cellular and acellular microbes that impact human health; a dysbiosis (imbalance) in the microbiome that changes the level, location, or diversity of the normal microbiota may lead to disease.**

ASM Recommended Curriculum Guideline: 23

NCLEX-RN Alignment: Basic Care & Comfort; Physiological Adaptation

- 2. Microorganisms are ubiquitous and live in diverse and dynamic ecosystems, including the human body.**

- a. Microorganisms have different characteristics that place them in different taxonomic groups. An understanding of these groups supports infection management and informs the patient care plan.
- b. Knowing where microbes thrive and what parts of the human body microbes colonize is important in infection control and for diagnosing infectious diseases.

ASM Recommended Curriculum Guideline: 20

NCLEX-RN Alignment: Pharmacological & Parenteral Therapies; Safety & Infection Control

- 3. Most bacteria in nature live in biofilm communities.**

- a. Biofilm production presents unique challenges to healthcare such as providing a continuously available pathogen source for renewed infections and conferring resistance to antimicrobial agents.
- b. Biofilms often form on implanted medical devices, introducing a unique challenge to infection control in healthcare settings.

ASM Recommended Curriculum Guideline: 21

NCLEX-RN Alignment: Pharmacological & Parenteral Therapies; Reduction of Risk Potential

- 4. Microbes interact with human hosts in beneficial, neutral, or detrimental ways.**

- a. Pathogens can be prokaryotic, eukaryotic, or acellular and primarily include bacteria, viruses, fungi, helminths, protozoa, and prions. A general understanding of these diverse

groups is essential to guide healthcare practices and promote communication among professionals in such settings.

- b. To best protect themselves and care for their patients, nurses should understand the microbiological and epidemiological features of pathogenic agents (e.g. etiological agent, reservoir, transmission patterns, incubation period, risk factors, potential complications, treatments, etc.)
- c. Host factors, such as age and overall health and life habits, impact infectious disease development.
- d. In humans, normal microbiota includes neutral and beneficial microbes (e.g. gut microbiota produce vitamins that humans cannot make and gut microbes compete with potential pathogens to limit their growth); also, microbes in probiotics are increasingly recognized as beneficial in a number of health applications.

ASM Recommended Curriculum Guideline: 23

NCLEX-RN Alignment: Pharmacological & Parenteral Therapies; Safety & Infection Control; Health Promotion & Maintenance; Basic Care & Comfort; Physiological Adaptation

5. Humans use microorganisms and their products to make pharmaceuticals.

ASM Recommended Curriculum Guideline: 26

NCLEX-RN Alignment: Health Promotion & Maintenance

Microbial Pathogenicity

6. Pathogens have diverse virulence factors that influence their pathogenesis and impact treatment options and clinical management.

- a. Understanding adhesion factors, enzymatic factors, endospores, pathogen strategies to evade immune responses, endotoxins, exotoxins, and the nature of toxigenic bacterial strains is central to developing effective patient care plans for toxemia and sepsis/septic shock.
- b. Understanding pathogenesis mechanisms allows healthcare workers to identify, properly treat, and reduce infectious disease transmission.
- c. Bacteriophages can impact bacterial pathogenicity. For example, lysogenic bacteriophages can perform specialized transduction, which can confer new genetic traits to bacteria while lytic bacteriophages serve as vehicles for generalized transduction of new genetic traits.

ASM Recommended Curriculum Guidelines: 8, 9, 10, 23

NCLEX-RN Alignment: Health Promotion & Maintenance; Safety & Infection Control

7. Pathogens are continuously evolving and virulence is not a static property.

Understanding mechanisms that impact pathogen evolution (i.e. vertical and horizontal genetic variation, mutations, recombination, etc.) is central to limiting pathogen evolution.

- a. Gene transfer events such as transduction, transformation, and conjugation help bacteria gain new virulence factors, including the ability to make toxins and acquire antimicrobial resistance.

ASM Recommended Curriculum Guidelines: 2, 3, 15

Identifying and Managing Infectious Diseases

8. Koch's postulates can be used to identify the etiological agent of certain infectious diseases.

ASM Recommended Curriculum Guideline: 23

NCLEX-RN Alignment: Management of Care

9. A variety of methods are used to identify infectious agents.

- a. Serology and other diverse molecular methods are used to diagnose infections and identify causative infectious agents.
- b. Staining and biochemical test media are useful for identifying bacterial pathogens.

ASM Recommended Curriculum Guideline: 34

NCLEX-RN Alignment: Physiological Adaptation

10. Vaccines are safe and effective methods to prevent disease.

- a. Vaccines allow the host immune system to acquire memory against a particular pathogen.
- b. Vaccines are produced through a variety of methods, come in different formulations, and have different recommended schedules of administration that are designed to optimize immunization efficacy.
- c. Vaccines promote herd immunity and protect at risk populations that cannot be vaccinated. Understanding immune responses (especially the nature of immunological memory) helps nurses and other healthcare providers understand how vaccines work.
- d. Nurses and other allied health workers must be able to intelligibly speak about vaccines to all stakeholders.

