School of Pharmacy
MPharm Keyword Search
Levels 1-4
Linked maps
Morphology, Structure and Reproduction of Fungi
Mycology, fungus, eukaryotic, taxonomy, deuteromycetes, mycotoxins, infection, allergic reaction, morphology, unicellular, yeast, multicellular, mould, dimorphism, fungal cell structure, nucleus, fungal cell membrane, ergosterol, mitochondrion/mitochondria, fungal cell wall, polysaccharide, glucan, chitin, Mannans, proteins, polypeptides, lipids, budding, bud scar, birth scar, pseudohyphae, vegetative hyphae, fertile/reproductive hyphae, sexual spore, asexual spore, mycelium, septate, non-septate (coenocytic), vegetative growth, asexual (anamorphic) reproduction, sporangiospore, conidium/conidia, chlamydospore, basidium, sterigmata, sporangium/sporangia, Rhizopus, Mucor, blastic conidia, thallic conidia, Aspergillus, Penicillium, Trichophyton, microscopy, inoculation, ELISA, PCR, sexual (teleomorphic reproduction), zygospore, pathogenic, superficial mycoses, dermatophytes, tinea, Candida albicans, thrush, systemic mycoses, Coccidioides immitis, Histoplasma capsulatum, Cryptococcus neoformans, antifungal drugs, target

Morphology, Structure and Reproduction of Viruses
Virus, akaryotic, Human Immunodeficiency Virus (HIV), viral infection, transmission, inhalation, size, nucleic acid, metabolic capabilities, viral particles, pox virus, polio virus, electron microscopy, influenza, bacteriophage, tobacco mosaic virus (TMV), Ebola, DNA, RNA, obligate intracellular parasite, protein coat, capsid, nucleocapsid, capsomere, helical symmetry, icosahedral symmetry, lipid envelope, complex structure, viral protein, glycoprotein, viral attachment protein, infection, replication, recognition, host specificity, attachment, tropism, penetration, endocytosis, viropexis, uncoating, translation, genome, transcription, messenger RNA (mRNA), macromolecular synthesis, RNA polymerase, retrovirus, reverse transcriptase, maturation, assembly, release, lysis, budding, neuraminidase, infection (silent, abortive, lytic, persistent), transforming/immortalisation (immortalization) of cell, virulent, temperate, cultivation, experimental animal, embryonated egg, tissue culture, prion, spongiform encephalopathy, Creutzfeldt-Jacob Disease (CJD), kuru, spongiform encephalitis, scrapie, Chlamydia, Rickettsia

Disinfection
Healthcare-associated infection, hygiene, disinfection, disinfectant activity, hospital-acquired infections (HAIs), nosocomial infections, community-acquired infections (CAIs), Staphylococcus aureus, Meticillin-resistant Staphylococcus aureus (MRSA), Clostridium difficile, glycopeptide-resistant enterococci (GRE), vancomycin-resistant enterococci (VRE), environment, behaviour, handwashing, hand hygiene, sterilisation/sterilization, antisepsis, antiseptic, aseptic, preservation, preservative, stasis, static, cidal, kinetics, decimal reduction time (D value), inactivation, neutralisation/neutralization, dilution, quenching, high level disinfection, intermediate level disinfection, low level disinfection, vegetative bacteria, Mycobacterium tuberculosis, bacterial spores, viruses, fungi, prions, disinfection policies, sterilisation/sterilization, equipment disinfection, high risk items, liquid chemical disinfectant, intermediate risk items, low risk items, cleaning, hypochlorite/halogen, available chlorine, aldehyde, phenol, quaternary ammonium compound, biguanide, diguanide, toxic, stability, corrosive, temperature, pH, concentration, temperature coefficient, concentration exponent, coefficient of dilution, ionisation/ionization, pKa, divalent cations, organic matter, formulation, compatibility, adsorption isotherm, S pattern, Langmuir Pattern, High Affinity Pattern, Constant Partitioning Pattern, hypochlorite degradation, decomposition (spontaneous, photochemical, catalytic), aldehyde polymerisation/polymerization

Protozoa and Helminths
Parasite, parasitic, host, protozoa, helminth, infection, infestation, phagocytosis, periplast, pellicle, endoplasm, ectoplasm, amoeba, sporozoan, flagellate, Giardia Lamblia,
Leishmania, Trichomonas vaginalis, malaria, life cycle, asexual, schizogeny, sexual, sporogeny, female anopheline mosquito, Plasmodium falciparum, Plasmodium vivax, Plasmodium ovale, Plasmodium malariae, endemic, sporozoite, merozoite, gametocyte, zygote, symptoms of malaria, 4-aminoquinolone, chloroquine, hydroxychloroquine, primaquine, mefloquine, biguanide, proguanil, atovaquone, Malarone, diaminopyrimidine, pyrimethamine, sulphonamide, sulphone, nematode, roundworm, platyhelminth, trematode, fluke, cestode, tapeworm, Taenia saginata, Taenia solium, larvae, scolex, proglottid, strobila, cyst, threadworm, pinworm, Enterobius vermicularis, anthelminthic, mebendazole, piperazine, pyrantel, niclosamide

