

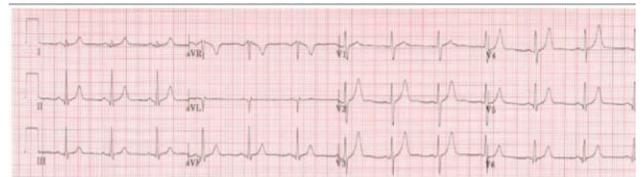
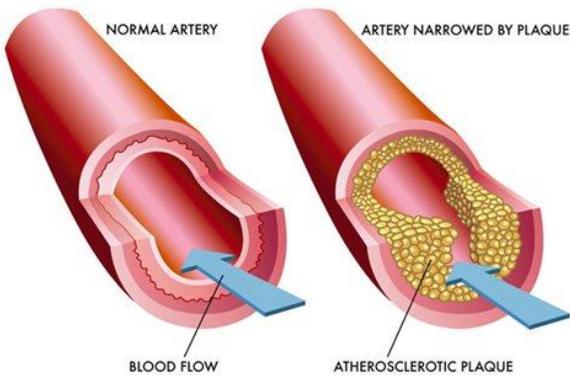
# STUDY GUIDE

## CARDIOVASCULAR SYSTEM MODULE-I

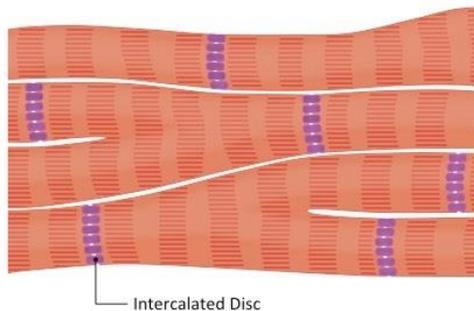
### FIRST YEAR MBBS

3<sup>rd</sup> July –25<sup>th</sup> July 2020

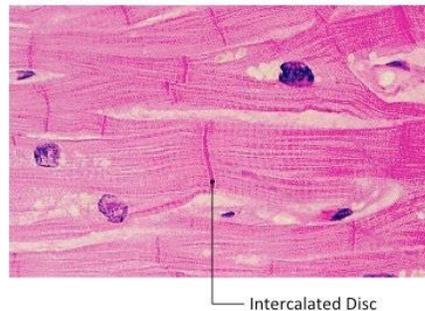
#### ATHEROSCLEROSIS



#### Cardiac Muscle Diagram



#### Cardiac Muscle Microscopy



**STUDY GUIDE FOR CARDIOVASCULAR SYSTEM MODULE-I**

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Module name: Cardiovascular System-I

Year: One

Duration: 4 weeks (July 2020)

Timetable hours: Lectures, Case-Based Learning (CBL), Self-Study, Practicals, Skills, Demonstrations, Visit to Wards & Laboratory

## MODULE INTEGRATED COMMITTEE

<b>MODULE COORDINATOR:</b>	<ul style="list-style-type: none"> <li>• Dr. Naila Parveen (Physiology)</li> </ul>
<b>CO-COORDINATORS:</b>	<ul style="list-style-type: none"> <li>• Dr. Hanna Naqvi (Pathology)</li> <li>• Dr. Mehnaz Umair (DHPE)</li> </ul>

## DEPARTMENTS' &amp; RESOURCE PERSONS' FACILITATING LEARNING

<b>BASIC HEALTH SCIENCES</b>	
<b>ANATOMY</b>	
<ul style="list-style-type: none"> <li>• Professor Zia-ul-Islam</li> </ul>	
<b>BIOCHEMISTRY</b>	
<ul style="list-style-type: none"> <li>• Dr. Kashif Nisar</li> </ul>	
<b>PHYSIOLOGY</b>	
<ul style="list-style-type: none"> <li>• Professor Syed Hafeezul Hassan</li> </ul>	
<b>DEPARTMENT of HEALTH PROFESSION EDUCATION</b>	
<ul style="list-style-type: none"> <li>• Professor Nighat Huda</li> <li>• Dr. Mehnaz Umair</li> </ul>	<ul style="list-style-type: none"> <li>• Dr Sobia Ali</li> <li>• Dr. Muhammad Suleman</li> <li>• Dr Afifa Tabassum</li> </ul>
<b>LNH&amp;MC MANAGEMENT</b>	
<ul style="list-style-type: none"> <li>• Professor Karimullah Makki, Principal, LNH&amp;MC</li> <li>• Dr. Shaheena Akbani, Director A.A &amp; R.T LNH&amp;MC</li> </ul>	
<b>STUDY GUIDE COMPILED BY:</b>	<b>Department of Health Profession Education</b>

