FACULTY OF HEALTH SCIENCES

DEPARTMENT OF EMERGENCY MEDICAL CARE AND RESCUE

PROGRAMME TITLE: Bachelor of Health Sciences in Emergency Medical Care
PROGRAMME CODE: BHEMC1

Study Guide 2018

SUBJECT: Emergency Medical Care IIIB
SUBJECT CODE: EMCB301

SAQA CREDITS: 15
DoHET CREDITS: 0.115
NQF LEVEL: 7

This module was revised on: January 2017
Revised by: Mrs Dagmar Muhlbauer

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Lectures	**:**	3 periods per week (Monday – Period 2, 3 & 4)
Practicals	**:**	3 periods per week (Monday – Period 6, 7 & 8)
Tutorials	**:**	Yes

Lecture Venue	**:**	Main lecture venue, DEMCR
Practical Venue	**:**	1st Floor, Block-W, ML Sultan Campus
Tutorial Venue	**:**	1st Floor, Block-W, ML Sultan Campus
Duration	**:**	Please refer to the relevant module Scheme of Work

Relevant Policies and rules: Please refer to the Departmental and Faculty Handbooks as well as the Departmental Student Code of Conduct.

1. Welcome

Welcome to Emergency Medical Care IIIB 2018. I trust that this year of study will be an exciting, stimulating and productive one. The environment that I aim to foster in our classroom is a mature one where we will all respect each other for what we bring to the learning environment.

As an adult learner, within an adult learning environment, it is important that you adopt the attitude that we all bring a different set of knowledge, skill sets and experiences to the classroom, and that we are all lifelong learners, learning from and, at the same time, teaching each other. Approach this subject with an open mind, be receptive to interaction, and engage in debate and together we will learn, which is what we are ultimately here to do.

The outcomes described in this guide are very important. It is against these outcomes that you will be assessed. Please refer to them regularly so that you can gauge your own progress. If you have any queries, please discuss them with your lecturer.

2. Using your online Moodle classroom

All taught subjects/modules have their own online classroom on the Moodle platform. You can access your classroom at:
http://dutmoodle.dut.ac.za/moodle/course/view.php?id=329

If you are having difficulty logging in, ask your lecturer for assistance.

3. Introduction to the module

The purpose of this module is to provide the student with a complete understanding and holistic, optimal approach to the treatment of all cardiac arrhythmias whether due to a pathological and/or physiological cause.

4. Module Pre-requisites

Successful completion of Emergency Medical Care IIA, Emergency Medical Care IIB and Clinical Practice II.

5. Module Co-requisites

None

6. Learning Outcomes

On completion of this module the learner will be able to:

a. Safely undertake advanced intravenous therapy in critically ill and/or injured patients.
b. Manage patients presenting with arrhythmias after determining whether the cause of the arrhythmia was physiological or pathological in nature.
c. Provide emergency medical care to treat the underlying cause of the arrhythmia if the cause is physiological in nature.
d. Provide emergency cardiovascular care to the critically ill and/or injured patient of the cause of the arrhythmia is pathological in nature.
e. Manage patients requiring intensive care in the pre-hospital environment or between medical facilities, employing management strategies that are based on current scientific evidence.
f. Read and critically appraise scientific research papers and evaluate his/her clinical practice based on his/her readings.

7. Module Resources

a. Prescribed Texts:
    - Neumar RW, Shuster M, Callaway CW, Gent LM, Atkins DL, Bhanji F, Brooks C, de Caen AR, Donnino MW, Ferrer JME, Kleinman ME, Kronick SL, Lavonas EJ, Link MS, Mancini ME, Morrison LJ, O'Connor RE, Sampson RA, Schexnayder SM, Singletary EM, Sinz EH, Travers AH, Wyckoff MH, Hazinski MF. 2015 American Heart Association Guidelines Update for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care. *Circulation*. 2015.OR