Cell biology 1: Structure and function of bacterial cell components
Bacterial cell structure, peptidoglycan, Gram positive, gram negative, cell wall, Cytoplasmic membrane, plasma membrane, cell membrane, selective permeability, Chromosome, Ribosomes, Plasmids, Cytoplasm, cytosol, bacterial metabolism, 50S and 30S subunits, protein synthesis, extrachromosomal DNA, antibiotic resistance, Capsule, Glycocalyx, phagocytic engulfment, adherence, Flagella, flagellum, Plorus, Fimbria, pili, fimbriae, conjugation, pili-mediated adhesion

Cell biology 2: The cytoplasmic membrane
Phospholipid bilayer, proteins, Phospholipids, carbon glycerol backbone, polar group, hydrophilic, hydrophobic, phosphate, Membrane Proteins, Amphipathic proteins, Membrane stabilisation, Hydrophobic interactions, Hydrogen bonds, Ionic interactions, selectively permeable, Simple diffusion, passive diffusion, Osmosis, Transport proteins, Transporters, carrier proteins, uniporter, antiporter, symporter, Group Translocation, phosphotransferase system, Disinfectants, Chlorhexidine, Antibiotics, Polymyxin, Amphotericin

Cell biology 3: The outer membrane (Gram negative bacteria)

Bacterial Genetics 1
Amino acids, proteins, R group, amino group, carboxyl group, peptide, polypeptide, peptide bond, protein primary structure, protein secondary structure, alpha helix, pleated sheet, protein tertiary structure, protein quaternary structure, deoxyribonucleic acid, DNA, double helix, deoxyribose, nitrogenous bases, adenine, guanine, cytosine, thymine, phosphate group, purines, pyrimidines, Base pairing, Ribonucleic Acid, RNA, ribose, uracil, single stranded, messenger RNA, mRNA, transfer RNA, tRNA, ribosomal RNA, rRNA, gene, Chromosome, supercoiling, DNA gyrase, DNA topoisomerases, DNA replication, protein synthesis, transcription, translation, codon, anticodon

Bacterial genetics 2: genetic variation and exchange
Genetic code, Mutation, Horizontal Gene transfer, Spontaneous mutation, induced mutation, Point mutations, frameshift mutations, missense mutation, nonsense mutation, sense mutation, silent mutation, insertion, deletion, Conjugation, Transduction, Transformation, Transposition, genetic recombination. Conjugation pilus, sex pilus, F plasmid, Fertility plasmid, bacteriophage, phage, transposable elements, transposons, Insertion sequences, jumping genes, Bacterial genome
Report writing workshop
laboratory report writing, communication, data presentation

Computer practical
statistics, graph, computer, Excel

Introduction to Pharmaceutical Microbiology
Microbiology, Pharmaceutical Microbiology, Infection, Infectious Diseases, Sterilisation, Contamination, Contamination control, pathogens, antimicrobial, antibiotic, biofilms, bacteria, fungi, virus, metabolism, molecular biology

Morphology, Structure & Reproduction of Bacteria
Prokaryote, eukaryote, taxonomy, nomenclature, pathogen, cell biology, macromolecular biosynthesis, metabolism, bacteria, archaea, haploid, nucleoid, virulence, virulence factors, binomial taxonomy, cocci, bacilli, streptococci, staphylococci, rods, inclusion granule, parasite, pathogen, opportunistic pathogen, disease, commensal, ribosome, cell wall, cell membrane, phospholipid, bacterial cell wall, peptidoglycan, Gram positive, Gram negative, crosslinking cell wall, penicillin, beta lactam, lipopolysaccharide, pyrogen, periplasm, diffusion, osmosis, Gram stain, flagella, pili, capsule, slime, fimbriae, DVLO theory, surface attachment, genetic exchange, transformation, transduction, conjugation, bacteriophage, generation time, growth curve, binary fission, lag phase, log phase, stationary phase, batch culture, growth cycle, morphogenesis, sporulation, endospore, cortex, resistance