## **INTRODUCTION**

### **WHAT IS A STUDY GUIDE?**

It is an aid to:

- Inform students how student learning program of the semester-wise module has been organized
- Help students organize and manage their studies throughout the module
- Guide students on assessment methods, rules and regulations

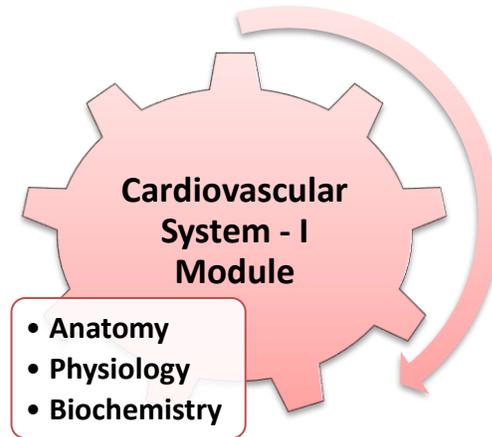
### **THE STUDY GUIDE:**

- Communicates information on organization and management of the module.  
This will help the student to contact the right person in case of any difficulty.
- Defines the objectives which are expected to be achieved at the end of the module.
- Identifies the learning strategies such as lectures, small group teachings, clinical skills, demonstration, tutorial and case based learning that will be implemented to achieve the module objectives.
- Provides a list of learning resources such as books, computer assisted learning programs, web- links, journals, for students to consult in order to maximize their learning.
- Highlights information on the contribution of continuous and semester examinations on the student's overall performance.
- Includes information on the assessment methods that will be held to determine every student's achievement of objectives.
- Focuses on information pertaining to examination policy, rules and regulations.

### **CURRICULUM FRAMEWORK**

Students will experience *integrated curriculum* of 1<sup>st</sup> & 2<sup>nd</sup> semesters.

**INTEGRATED CURRICULUM** comprises of system-based modules such as Locomotor system, Respiratory System and Cardiovascular system which links basic science knowledge to clinical problems. Integrated teaching means that subjects are presented as a meaningful whole. Students will be able to have better understanding of basic sciences when they repeatedly learn in relation to clinical examples. Case-based discussions, computer-based assignments, early exposure to clinics, wards, and skills acquisition in skills lab are characteristics of integrated teaching program.

**INTEGRATING DISCIPLINES OF CVS-I MODULE****LEARNING METHODOLOGIES**

The following teaching / learning methods are used to promote better understanding:

- Interactive Lectures
- Hospital / Clinic visits
- Small Group Session
- Case- Based Learning
- Practicals
- Skills session
- Self Study

**INTERACTIVE LECTURES**

In large group, the lecturer introduces a topic or common clinical conditions and explains the underlying phenomena through questions, pictures, videos of patients' interviews, exercises, etc. Students are actively involved in the learning process.

**HOSPITAL VISITS:** In small groups, students observe patients with signs and symptoms in hospital or clinical settings. This helps students to relate knowledge of basic and clinical sciences of the relevant module.

**SMALL GROUP SESSION (SGS):** This format helps students to clarify concepts acquire skills or attitudes. Sessions are structured with the help of specific exercises such as patient case, interviews or discussion topics. Students exchange opinions and apply knowledge gained from lectures, tutorials and self study. The facilitator role is to ask probing questions, summarize, or rephrase to help clarify concepts.

**CASE- BASED LEARNING:** A small group discussion format where learning is focused around a series of questions based on a clinical scenario. Students' discuss and answer the questions applying relevant knowledge gained in clinical and basic health sciences during the module.

**PRACTICAL:** Basic science practicals related to anatomy, biochemistry, pathology, pharmacology and physiology are scheduled for student learning.

**SKILLS SESSION:** Skills relevant to respective module are observed and practiced where applicable in skills laboratory or Department of Physiotherapy.