8. Learning Activities

Total credit value : 15 credits

Total notional hours : 150 hours

Learning activities:	
Large class activities such as lectures and video presentations	20%
Small group activities such as class discussion, individual case presentation or group presentations, assignments and tutorials	10%
Individual skills, group skills, patient simulations	70%

9. Graduate Attributes

The graduate attributes that will be developed and/or assessed in this module are:

- Professionalism
- Coordination
- Delegation
- Communication
- Confidence
- Leadership
- Teamwork
- Decision making
- Debriefing
- Pre-planning

These graduate attributes will be assessed in the form of written assessments, an assignment as well as a patient simulation with a post-simulation interview.

10. Assessments (100% course mark / continuous assessment)

A sub-minimum of 50% is required to pass this module.

b. Theory component (60% of total module mark with a 50% sub-minimum)

Assessment	Weighting	Date of Assessment
Tutorial 1	10%	Monday 23rd July 2018
Test 1	30%	Monday 13th August 2018
Assignment	15%	Monday 20th August 2018
Tutorial 2	10%	Monday 10th September 2018
Test 2	35%	Monday 17th September 2018
Supplementary	*100%*	*Thursday 18th October 2018*

Should a learner attain an overall theory mark of less than 50% after all four assessments, he/she will be granted an opportunity for a summative supplementary written theory assessment that will cover **all** of the study units. You are required, according to this regulation to have achieved at minimum an overall average of 40% or greater for the theoretical component in order to qualify for this supplementary assessment. Should a student write the supplementary theory assessment and pass, the mark for the theory component will be capped at 50%.

c. Practical component (40% of total module mark with a 50% sub–minimum)

Assessment	Weighting	Date of Assessment
Patient Simulation	70%	Thursday 11th & Friday 12th October 2018
Post-Simulation Interview	30%	Thursday 11th & Friday 12th October 2018
Supplementary	*100%*	*Monday 22nd October 2018*

Should a learner attain an overall practical mark of less than 50%, he/she will be granted an opportunity for a supplementary patient simulation assessment irrespective of what the initial result was. Should a student undertake a supplementary practical assessment and pass, the mark for the practical component will be capped at 50%.

You will note that the OSCE skills do not add to the weighting of the year mark for EMCIIIB. The OSCE skills are a psychomotor skill and therefore have the ability to falsely inflate the academic year mark. You will not be formally assessed on the OSCE skills, instead you need to ensure that you complete the Critical Skills OSCE booklet before the end of this module.

Each skill has to be signed off by a lecturer when you have demonstrated competence and it is your responsibility to ensure that you have signed off on all components before the end of this module (**15th October 2018**). Completion of the Critical Skills OSCE booklet is a requirement to successfully complete this module. There is no limit to the number of attempts you can have at a skill, but remember, that it is a requirement to successfully complete the EMC IIIB module.

Herewith is a list of the OSCE skills you will be required to complete as part of the Critical Skills OSCE booklet:

- ✓ Drug Infusion Preparation & Administration using a Syringe Driver
- ✓ External Jugular Vein Cannulation
- ✓ Intraosseous Cannulation (Adults)
- ✓ Synchronized Cardioversion
- ✓ Transcutaneous Pacing
- ✓ Vagal maneuvers

Assessments will be moderated in accordance with the institutional policy.

	THEORY				**PRACTICAL**		
Tutorial 1	**Test 1**	**Assignment**	**Tutorial 2**	**Test 2**	**OSCEs**	**Patient Simulation**	**Post-Simulation Interview**
10%	30%	15%	10%	35%	Must pass all critical skills identified	70%	30%
	60% (with a sub-minimum of 50%)				**40% (with a sub-minimum of 50%)**		

Feedback to students on assessments will be fed back to the students through model answers and marking rubrics as well as one-on-one consultations should the need arise.