Bacterial Growth & Metabolism
Free Energy, Adenosine Triphosphate (ATP), Adenosine Diphosphate (ADP), nucleotide, phosphoanhydride bond, energy donor, aerobe, anaerobe, autotroph, heterotroph, facultative, selective media, differential media, IMVIC Test, Koch's Postulates, Germ theory of disease, psychrophile, mesophile, thermophile, extremophile, TAQ polymerase, PCR, pH, H. pylori, acidophile, alkalophile, Water Activity (Aw), Halophile, Osmophile, cyanobacteria, embden mayerhoff pathway, aerobic respiration, anaerobic respiration, krebs cycle, citrate/TCA cycle, enzymes, alloenzyme, cofactors, flavin, flavoprotein, FADH2, NADH, NADPH, electron transport chain, mode of action of antibiotics, minimum inhibitory concentration (MIC), minimum bactericidal concentration (MBC)

Microbial Biofilms
Infection, Infectious Diseases, pathogens, antimicrobial, antibiotic, biofilms, bacteria, fungi, planktonic, sessile, Koch's Postulates, Antimicrobial Susceptibility, MIC, MBC, biocide, tolerance, resistance, biofilm growth cycle, glycocalyx, exopolysaccharide, miucoid, slime, tolerance mechanisms, quorum sensing, chronic infection, persister cells, genetic diversity, hypermutation, insurance hypothesis, nosocomial infection, device-associated infection, commensal, minimum biofilm eradication concentration (MBEC), Calgary Biofilm Device (CBD), CDC Biofilm Reactor, Continuous Flow model

Infectious Diseases
Pathogen, Host-Parasite Relationship, Commensal, Symbiont, Symbiosis, Mutualism, Pathogenic, Normal flora, microbial flora, sterile, colonisation, colonisation resistance, proliferation, bacteriocins, immunocompromised, strict pathogen, facultative pathogen, opportunistic apthogen, clinical infection, sub-clinical infection, latent infection, pathogenicity, Koch's Postulates, Virulence, virulenc factor, toxin, Lipopolysaccharide (LPS), source of infection, transmission, Zoonose, Fecal-Oral Route, Tuberculosis, HIV/AIDS, Portals of Entry, Skin, Mucous Membranes, Respiratory Tract, Mucociliary
Escalator, invasion, GI Tract, Urogenital Tract, endotoxin, immunogenicity, inflammatory response, Lipid A, Pyrogen, Pyresis, Meningitis, Neisseria meningitidis, influenza, antibiotics

**Sterilisation**
Microbiology, Pharmaceutical Microbiology, Sterilisation, Contamination, Contamination control, bacteria, fungi, virus, metabolism, sterilisation, sterilisation processes, logarithmic order of death, D-value, decimal reduction time, bioburden, spore, vegetative bacteria, rate of kill, Thermal sterilisation process, moist heat sterilisation, Aw, heat inactivation, Dry heat sterilisation, saturated steam, sensible heat, latent heat, superheating, autoclave, Cold Sterilisation, Gaseous sterilisation, ethylene oxide, formaldehyde, relative humidity, Radiation sterilisation, Filtration sterilisation, laminar air flow cabinet, HEPA Filter, BP Sterility Test, Physical Controls, biological Controls, Chemical Indicators

**Pharmaceutical Microbiology Practical Course**
Aseptic technique, microscopy, skill development, oral skills, group work, isolation of bacteria, Gram Stain, identification of microorganisms, serial dilution, sub-culture, bacteriological loop, Miles & Misra plate count, spread plate, seeded plate, agar, brith, media, streak plate, membrane filtration, enumeration, total cell count, colony forming units, bacterial growth curves, determination of generation time, log phase, lag phase, stationary phase, bacteriostatic determinations, broth dilution, zone of inhibition, agar dilution, breakpoint, resistant, sensitive, antibiotic, disinfectant, sporocidal, viable count, differential media, IMVIC test, sterilisation, Microbiology, Pharmaceutical Microbiology, Infection, Infectious Diseases, Sterilisation, Contamination, Contamination control, pathogens, antimicrobial, antibiotic, biofilms, bacteria, fungi
Membrane Potentials and Action Potentials
Membrane Potentials, action potentials, nerve, excitable cells, central nervous system, peripheral nervous system, resting membrane potential, potassium ions, sodium ions, Nernst equation, conductance, Na+-K+ pump, Passive/leak channels, voltage-gated channel, chemically regulated channel, mechanically regulated channel, graded potential, depolarizing, hyperpolarizing, presynaptic, postsynaptic, IPSP, EPSP, summation, refractory period, propagation, myelination, unmyelinated, axon, salutatory conduction, schwann cell, conduction velocity, node of Ranvier