ASM Recommended Curriculum Guideline: 31

*NCLEX-RN Alignment: Reduction of Risk Potential; Communication & Documentation;
Physiological Adaptation*

Healthcare Associated Infections and Epidemiology

11. Healthcare associated infections (HAIs, nosocomial) are costly and often have a poorer prognosis than community acquired infections.

- a. HAIs can be limited by standard/universal precautions, transmission precautions, surgical asepsis, and biosafety level precautions. These precautions are central to safely managing patients and safely collecting/analyzing patient samples.

ASM Recommended Curriculum Guidelines: 23, 37

*NCLEX-RN Alignment: Safety & Infection Control; Health Promotion & Maintenance;
Therapeutic Environment*

12. Tracking and reducing the incidence of healthcare acquired infections is a collaborative effort that saves lives.

- a. Epidemiologists including those at state health departments, the Centers for Disease Control & Prevention (CDC), and the World Health Organization (WHO) use a variety of surveillance techniques to monitor certain infectious diseases. Being familiar with

emerging and remerging infectious agents is essential if healthcare teams are to be prepared to manage potential outbreaks.

- b. An understanding of nationally notifiable diseases is essential for compliance with reporting protocols.

ASM Recommended Curriculum Guidelines: 23, 37

NCLEX-RN Alignment: Safety & Infection Control; Health Promotion & Maintenance; Therapeutic Environment

13. There are numerous strategies (i.e. quarantine, vector control, patient education) to break the epidemiological triangle and prevent disease transmission.

ASM Recommended Curriculum Guideline: 23

NCLEX-RN Alignment: Safety & Infection Control; Behavioral Intervention; Therapeutic Communication

Controlling Microbial Growth to Limit Disease

14. A microbe's survival and growth in a given environment depends on its metabolic characteristics.

- a. Understanding a pathogen's metabolic features (e.g. aerobic versus anaerobic metabolism or ability to break down certain nutrients) is essential for recognizing where they can thrive and their potential for introduction into humans.

ASM Recommended Curriculum Guidelines: 11, 13

NCLEX-RN Alignment: Physiological Adaptation; Basic Care & Comfort

15. Microbial growth is controlled using physical, chemical, mechanical, and biological means.

- a. Physical and chemical methods are used to limit microbial growth in clinical settings. These are essential to reduce the incidence of healthcare associated infections (HAIs) and promote a safe and effective healthcare environment.
- b. The human body relies on specific and nonspecific immune defenses as forms of biological control against pathogens, but patients in healthcare settings are often immune suppressed or immune compromised.
- c. An understanding of microbial control (sterilization and disinfection methods) is essential to understand how critical, semi-critical, and non-critical equipment should be managed as well as how to properly prepare patient body sites for medical procedures like injections and surgery.

ASM Recommended Curriculum Guidelines: 7, 8, 14

NCLEX-RN Alignment: Pharmacological & Parenteral Therapies; Health Promotion & Maintenance; Physiological Adaptation; Basic Care & Comfort

16. Antimicrobial compounds combat bacteria, fungi, helminths, protozoans, and viruses.

- a. Understanding structural and functional features of microbes allows us to develop new antimicrobial drugs and assess drug specificity mechanisms to limit adverse drug effects.

- b. The type of antimicrobial drug used to treat a particular pathogen depends on patient and microbe features.

ASM Recommended Curriculum Guidelines: 14, 15

NCLEX-RN Alignment: Safety & Infection Control

17. Proper stewardship of antimicrobial drugs is essential to limit antimicrobial resistance.

- a. Testing for resistance, tracking resistance, only prescribing antimicrobials when needed, and compliance with drug dosing regimens are aspects of antimicrobial drug stewardship.
- b. Improving antimicrobial drug stewardship requires that healthcare workers know when antimicrobial drugs are useful, recognize what microbes these drugs treat, and understand why prescription compliance is essential to combat antibiotic resistance.

ASM Recommended Curriculum Guidelines: 14, 15

NCLEX-RN Alignment: Pharmacological & Parenteral Therapies; Safety & Infection Control; Psychosocial Integrity

Part 2: Competencies and Skills

Scientific Process and Critical Thinking Skills

18. Applying the process of science is relevant to nursing.

- a. Understanding the process of science (making observations, drawing conclusions, appreciating the roles of theories and laws in science) is central to science literacy and fundamental to nursing practices.
- b. Analyzing and interpreting results from a variety of microbiological tests and applying analytical reasoning to solve problems are central to nursing practices.