11. Module Outline

a. Study Unit 1: Advanced intravenous therapy
b. Study Unit 2: Arrhythmia management
c. Study Unit 3: Cardiopulmonary resuscitation & post-cardiac arrest care
d. Study Unit 4: Pharmacology associated with cardiovascular care
e. Study Unit 5: Thrombolysis

12. Module Preparation

Please make sure that you are familiar with the following outcomes, as this knowledge will be assumed to be in place and will not be revised in class.

a. Applied anatomy and physiology of neck region:

- Identify the circulatory anatomy of the neck and the influence of surrounding structures on external jugular vein cannulation.
- Label a detailed diagram of the anatomy of the neck region including its venous vasculature.

b. Cardiopulmonary Resuscitation:

- Discuss the chain of survival principle.
- Discuss the principle of early defibrillation.
- Differentiate between monophasic and biphasic defibrillation.
- Discuss the cardiac / thoracic pump mechanism.

c. Coronary Care Diagnostics:

- Demonstrate a thorough understanding of cardiac electrophysiology.
- Identify the following cardiac rhythms / arrhythmias when presented with an ECG:
  - ✓ Rhythms originating in the atria (bradycardia, tachycardia, normal).
  - ✓ Rhythms originating in the ventricles (bradycardia, tachycardia, escape).
  - ✓ Atrioventricular conduction abnormalities (AV blocks and pre-excitation).
  - ✓ Bundle branch and hemi- blocks.
  - ✓ Ectopy (supraventricular and ventricular origin).
  - ✓ Cardiac arrest rhythms.
- List and identify the ECG changes (including reciprocal changes) consistent with ischaemia and relate these changes to cardiac anatomy.
- When presented with a 12/15 lead ECG trace within its clinical context, be able to identify the probable region of infarction / ischaemia and involved vascular structures (including anterior, inferior, posterior, lateral, septal and combination infarcts).

13. Study Units

Study Unit 1: Advanced intravenous therapy

Outline:

- External jugular vein cannulation
- Intraosseous cannulation in adults

Outcomes:

On completion of this study unit, the learner will be able to:

- External jugular vein cannulation:
  - Describe the anatomical location of the external jugular vein.
  - Investigate the indications and contra-indications of external jugular vein cannulation.
  - Consider the advantages and disadvantages associated with performing this skill.
  - Compile a list of the complications that may arise from performing an external jugular vein cannulation.
  - Prioritize all of the recognized methods that you are aware of that can assist in distending the external jugular vein to assist with the cannulation procedure
  - Explain some of the anatomical, physiological and pathological considerations that you would need to be aware of that could make the external jugular vein cannulation procedure more difficult than under normal circumstances.
  - Compile a detailed explanation as to the procedure you would follow to cannulate the external jugular vein.
- Intraosseous cannulation in adults:
  - Investigate the indications and contra-indications of intraosseous cannulation.
  - Consider the advantages and disadvantages associated with performing this skill.
  - Compile a list of the complications that may arise from performing intraosseous cannulation.
  - Discuss in detail the movement of fluid that is administered via intraosseous cannulation.

- List and explain how you would prepare and inspect the equipment needed to perform intraosseous cannulation.
- Describe how you would assess whether your intraosseous cannulation has been successful.
- Compile a detailed explanation as to the procedure you would follow for intraosseous cannulation using the following devices:
  - Bone injection gun
  - F.A.S.T. – 1 Sternal Intraosseous Device
  - EZ-IO drill
  - Intraosseous needle

Study Unit 2: Arrhythmia Management

Outline:

- Bradyarrhythmias:
  - Stable and unstable bradycardia algorithm
  - Transcutaneous pacing
- Tachyarrhythmias:
  - Stable and unstable tachycardia (wide and narrow) algorithm
  - Vagal maneuvers
  - Synchronized cardioversion
- Premature ventricular contractions

Outcomes:

On completion of this study unit, the learner will be able to:

- Consider all of the methods available to manage patients suffering from a bradycardia in a variety of settings.
  - Clearly demonstrate an ability to determine whether the cause of the bradycardia is physiological or pathological in nature.
  - Determine how you would decide as to whether a patient with a bradycardia is stable or unstable.
  - List and explain some of the causes of a bradycardia.