Synaptic and neuromuscular transmission
Neurotransmission, neuromuscular transmission, synaptic transmission, neurotransmitters, neuromuscular junction, action potential, post-synaptic, presynaptic, receptor, second messenger, calcium, G- protein, presynaptic modulation, acetylcholine, noradrenaline, peptides, autoinhibition, neuromuscular junction, motor end plate, nicotinic receptor, miniature end plate potential, summation, acetylcholinesterase, neuromuscular block, myasthenia gravis

Skeletal muscle contraction
Skeletal muscle contraction, Sliding filaments, cross-bridging, excitation-contraction coupling Fibre types, fibre twitch characteristics, sarcoplasmic reticulum, T-tubule, thick filament, thin filament, mitochondria, Z line, M line, I band A band, actin, tropomyosin, troponin, myosin, myosin head, calcium, striated muscle, sarcomere, active site, ATP, ADP phosphorous, tetany, fast fibre, slow fibre, type I fibre, type IIa fibre, type IIb fibre, motor unit, motor neurone, size principle

Structure of the central nervous system
central nervous system, CNS, peripheral nervous system, afferent, efferent, autonomic nervous system, parasympathetic nervous system, sympathetic nervous system, embryological development, forebrain, midbrain, hindbrain, neural tube, grey matter, cerebral cortex, cerebral hemispheres, frontal, temporal, parietal, occipital, corpus callosum, sulcus, post central sulcus, lobe, meninges, subdural, subarachnoid, ventricle, cerebrospinal fluid, choroid plexus, cerebral, consciousness, primary sensory cortex, sensation, occipital lobe, visual cortex, frontal lobe, gustatory cortex, temporal, auditory cortex, olfactory cortex, association area, Wernicke’s area, Broca’s area basal nuclei, substantia nigra, limbic system, midbrain, cerebellum, medulla oblongata, spinal chord, grey matter, white matter, dorsal horn

Spinal reflexes
Spinal reflex, afferent sensory feedback, Golgi tendon organs, spinal cord, cerebellum, cerebral cortex, reflex arc, modified reflex, motor nerve, sensory nerve, sensory receptor, motoneurone, stretch reflex, monosynaptic reflex, muscle spindle, Inhibitory interneurone, crossed extensor reflex, motor control

Control of Posture and Movement
motor pathways, cortical association areas, cerebellum, basal ganglia, premotor & motor cortex, motor cortex, corticospinal tracts, homulcular man, rubrospinal tract, vestibulospinal tract, reticular formation, pyramidal, extrapyramidal, Cerebellum, basal ganglia, lower motor neurone lesions, spinal injury, upper motor lesions

Ascending sensory pathways & pain
somatosensory perception, somatosensory cortex, touch, temperature, joint position, proprioception, pain, first order neurone, second order neurone, cerebral cortex
ascending tract, third order neurone, nerve conduction velocity, muscle spindle, golgi, tendon organ, touch sensor, pressure sensor, temperature sensor, spinohalmic tract, dorsal column, somatosensory cortex, dermatomes, pain, pain receptors, Somatic pain, visceral pain, referred pain, Fast pain, slow pain, itch, nociceptor, central pathways in pain perception, pain sensitization, pain gating, limbic system, analgesia

**Somatic senses**
General principles of sensation, receptor types, receptor coding, mechanoreceptors, chemoreceptors, thermoreceptors, nociceptors, sensory transduction, pain, temperature, touch, pressure, vibration, proprioception, Sensory specificity, Sensory modality, receptive field, receptive field, receptor potential, phasic response, tonic response, tactile receptor, proprioceptors, baroreceptors, nerve classification

**The autonomic nervous system**
autonomic nervous system sympathetic nervous system, parasympathetic nervous system, autonomic reflex arc, fight or flight, preganglionic nerve, postganglionic nerve, sympathetic ganglia, adrenal medulla, adrenaline, noradrenaline, acetylcholine, neurotransmitter, neuroeffector junction, varicosity, autonomic reflex arc, enteric nervous system

**Smooth muscle**
Blood vessel, gastro-intestinal tract, urinary tract, reproductive system, respiratory system, Iris and ciliary muscle, calcium, sarcoplasmic reticulum, myosin light chain kinase, calmodulin, G-protein-coupled receptor,

**Blood brain barrier, hypothyalmus, temperature control**
Blood blood barrier, hypothalamus, temperature control, tight junction, pericyte, astrocyte, vegetative function, Gastrointesinal & feeding regulation, Cardiovascular regulation, hypothalamic defence area, Regulation of body water, Control of hypophysiotrophic hormones, core temperature, set point, temperature receptors, heat loss, heat gain, fever, pyrogen

**Introduction to Endocrine System**
Definition of hormone, cell to cell communication, endocrine, paracrine, neuroendocrine and neural communication, mechanism of action of hormones, hypothalamus, pituitary, thyroid parathyroid, pancreas, adrenals testes, ovaries. Hypothalamic control of hormone release (hypothalamo/pituitary/endocrine axis)

**Pituitary gland**
Structure of the pituitary, anterior, posterior pituitary, adenohypophysis, neurohypophysis, neuroendocrine control of posterior pituitary hormones (ADH and oxytocin), releasing hormone control of anterior pituitary hormones (ACTH, TSH, Prolactin, Growth hormone, FSH and LH), deficiency and oversecretion states (pan hypopituitarism, pituitary dwarf, acromegaly, gigantism diabetes insipidus).