**SELF STUDY:** Students' assume responsibilities of their own learning through individual study, sharing and discussing with peers, seeking information from Learning Resource Center, teachers and resource persons within and outside the college. Students can utilize the time within the college scheduled hours of self-study.

## **MODULE 5 : CARDIOVASCULAR SYSTEM-I**

### **INTRODUCTION**

Welcome to the Cardiovascular System Module-I. In the next four weeks you will have the opportunity to develop understanding of the basic concepts of cardiovascular system through an integrated course designed by basic and clinical sciences faculty.

Heart being the main organ of cardiovascular system is responsible for distributing blood all over human body. A perfectly functioning cardiovascular system is so important for human body, that if it stops for a minute, rapid death may occur. In the 3<sup>rd</sup> year in cardiovascular system - II module students will learn in depth about the cardiovascular diseases.

In Pakistan cardiovascular diseases account for about 19% of all deaths and about 38% of deaths occurring due to non-communicable diseases. It is also one of the leading causes of illness and reduces quality of life.

The medical curriculum is not only the study of disease outcomes but also about “prevention being better than cure” Unhealthy lifestyle choices such as rich fat diet, overweight, smoking, increase the risk of cardiovascular diseases. Therefore as a medical student it is important to understand how the risk of cardiovascular disorders can be reduced by adapting healthy lifestyle.

We hope you enjoy the next four weeks. There will be other modules ahead, but a good grounding in cardiovascular module will be an important stage of your journey through this system-based course. As a physician you are expected to manage individuals, families and communities on prevention of illnesses including cardiac disorders

1. *World Health Organization – Non-communicable Diseases (NCD) Country Profiles, 2014*

**COURSE OBJECTIVES AND STRATEGIES**

At the end of the module the students will be able to:

**ANATOMY**

<b>TOPICS &amp; OBJECTIVES</b>	<b>TEACHING STRATEGIES</b>
<b><u>Embryology:</u></b> <ul style="list-style-type: none"> <li>• Explain the development of cardiovascular system</li> </ul>	Interactive Lectures
<ul style="list-style-type: none"> <li>• Describe the following congenital heart defects:               <ol style="list-style-type: none"> <li>a. Atrial septal defect</li> <li>b. Ventricular septal defect</li> <li>c. Tetralogy of Fallot</li> <li>d. Patent Ductus Arteriosus</li> <li>e. Transposition of great vessels</li> </ol> </li> </ul>	
<ul style="list-style-type: none"> <li>• Describe the development of aortic arches</li> </ul>	
<ul style="list-style-type: none"> <li>• Describe fetal circulation with relation to changes that occur at birth</li> </ul>	
<b><u>Histology:</u></b> <ul style="list-style-type: none"> <li>• Describe the microscopic features of               <ol style="list-style-type: none"> <li>a. Artery</li> <li>b. Vein</li> <li>c. Lymph vessels</li> </ol> </li> </ul>	Interactive Lecture & Practical
<ul style="list-style-type: none"> <li>• Discuss the basic structure of blood circulatory system</li> </ul>	
<ul style="list-style-type: none"> <li>• Enumerate the layers of the walls of heart</li> <li>• Describe the histological characteristics of cardiac muscle</li> <li>• Discuss the structure and significance of intercalated discs</li> </ul>	
<b><u>Gross Anatomy:</u></b> <ul style="list-style-type: none"> <li>• Describe pericardium and pericardial sinuses</li> </ul>	Lecture
<ul style="list-style-type: none"> <li>• Describe internal structure of heart</li> </ul>	Demonstration
<ul style="list-style-type: none"> <li>• Describe heart wall and fibrous skeleton</li> </ul>	Interactive Lectures
<ul style="list-style-type: none"> <li>• Describe the gross anatomy of heart valves</li> </ul>	