- Defend the treatment regime you would elect to follow in managing an unstable bradycardia (include all variants).
- Describe the different types of pacemakers (permanent and temporary) that are available.
- Consider the physiological effects of pacing.
- Elaborate on the advantages of transcutaneous pacing.
- Investigate the indications and contra-indications of pacing.
- Compile a list of the complications associated with pacing.
- Differentiate between asynchronous and synchronous pacing modes. Be sure to include the advantages and disadvantages associated with each mode.
- Formulate a detailed step-by-step approach to transcutaneous pacing.

- Consider all of the strategies available to manage patients suffering from various different tachycardia arrhythmias.
  - Clearly demonstrate an ability to determine whether the cause of the tachycardia is physiological or pathological in nature.
  - Determine how you would decide whether a patient with a tachycardia is stable or unstable.
  - Differentiate between a physiological and a pathological tachycardia.
  - Defend the treatment regime you would elect to follow in managing the following tachycardias (include all variants):
    - Regular narrow complex tachycardias (Sinus Tachycardia, Reentry SVT)
    - Wide complex tachycardias
    - Irregular tachycardias (Atrial Flutter, Atrial Fibrillation, Polymorphic VT, Torsades de Pointes)
  - List and discuss the different vagal maneuvers commonly used by ECPs.
  - Provide a detailed explanation as to how the valsalva maneuver accomplishes a slowing of the heart rate.
  - Describe in detail the various techniques that may be utilized to assist your patient in performing a valsalva maneuver.
  - Determine the steps that need to be followed in preparation for a valsalva maneuver as well as during the actual procedure.

- Explain in detail the effects of cardioversion on the myocardium.
- Investigate the indications and contraindications of cardioversion.
- Compile a list of the complications associated with performing cardioversion.
- Formulate a detailed description of the steps involved in performing cardioversion on the following arrhythmias:
  - Narrow complex tachycardias (Regular: SVT and Irregular: Atrial Flutter & Atrial Fibrillation)
  - Monomorphic VT
  - Polymorphic VT

- Identify ectopic beats and discuss the mechanisms of ectopic electrical impulse formation and undertake management within the advanced life support scope of practice.

Study Unit 3: Cardiopulmonary resuscitation and post-cardiac arrest care

Outline:

- Cardiac arrest management algorithms of shockable and non-shockable rhythms
- Post-cardiac arrest care
- Declaration, DNR & Living Will
- Medications associated with the management of cardiac arrest

Outcomes:

On completion of this study unit, the learner will be able to:

- Ensure that you have a detailed understanding of the American Heart Association 2015 resuscitation guidelines and the rationale behind all of the changes.
- Defend in detail the management of a patient in cardiac arrest providing a motivation for each of your actions. Be sure to address the following arrhythmias:
  - Ventricular fibrillation
  - Pulseless Ventricular Tachycardia
  - Pulseless Electrical Activity
  - Asystole
- Argue why the following interventions that were previously thought to be of benefit to a patient in cardiac arrest are no longer supported by outcomes:

    - Underdrive pacing
    - Precordial thump
    - Routine fluid administration
    - Mega dosing adrenaline
- Provide a detailed discussion on post-resuscitation support after the return of spontaneous circulation.
- Compile a list the criteria that needs to be assessed before one can terminate a resuscitation attempt.
- Differentiate between the following two documents associated with resuscitation:
    - DNR
    - Living Will

Study Unit 4: Pharmacology associated with cardiovascular care

Outline:

- Drug calculations
- Drug administration routes:
    - Infusion (preparation & administration)
- Medications (in addition to those on the ECP scope of practice):
    - β-blocking agents
    - Nitrates
    - Calcium channel blockers (antagonists)
    - Angiotensin-converting enzyme inhibitors (ACE inhibitors)
    - Anti-arrhythmic agents
    - Diuretic agents
    - Inotropic agents

Outcomes:

On completion of this study unit, the learner will be able to:

- Drug Calculations:
    - Solve drug calculations in order to determine the required drug bolus and infusion dosages, volumes and rates of administration

- Elaborate on the various methods of administering medications via the following routes:
  - Infusion (preparation & administration)
- Consider the general uses of the following classes of medications that fall outside the ECP scope of practice associated with the management of patients:
  - β-blocking agents
  - Nitrates
  - Calcium channel blockers (antagonists)
  - Angiotensin-converting enzyme inhibitors (ACE inhibitors)
  - Anti-arrhythmic agents
  - Diuretic agents
  - Inotropic agents

Study Unit 5: Thrombolysis

Outline:

- Definition of the term thrombolysis
- Therapeutic role
- Value & benefits of thrombolysis in the pre-hospital environment
- Thrombolytic medications
- Thrombolysis regimens
- Complications

Outcomes:

On completion of this study unit, the learner will be able to:

- Define the term thrombolysis and give an overview of the theoretical benefits and complications of thrombolytic therapy.
- Appraise the therapeutic role played by thrombolytic therapy in the treatment of myocardial infarction (MI) and related acute coronary syndromes.
- Criticize current scientific literature either supporting or refuting the safety and effectiveness of pre-hospital thrombolysis by non-physician, independent practitioners.

- Consider the theoretical benefits of initiating thrombolytic therapy in the pre-hospital environment.
- Discuss the thrombolytic medications in common usage under the following headings: mechanism of action; indications; contra-indications; precautions and drug interactions.
- Review the most recent, accepted thrombolysis regimens and referring to published evidence, evaluate their appropriateness within the pre-hospital context.
- Determine the common complications of thrombolysis, particularly in the pre-hospital environment, and approaches that may mitigate against these complications.

14. Activities to Promote Learning

During the course of this module a number of useful websites will be referred to for tutorials and additional information as well as YouTube video links will be provided to you. These will be provided to you at the end of each lecture via your DUT4Life email address and the links will also be uploaded onto Moodle for ease of access.

15. Library Orientation

A formal orientation to the library was conducted as part of your first year of study at the Durban University of Technology. Should you require any further assistance with the location of resources in the library, please engage with the Faculty of Health Sciences Library Representative: Mr. Dennis Mpumlwana in person or either on dennism@dut.ac.za or (031) 373 2565.

16. Scheme of work

Month	Date	Day	Session	Lesson Plan
July	16	Monday	Theory	Study Unit 1
			Practical	Skills: EJVC / IO
	23	Monday	Theory	ECG revision
			Practical	Skills: Syringe driver & Sign Off
			Assessment	**Tutorial 1 – ECGs**
	30	Monday	Theory	Study Unit 2: Bradycardia
			Practical	Skills: TCP
August	6	Monday	Theory	Study Unit 2: Tachycardia
			Practical	Skills: Vagal Maneuvers & CV
	13	Monday	**Assessment**	**EMCIIIB Test 1**
			Practical	Simulations
	20	Monday	**Assessment**	**Assignment - Resuscitation Ethics**
			Theory	Study Unit 3
			Practical	Simulations
	23	Thursday	Practical	Skills: Practice & Sign Off
	27	Monday	Theory	Study Unit 4: Drug Calculations
			Practical	Simulations
	30	Thursday	Practical	Simulations
September	3	Monday	**Excursion**	**Gariep Dam**
	10	Monday	**Assessment**	**Tutorial 2 - Drug Calculations**
			Theory	Study Unit 4: Drug Calculations
			Practical	Simulations
	17	Monday	**Assessment**	**EMCIIIB Test 2**
			Practical	Simulations
	24	Monday	**Recess**	**Recess**
October	1	Monday	Theory	Study Unit 5
			Practical	Simulations
	8	Monday	Practical	Simulations
	11	Thursday	**Assessment**	**Patient Simulation Assessment**
	12	Friday	**Assessment**	**Patient Simulation Assessment**
	15	Monday	Practical	Skills: Sign Off
			Assessment	**SEQ** **Critical Skills OSCE Book due**
	18	Thursday	**Assessment**	**EMCIIIB Supplementary Written**
	22	Monday	**Assessment**	**EMCIIIB Supplementary Simulation**