**Thyroid Hormones**
Regulation of human metabolism, thyroxine, T3 and T4 biosynthesis, control of secretion of T3 and T4 via hypothalamo/pituitary/thyroid axis, Transport and binding of T3 and T4 with TBG and TBPA, mechanism of action of T3 and T4, effects of T3 and T4, hyperthyroidism, myxodema, goiter.

**Adrenal hormones**
Regulation of human metabolism, Adrenal gland, adrenal cortex, adrenal medulla, glucocorticoids (cortisol, corticosterone, cortisone), mineralocorticoids (aldosterone), and adrenal androgens, biosynthesis, control and effects of glucocorticoids, stress and glucocorticoids, , control of mineralocorticoid release, mineralocorticoid effects, adrenal androgens, cushings disease, addisons disease.

Control of blood glucose
Control of blood glucose. Fed and fasting states. Glucose lowering and raising reactions, release and effects of hormones that raise blood glucose (glucagon, growth hormone, catecholamines, glucocorticoids), release and effects of hormones that lower blood glucose(insulin), diabetes mellitus, type I and type II, animal models of disease

Control of blood calcium
Regulation of ECF calcium concentration, bone as a calcium reservoir, readily available calcium in bone, parathormone and vitamin D release and effects, calcitonin release and effects, hypocalcaemia, and hypercalcaemia

Male reproductive organs
Primary and secondary male reproductive organs, testes, scrotum, epididymis, seminal vesicle, prostate, bulbourethral glands, spermatogenesis, spermiogenesis, meiosis, stages in spermatogenesis and spermiogenesis, capacitation, penis, hormonal control of male reproductive function, effects of androgens on male secondary sexual characteristics, brain/testicular axis

Female reproductive organs
Female primary and secondary sexual organs, uterus, endometrium myometrium, ovaries, fallopian tubes, cervix, vagina, clitoris, perineum, vulva, oogenesis, meiosis I and II, Primordial follicle, secondary follicle, tertiary follicle (Graafian follicle), corpus luteum, endocrine control of female reproductive function, progesterone, oestrogen, estrogen, functional layer and basilar layer of endometium, uterine cycle, ovarian cycle, menstrual cycle, menses, proliferative phase and maintenance phase of menstrual cycle.

Local Anaesthesia
Anaesthesia, anesthesia, ion channel, voltage-gated, sodium, molecular target, membrane, lipid, hydrophobic, hydrophilic, amphipathic, chemical structure, nerve, pH, pKa, block, epidural, spinal, sympathetic, drug, side-effect, adverse effect, action potential, axon, voltage-clamp, Hodgkin and Huxley, site of action, inactivation, depolarisation, fiber type, fibre type, autonomic, sensory, motor, pain, threshold, diameter, safety factor, myelin, myelinated, Node of Ranvier, Schwann cell, electrotonic, frequency dependent, ester, amide, receptor, mechanism

General anaesthesia
Anaesthesia, anesthesia, drug, side-effect, minimum alveolar concentration (MAC), partition coefficient, adjunct, consciousness, unconsciousness, molecular target, surgery, analgesia, amnesia, muscle relaxation, autonomic, cardiovascular, motor, hormonal, inhalational, volatile, gas, intravenous, solubility, toxicity, chemoreceptor, malignant hyperthermia, ryanodine receptor, receptor, induction, recovery, barbiturate, benzodiazepine, opioid, mechanism, Meyer-Overton, hydrophobicity, membrane, lipid, stereoselectivity, hydrophobic pocket, ion channel, ligand

Vision
Eye, lens, pupil, aqueous humor, vitreous humor, cornea, fovea centralis, optic nerve, optic disk, ciliary body, suspensory ligaments, iris, refraction, distant vision, close vision, accommodation, cycloplegia, sympathetic, parasympathetic, convergence, near response, edge effects, pupillary constriction, pupillary dilation, radial muscles, circular muscles, depth perception, stereoscopic vision, pupillary light reflex, consensual light reflex, mydriasis, mydriatic, rod, cone, rhodopsin, occipital cortex, pretectal nucleus, superior colliculus