<ul style="list-style-type: none"> <li>Identify the anatomical position, borders and surfaces of the heart</li> </ul>	Interactive Lectures & Demonstrations
<ul style="list-style-type: none"> <li>Demonstrate the surface marking of               <ol style="list-style-type: none"> <li>Heart</li> <li>Aorta</li> <li>Superior vena cava</li> </ol> </li> </ul>	
<ul style="list-style-type: none"> <li>Perform Precordial examination on human subject</li> </ul>	Interactive Lectures/ Demonstration
<ul style="list-style-type: none"> <li>Describe the position, extent and branches of :               <ol style="list-style-type: none"> <li>Ascending aorta</li> <li>Arch of aorta</li> <li>Descending aorta</li> </ol> </li> </ul>	
<ul style="list-style-type: none"> <li>Describe pulmonary trunk, superior vena cava, inferior vena cava and brachiocephalic vein</li> </ul>	
<ul style="list-style-type: none"> <li>Explain the role of lymphatic's in prevention of edema</li> </ul>	Interactive Lectures/ Case-Based Learning
<ul style="list-style-type: none"> <li>Describe the neurovascular supply of heart in context to ischemic heart diseases</li> </ul>	
<ul style="list-style-type: none"> <li>Describe the conducting system of heart</li> </ul>	
<ul style="list-style-type: none"> <li>Explain the different components of conducting system</li> </ul>	
<ul style="list-style-type: none"> <li>Discuss blood supply of conducting system of heart</li> </ul>	
<ul style="list-style-type: none"> <li>Discuss the innervation of heart and clinical relevance of cardiac pain.</li> </ul>	

## BIOCHEMISTRY

<b>TOPICS &amp; OBJECTIVES</b>	<b>TEACHING STRATEGIES</b>
<p><b><u>Lipid Metabolism:</u></b></p> <ul style="list-style-type: none"> <li>Describe the process of digestion and absorption of Lipids and its significance in CVS disease</li> </ul>	Interactive Lectures
<ul style="list-style-type: none"> <li>Explain the process of synthesis &amp; catabolism of fatty acids and their clinical significance.</li> </ul>	Interactive Lecture/tutorial
<ul style="list-style-type: none"> <li>Discuss Lipoproteins and their clinical significance in CVS disease</li> </ul>	
<ul style="list-style-type: none"> <li>Describe Ketone Bodies' synthesis, functions and Ketoacidosis</li> </ul>	
<ul style="list-style-type: none"> <li>Discuss the biochemical role of Eicosanoids and their clinical significance</li> </ul>	

<ul style="list-style-type: none"> <li>Discuss the metabolism and functions of Cholesterol and its clinical significance in CVS diseases</li> </ul>	Interactive Lecture
<ul style="list-style-type: none"> <li>Discuss the biochemical role of oxidants and antioxidants</li> <li>Discuss their specific role in the progression of CVS diseases</li> </ul>	Interactive Lecture
<ul style="list-style-type: none"> <li>Explain the role of minerals in hypertension</li> </ul>	Interactive Lecture/tutorial
<ul style="list-style-type: none"> <li>Discuss the importance of lipid profile in CVS diseases</li> </ul>	Practical
<ul style="list-style-type: none"> <li>Estimate and interpret the TAGs in the given sample</li> </ul>	
<ul style="list-style-type: none"> <li>Estimate the total cholesterol, HDL, LDL in the serum</li> <li>Interpret the results</li> <li>Discuss the importance of this test for the diagnosis of CVS disease</li> </ul>	
<ul style="list-style-type: none"> <li>Estimate CKMB in given sample</li> <li>Discuss the importance of cardiac enzymes as markers of CVS disease.</li> </ul>	

## PHYSIOLOGY

<b>TOPICS &amp; OBJECTIVES</b>	<b>TEACHING STRATEGIES</b>
<ul style="list-style-type: none"> <li>Describe the Physiologic anatomy of heart and properties of cardiac muscles</li> </ul>	Interactive Lectures
<ul style="list-style-type: none"> <li>Explain the phenomenon of generation of action potential in cardiac muscle &amp; process of excitation contraction coupling</li> </ul>	
<ul style="list-style-type: none"> <li>Describe conducting system of heart &amp; role of pacemaker in maintaining cardiac rhythm</li> </ul>	
<ul style="list-style-type: none"> <li>Explain neural regulation of heart through autonomic nervous system &amp; its effect on cardiac rate (chronotropic), force of contraction (ionotropic), &amp; velocity of conduction (dromotropic) on junctional tissue</li> </ul>	
<ul style="list-style-type: none"> <li>Describe events of cardiac cycle &amp; associated events ( pressure changes, heart sound generation, &amp; effect on volume of heart chambers &amp; vessels)</li> </ul>	
<ul style="list-style-type: none"> <li>Analyze and interpret ECG/vectors</li> </ul>	Interactive Lectures
<ul style="list-style-type: none"> <li>Define principles of hemodynamics applicable to heart/blood vessels</li> </ul>	
<ul style="list-style-type: none"> <li>Define cardiac output and factors regulating cardiac output</li> </ul>	
<ul style="list-style-type: none"> <li>Explain preload/after load &amp; its effect on heart</li> </ul>	Interactive Lectures