17. Copyright and plagiarism

The University is a community striving to discover, construct and communicate knowledge for the benefit of society. To this end, academic integrity is a commitment to the fundamental values of honesty, trust, fairness, respect and responsibility. Sharing, collaborating and innovating from existing knowledge must be encouraged, but knowledge workers must give credit to others whose work they have used, showing how they have built on it. Without this care by the academic community, the work of knowledge construction is meaningless.

Students are reminded to make sure that they are familiar with the DUT "Plagiarism Policy and Procedures for Staff and Students" which was implemented on the 1st January 2009.

18. Student Support

The following support services are available for all students registered for this module: student counselling, academic development, mentoring and tutorials. As the module lecturer, I am available for consultation on either a Thursday or a Friday but by appointment only.

After each assessment, students who have underperformed will be identified as "at risk" and they must then organize a meeting with the module lecturer:

- The student must then complete the pre-interview form (Annexure 1).
- The student must then bring this completed form with to the appointment
- Meeting with the student is held
- Minutes are captured by the lecturer
- Students are referred to the Faculty Academic Development Officer who will assist students and refer if required to student counselling for assistance with study techniques and time management
- Students are assisted by the subject lecturer for content, teaching and/or assessment related issues and additional tutorials are provided if needed
- Student provides lecturer with feedback on outcome of referrals

- If a student reports that they have not been adequately assisted, then this is reported to the HOD for further action.

19. Quality Assurance and Enhancement

Student feedback will be elicited through the administration of lecturer (LEQ) and subject evaluation (SEQ) questionnaires. Both the SEQ and LEQ will be administered on the **15th October 2018**.

I also welcome feedback at any stage from all students registered for this module. Any feedback received will be considered as an attempt to improve on the offering of this module. Any changes that need to be made will be discussed with the class as a whole, and amendments will only be made provided there is agreement from all of the students and that the amendments are for the benefit of all of the students.

ANNEXURE 1:

NAME:	
STUDENT NUMBER:	
SUBJECT NAME:	
SUBJECT CODE:	
DATE OF APPOINTMENT:	

1. What factors do you feel contributed to your poor performance in this assessment opportunity?

2. How do you propose to remedy these factors so that your performance improves?

3. Do you feel you put in the time required to expect to pass this assessment? If not, why?

4. Lecturer's summary of discussion:

Student's commitment to resolving identified issues and thereby improving performance:

It is imperative that the student makes a commitment to resolving the issues identified, and this is done in the form of a signature:

Student name:	
Student signature:	
Lecturer name:	
Lecturer signature:	

FACULTY OF HEALTH SCIENCES

DEPARTMENT OF EMERGENCY MEDICAL CARE AND RESCUE

STUDENT UNDERTAKING – EMC IIIB (EMCB301)

I_____ (ID number _____ &
Student number _____)

The undersigned hereby state that I have read the study guide for the module: Emergency Medical Care IIIB (EMCB301) and I state that I fully understand the contents thereof and agree to uphold and abide by all the policies, rules, regulations and deadline dates as set out therein. I also understand that ignorance of these policies will not be admissible as a defence at any point during the year.

Signed at _____ this _____ day of _____20 ___

Student (Full Names) _____

Student Number _____

Signature _____