**Hearing and Balance**
Ear, tympanic membrane, auricle, pinna, semicircular canals, malleus, incus, stapes, utricle, saccule, cochlea, vestibulocochlear nerve, oval window, round window, auditory tube, Eustachian tube, external auditory meatus, signal transduction, frequency, hertz, decibels, ossicular conduction, bone conduction, auditory ossicles, scala vestibule, scala tympani, cochlear duct, basilar membrane, tectorial membrane, endolymph, place principal, deafness, ototoxic, cochlear nucleus, superior olivary nucleus, inferior colliculus, thalamus, auditory cortex, static equilibrium, dynamic equilibrium, hair cells, cerebellum, vestibular nucleus, pons, crista ampullaris, macula

**Taste and smell**
Tongue papillae, taste buds, taste hairs, saliva, salty, sweet, sour, bitter, umami, facial nerve (VII) glosopharyngeal nerve (IX) medulla oblongata, hypothalamus, amygdala, thalamus, gustatory cortex, gestation, frontal lobe, olfaction, olfactory cells, olfactory bulbs, olfactory cortex, temporal lobe, hippocampus

**Fluids and electrolytes**
Total body water, intracellular fluid volume, extracellular fluid volume, plasma volume, indicator dilution, sodium, potassium, chloride, bicarbonate, urea, glucose, protein anions, osmolarity, osmolality, colloid osmotic pressure, semipermeable membranes, capillary membranes, cell membranes, homeostasis

**Glomerular filtration and renal plasma flow**
Cortex of kidney, medulla of kidney, glomeruli, proximal convoluted tubules, distal convoluted tubules, loop of Henle, collecting ducts, afferent arterioles, efferent arterioles, vasa recta, glomerular capillaries, peritubular capillaries, filtration, reabsorption, secretion, excretion, renal clearance, glomerular filtration rate, glomerular filtration pressures, inulin, creatinine, renal plasma flow rate, para-amino-hippuric acid

**Tubular function**
Transport mechanisms, passive diffusion, facilitated diffusion, active transport, secondary active transport, symport, antiport, pinocytosis, osmosis, segmental functions of tubules, tubulo-glomerular feedback, juxtaglomerular apparatus, countercurrent multiplier

**Pathophysiologies**
Functions of kidneys, excretion of waste, regulation of body fluids and electrolytes, endocrine, erythropoietin, active vitamin D, calcium, acute renal failure, chronic renal failure, micturition, neurotransmitters, blockers, spinal cord/nerve damage.

**Salt and water regulation**
Negative feedback, glomerulo-tubular balance, osmolarity, osmoreceptors in hypothalamus, antidiuretic hormone, water permeability, renin-angiotensin-aldosterone, atrial natriuretic peptide, volume receptors, sodium/potassium ATPase
**pH regulation**
Buffers, respiratory compensation, renal compensation, hydrogen, bicarbonate, phosphate, ammonia, acidosis/alkalosis/ acute/ chronic/respiratory/metabolic/mixed

**Excretion of water and solutes**
Excretion of water and solutes, urine, diuretic, aldosterone, ADH,

**Contractile properties of skeletal muscle**
skeletal muscle, contraction, threshold, tetany, length-tension relationship, sliding filament, passive tension, active tension

**Electrical properties of frog sciatic nerve**
compound action potential, ‘all-or-none’ response, refractory period, conduction velocity, local anaesthetic

**Electromyography**
Conduction velocity, reflex, afferent, efferent, sensory nerve

**Hearing and balance**
Hearing, balance, audiometer, nerve deafness, conductive deafness, hearing loss, vestibular apparatus, balance, nystagmus

**Vision**
Vision, visual system, depth of focus, pupillary responses, visual acuity, colour defects, ophthalmic examination, retina, fovea, binocular vision, blind spot
PMY1003
Medicines from Concept to Clinic
Community Pharmacy
Community Pharmacy, patient safety, pre-reg, pre-registration, pharmacy representative bodies, Pharmacy services, minor ailments service, smoking cessation, repeat dispensing, independent pharmacy, multiple pharmacies, legal category, prescription

Genetically Engineered Drugs
Need for recombinant drugs; Synthesis of recombinant drugs; recombinant DNA technology; plasmids; DNA-RNA-Protein; restriction digests; restriction enzymes; DNA ligase; large scale production; hormones; cytokines; platelet derived growth factor; Regranex; recombinant antibodies; licensed antibodies; Herceptin

Routes of administration
Drug, medicine, therapeutic, medication, route, drug delivery, administration, absorption, site of action, oral, peroral, parenteral, injection, enteral, mucosal, transmucosal, mucosa, nasal, nose, pulmonary, lung, buccal, vaginal, rectal, intravenous, intramuscular, intrarterial, intraperitoneal, intracadiac, subcutaneous, transdermal, percutaneous, skin, particle size, molecular weight, particle charge, paracellular pathway, transcellular pathway, hydrophobicity, hydrophilicity, lipophilic, hydrophilic, logP, pKa, pH