<ul style="list-style-type: none"> <li>Define arterial blood pressure &amp; state mechanism of regulation of blood pressure (short, intermediate, long term)</li> </ul>	
<ul style="list-style-type: none"> <li>Record blood pressure and explain changes in arterial pressure in different body positions (lying, upright, standing)</li> </ul>	Practical
<ul style="list-style-type: none"> <li>Explain Hypertension</li> </ul>	Interactive Lectures
<ul style="list-style-type: none"> <li>Define capillary fluid shift mechanism</li> </ul>	
<ul style="list-style-type: none"> <li>Explain auto regulation of local blood flow and list vasodilator / vasoconstrictor</li> </ul>	
<ul style="list-style-type: none"> <li>Describe cardiovascular adaptation to exercise</li> </ul>	
<ul style="list-style-type: none"> <li>Enlist content of lymph and lymphatic circulation</li> </ul>	
<ul style="list-style-type: none"> <li>Describe Circulatory shock</li> </ul>	
<ul style="list-style-type: none"> <li>Demonstrate proper arrangement of ECG machine and placement of its leads on human subject</li> <li>Interpret Normal ECG waves</li> </ul>	Practical
<ul style="list-style-type: none"> <li>Demonstrate the refractory period of cardiac muscle through power lab</li> </ul>	
<ul style="list-style-type: none"> <li>Predict changes in the cardiac cycle based on given disease conditions</li> </ul>	Tutorial
<ul style="list-style-type: none"> <li>Differentiate between cardiac and respiratory causes of dyspnoea in given clinical scenarios.</li> </ul>	
<ul style="list-style-type: none"> <li>Select relevant investigations for such patients</li> <li>Predict results of investigations for such patients</li> </ul>	
<ul style="list-style-type: none"> <li>Differentiate between normal and abnormal ECGs</li> <li>Diagnose most common cardiac conditions based on ECG changes</li> </ul>	



***Apart from attending daily scheduled sessions, students too should engage in self-study to ensure that all the objectives are covered.***

**LEARNING RESOURCES**

<b>SUBJECT</b>	<b>RESOURCES</b>
<b>ANATOMY</b>	<p><b>A. <u>GROSS ANATOMY</u></b></p> <ol style="list-style-type: none"> <li>1. K.L. Moore, Clinically Oriented Anatomy</li> <li>2. Neuro Anatomy by Richard Snell</li> </ol> <p><b>B. <u>HISTOLOGY</u></b></p> <ol style="list-style-type: none"> <li>1. B. Young J. W. Health Wheather's Functional Histology</li> </ol> <p><b>C. <u>EMBRYOLOGY</u></b></p> <ol style="list-style-type: none"> <li>1. Keith L. Moore. The Developing Human</li> <li>2. Langman's Medical Embryology</li> </ol>
<b>BIOCHEMISTRY</b>	<p><b>A. <u>TEXTBOOKS</u></b></p> <ol style="list-style-type: none"> <li>1. Harper's Illustrated Biochemistry</li> <li>2. Lehninger Principle of Biochemistry</li> <li>3. Biochemistry by Devlin</li> </ol>
<b>PHYSIOLOGY</b>	<p><b>A. <u>TEXTBOOKS</u></b></p> <ol style="list-style-type: none"> <li>1. Textbook Of Medical Physiology by Guyton And Hall</li> <li>2. Ganong ' S Review of Medical Physiology</li> <li>3. Human Physiology by Lauralee Sherwood</li> <li>4. Berne &amp; Levy Physiology</li> <li>5. Best &amp; Taylor Physiological Basis of Medical Practice</li> </ol> <p><b>B. <u>REFERENCE BOOKS</u></b></p> <ol style="list-style-type: none"> <li>1. Guyton &amp; Hall Physiological Review</li> <li>2. Essentials Of Medical Physiology by Jaypee</li> <li>3. Textbook Of Medical Physiology by Indu Khurana</li> <li>4. Short Textbook Of Physiology by Mrthur</li> <li>5. NMS Physiology</li> </ol>