ASM Recommended Curriculum Guideline: 28

NCLEX-RN Alignment: Nursing Process

19. Using quantitative reasoning ties into nursing practice.

- a. Nurses should be competent in drawing conclusions from charts and graphs related to patient medical history.
- b. Nurses should understand the metric system and scientific notation (e.g. milli (10^{-3}), micro (10^{-6}) and nano (10^{-9}) scales) as this terminology is used in patient medical history (e.g. lymphocyte counts) and is used in calculating dosage for medications.
- c. Nurses should appreciate that microbe levels impact disease development and prognosis (i.e. lethal dose-50 and infectious dose-50 as parameters that impact morbidity and mortality).

ASM Recommended Curriculum Guideline: 29

NCLEX-RN Alignment: Pharmacological & Parenteral Therapies; Reduction of Risk Potential

20. The ability to communicate and collaborate with other disciplines is important for a cross disciplinary healthcare team.

- a. Microbiology is central to the top three threats in healthcare: healthcare associated infections, antibiotic resistance, and emerging diseases. Nurses and other allied health care workers should be able to effectively communicate about microbiology related topics in written and oral formats. Furthermore, nurses are often called upon to explain concepts that physicians mention to patients.
- b. Nurses must work effectively as individuals and in groups.

ASM Recommended Curriculum Guideline: 30

NCLEX-RN Alignment: Communication & Documentation; Management of Care

21. Understanding the relationship between science and society improves clinical practice and promotes the human aspect of medicine.

- a. Nurses should be able to identify and discuss ethical issues in microbiology, especially with regard to vaccines and antimicrobial drug stewardship.

ASM Recommended Curriculum Guideline: 31

NCLEX-RN Alignment: Management of Care; Communication & Documentation; Psychosocial Integrity

Microbiology Laboratory Skills

22. Aseptic technique is central to collecting clinical samples and to protecting healthcare providers and patients.

- a. Microbiology laboratory curricula cover aseptic methods as well as biosafety measures (correct handling and storage of patients' samples, proper handwashing, best practices for handling and disposal of sharps and other biological hazards, etc.). These competencies are central to protecting patients and healthcare providers.
- b. When applicable, specimen samples should be properly prepared for examination using microscopy (bright field and, if possible, phase contrast). Microscopy can lead to presumptive identification of certain pathogens (i.e. *Trichomonas vaginalis* and yeast infections).

ASM Recommended Curriculum Guidelines: 32, 34

NCLEX-RN Alignment: Management of Care, Safety & Infection Control;

Health Promotion & Maintenance; Psychosocial Integrity;

Basic Care and Comfort

23. Microbiological and molecular lab techniques are key to identifying pathogens and implementing effective treatment options.

- a. To effectively explain how diagnostics work and their strengths and limitations, nurses will benefit from an exposure to lab equipment and methods.
- b. Clinical microbiology techniques include using appropriate methods to enrich for and isolate microorganisms from clinical samples. Nurses are the main healthcare providers who collect such samples for analysis and they should understand how their work at the patient level can impact the accuracy of clinical microbiology tests.
- c. Nurses should understand how microbes are identified (e.g. the use of selective/differential media, rapid test kits, and molecular and serological methods).

- d. General staining procedures as well as differential staining procedures like the Gram stain and acid-fast stain are important in diagnosis. Nurses should understand the clinical implications that staining results have on diagnosis and treatment options.
- e. Understanding how pathogens are enumerated in a patient sample (for example, through direct count, viable plate count, and spectrophotometric methods) ties into how infections are treated and patient prognosis.

ASM Recommended Curriculum Guidelines: 33, 34, 35, 36

NCLEX-RN Alignment: Management of Care

24. All healthcare providers must understand protective procedures for handling infectious materials to prevent the spread of disease.

- a. Understanding biosafety levels and emergency procedures is central to safe nursing.
- b. Understanding proper biomedical waste management is important to reduce risk of pathogen exposure and limit infections.
- c. Properly employing personal protective equipment is a standard part of the microbiology laboratory curriculum.

ASM Recommended Curriculum Guideline: 37

*NCLEX-RN Alignment: Safety & Infection Control; Physiological Adaptation;
Reduction of Risk Potential; Basic Care & Comfort*

25. The ability to document and report on experimental protocols, results and conclusions is key to patient treatment.

- a. Nurses must accurately label specimens and keep records.
- b. In the microbiology lab nurses learn how to properly label specimens, correctly maintain records/complete paper work (which may be considered legal documentation), and use flow charts to solve a problem or direct their action.

ASM Recommended Curriculum Guideline: 38

NCLEX-RN Alignment: Communication & Documentation