Physicochemical Aspects of Drugs
physicochemical, drug, molecular size, volume, solubility, pH, lipophilicity, partition coefficient, polymorphism, stability, pKa, ionisation, ionization, pH-partition theory, cell membrane, fluid mosaic model, phospholipid, absorption, diffusion, tight junction, transport pathway, tranacellular, paracellular, transdermal, epithelial, epithelium, Lipinski, salt, ester, particle size, amorphous, clindamycin, pseudoephedrine, dissolution rate, crystalline, X-ray diffraction, Henderson-Hasslebalch, octanol, immiscible, passive diffusion, concentration gradient, logP, activity, benzocaine, caffeine, bromocriptine, phenytoin, sulfathizole, polymorph, melting point, hydrolysis, aspirin, lactam, oxidation,

Supplementary and independent prescribing
Pharmacist prescribing, non-medical prescribing, government policy, supplementary prescribing, independent prescribing, legislation, NICPLD, skills, reflective practitioners, patients, chronic disease states, pharmacist independent prescribers, healthcare professionals, clinical management plans, regulation, monitoring, COPD, inhaled medicines, peak flow, inhaled medication, corticosteroids, antibiotics, clinical response, referral

Role of the Pharmacist in Diabetes
Aetiology, Clinical pathology, Type 1 diabetes mellitus, Type 2 diabetes mellitus, diabetes, pharmacist role, insulin, glucose, Heart disease, Renal failure, Blindness, Foot problems, insulin deficiency, symptoms, hyperglycaemia, risk factors, Long term complications, Retinopathy, Nephropathy, Neuropathy, heart attack, stroke, Subcutaneous injection, injection devices, Patient identification/screening, Patient assessment, Patient education, Patient referral, Monitoring diabetes care, Pharmaceutical care plan, compliance,

Formulation of Drugs
Oral drug delivery, capsules, tablets, pharmaceutical excipients, routes of administration, gastrointestinal structure, drug dissolution, drug absorption, therapeutic range, minimum effective concentration, maximum safe concentration, tablet manufacture, diluent, binder, lubricant, tablet press.
ADME
ADME, absorption, distribution, metabolism, excretion, elimination, gastro-intestinal tract (GIT), pH, first pass effect, clearance, half-life, volume of distribution, CYP, cytochrome P450, liver, kidney, lungs, lipid solubility, pharmacokinetics, blood-brain barrier, prodrug, glomerular filtration, route of administration, oral, sub-cutaneous, intra-muscular, intra-venous, inhalation, topical, systemic, parenteral, bioavailability, loperamide, P-glycoprotein

Drugs from Natural Products
Natural Products, Metabolites, Case Studies (Morphine, Aspirin, Quinine, Penicillin, Taxol, Ephedrine, Artemisinin)

Formulation of Drugs
Pharmaceutics, drugs, physicochemical, tablets, capsules, gels, creams, ointments, solutions, suspensions, suppositories, pessaries, injections, inhalers

Quality of Medicines
Pharmacopoeial standards, industry, regulation, British Pharmacopoeia, good manufacturing practice, patients

Man-made drugs
synthetic drugs, natural products, medicine, development, drug discovery, combinatorial chemistry, organic chemistry, synthetic chemistry, drug design, alkaloids, opiates, morphine, codeine, salicylates, willow bark, poppy, aspirin, cocaine, heroin, chemical reaction, isolation, purification, chromatography, structure, structure determination, biological activity, structure activity relationships, crystallisation, distillation, extraction, freeze drying, melting point, boiling point, infrared spectroscopy, vibrational spectroscopy, functional groups, mass spectrometry, elemental analysis, molecular formula, nuclear magnetic resonance, NMR, molecular connectivity, X-ray crystallography, screening, analogues, side effects, dosage form, structural variation, penicillin, ampicillin, methicillin, oxycodone, dihydromorphone, hydrocodone, combinatorial library

Industrial pharmacy
Drug Synthesis, Drug Testing, Formulation, Pharmaceutical Analysis, Quality Control/Assurance, Shelf-Life, Clinical Trials, Regulatory Affairs

Supplementary and independent prescribing
Pharmacist prescribing, non-medical prescribing, government policy, supplementary prescribing, independent prescribing, legislation, NICPLD, skills, reflective practitioners, patients, chronic disease states, pharmacist independent prescribers, healthcare professionals, clinical management plans, regulation, monitoring, COPD, inhaled medicines, peak flow, inhaled medication, corticosteroids, antibiotics, clinical response, referral