**ADDITIONAL LEARNING RESOURCES**

<b><u>Hands-on Activities/ Practical</u></b>	Students will be involved in Practical sessions and hands-on activities that link with the CVS module-I to enhance learning with understanding.
<b><u>Labs</u></b>	Utilize the lab to relate the knowledge to the specimens and models available.
<b><u>Skill Lab</u></b>	A skills lab provides the simulators to learn the basic skills and procedures. This helps build the confidence to approach the patients.
<b><u>Videos</u></b>	Video familiarize the student with the procedures and protocols to assist patients.
<b><u>Computer Lab/CDs/DVDs/Internet Resources:</u></b>	To increase the knowledge students should utilize the available internet resources and CDs/DVDs. This will be an additional advantage to increase learning.
<b><u>Self Learning</u></b>	Self Learning is scheduled to search for information to solve cases, read through different resources and discuss among the peers and with the faculty to clarify the concepts.

**ASSESSMENT METHODS:**

- **Best Choice Questions(BCQs)** also known as MCQs (Multiple Choice Questions)
- **Objective Structured Practical/Clinical Examination (OSPE or OSCE)**

**BCQs:**

- A BCQ has a statement or clinical scenario of four options (likely answers).
- **Correct answer carries one mark, and incorrect 'zero mark'. There is NO negative marking.**
- Students mark their responses on specified computer-based sheet designed for LNHMC.

**OSCE:**

- All students rotate through the same series of stations in the same allocated time.
- At each station, a brief written statement includes the task. Student completes the given task at one given station in a specified time.
- Stations are observed, unobserved, interactive or rest stations.
- In unobserved stations, flowcharts, models, slide identification, lab reports, case scenarios may be used to cover knowledge component of the content.
- Observed station: Performance of skills /procedures is observed by assessor
- Interactive: Examiner/s ask questions related to the task within the time allocated.
- In Rest station, students in the given time not given any specific task but wait to move to the following station.

**Internal Evaluation**

- Students will be assessed comprehensively through multiple methods.
- 20% marks of internal evaluation will be added to JSMU final exam. That 20% may include class tests, assignment, practicals and the internal exam which will all have specific marks allocation.

**Formative Assessment**

Individual department may hold quiz or short answer questions to help students assess their own learning.

The marks obtained are not included in the internal evaluation

**For JSMU Examination Policy, please consult JSMU website!**

**More than 75% attendance is needed  
to sit for the internal and final  
examinations**

**LNMC EXAMINATION RULES & REGULATIONS**

- Student must report to examination hall/venue, 30 minutes before the exam.
- **Exam will begin sharp at the given time.**
- No student will be allowed to enter the examination hall after 15 minutes of scheduled examination time.
- Students must sit according to their roll numbers mentioned on the seats.
- **Cell phones are strictly not allowed in examination hall.**
- If any student is found with cell phone in any mode (silent, switched off or on) he/she will be not be allowed to continue their exam.
- No students will be allowed to sit in exam without University Admit Card, LNMC College ID Card and Lab Coat
- Student must bring the following stationary items for the exam: Pen, Pencil, Eraser, and Sharpener.
- Indiscipline in the exam hall/venue is not acceptable. Students must not possess any written material or communicate with their fellow students.

**SCHEDULE:**

WEEKS	1 <sup>ST</sup> YEAR	MONTH
WEEK 1	FOUNDATION MODULE	3 <sup>rd</sup> Feb 2020
WEEK 2		
WEEK 3		
WEEK 4		
WEEK 5		
WEEK 6		13 <sup>th</sup> March 2020
WEEK 1	BLOOD MODULE	6 <sup>th</sup> April 2020
WEEK 2		
WEEK 3		
WEEK 4		
WEEK 5		
WEEK 6		11 <sup>th</sup> May 2020
WEEK 1	RESPIRATORY MODULE - I	30 <sup>th</sup> May 2020
WEEK 2		
WEEK 3		
WEEK 4		19 <sup>th</sup> June 2020
WEEK 1	CARDIOVASCULAR SYSTEM MODULE - I	3 <sup>rd</sup> July 2020
WEEK 2		
WEEK 3		
WEEK 4		25 <sup>th</sup> July 2020

\*Final dates will be announced later