Pharmacy in Practice: Hospital Pharmacy
Variety, dispensary, clinical checking, counselling, stock management, clinical, ward, medication history, counselling, monitoring, ward rounds, audit, guidelines, clinical speciality, aseptic, sterile, Parenteral nutrition, Centralised Intravenous Additive Service, eye preparations, Medicines Information, drug-related queries, Radiopharmacy, radioactive injections, Quality assurance, medical gas testing, aseptic suite monitoring, unlicensed medicines, Procurement, tendering, formulary, evidence-base, cost, clinical trials, documentation, Interface, red, amber, Medicines governance, risk, medication
errors, incident forms, Teacher-Practitioner, students, university, teaching, Management, Consultant pharmacist, Pharmacist prescribing.
Blood composition & typing
Composition of blood, blood types, red blood cells, white blood cells, formed elements, plasma, clotting factors, haematocrit, plasma proteins, albumin, globulins, fibrinogen, colloid osmotic pressure, pH buffering, blood clotting, erythropoesis, haemopoesis, vitamin B12, folate, oxygen transport, haemoglobin, surface antigen, rhesus, antibodies, blood typing, agglutination, haemolysis, coagulation, haemolytic disease of the newborn, cross matching, pathogens, neutrophils, eosinophils, basophils, monocytes

Immunity and haemostasis
Immunity, haemostasis, non–specific defenses, specific defenses, skin, epidermis, bactericides, lysozymes, mucus, acid, phagocytes, surveillance, natural killer cells, compliment, inflammation, interferon, fever, pyrogen, cell-mediated immunity, antibody mediated immunity, T cells, B cells, memory cells, suppressor T cells, helper T cells, HIV, cytokines, plasma cells, vaccination, passive immunity, lymphatic system, lymph, lymphoid organs, lymph vessel, lymph node, appendix, tonsils, spleen, thymus, vascular phase, platelet phase, platelet, platelet aggregation, coagulation, clotting factors, extrinsic path, intrinsic path, common path, fibrin, clot retraction, tissue plasminogen activator, anaemia, immunodeficiency disease, haemophilia, thrombi, emboli, streptokinase

Haemoglobin and osmosis
Haemoglobin and osmosis, osmotic lysis, erythrocyte sedimentation rate, primary indices, Haemoglobin content, packed cell volume, haematocrit, secondary indices, mean corpuscular haemoglobin concentration, mean corpuscular haemoglobin, anaemia

Molecular biology
Molecular biology, introduction to cell biology, reticulum, cell division, mitochondria, organelles, eukaryotic, prokaryotic, gene cloning, mRNA, DNA, cDNA library

Observations on blood groups, bleeding and clotting
blood groups, bleeding, clotting, agglutination, coagulation, ABO and Rhesus systems, bleeding time, clotting time, clot formation

Responses of intestinal smooth muscle
smooth muscle, acetylcholine, muscarinic receptors, adrenaline, agonist, antagonist, dose-response curve

Properties of heart muscle
heart muscle, origin of the heart beat, autonomic neuro-transmitters, sinus node atrioventricular nerve, all or none law, pacemaker, Staniu ligature, heart rate, complete heart block

Human arterial and venous blood pressures
Arterial blood pressure, venous blood pressure, pressure cuff, sphygmomanometer, pulse, systolic, diastolic, Korotkoff sounds, venous valves, muscle pump, jugular venous pressure

Carbon dioxide content of alveolar air
Carbon dioxide content of alveolar air, hyperventilation, hypoventilation, hypercapnia, hypocapnia, pH, chemoreceptors

Respiratory function tests
Respiratory function tests, vital capacity, forced expiratory volume, peak flow
Building blocks of cells and tissues
structure, acid, base, isomers, amino acid, genes, proteins, carbohydrates, fatty acids, nucleotides, alpha carbon, amino, carboxyl, ionic, zwitterion, ampholyte, pH, pKa, titration, non polar, uncharged polar, charged polar, glycine, alanine, isoleucine, valine, threonine, serine, aspartic acid, lysine, arginine, leucine, methionine, phenylalanine, tryptophan, tyrosine, glutamic acid, glutamine, asparagine, cysteine, serine, proline, essential amino acids

Peptides and proteins
peptide bond, rotation, structure, peptide, polypeptide, protein, condensation, cis, trans, free rotation, planar bond, aliphatic, hydroxyl, post-translational modifications, phosphorylation, hydrogen bond, sulphur, disulphide bridge, disulfide bridge, imino acid, catalysis, enzyme, aromatic, hydrophilic, hydrophobic, histamine, dopamine

Protein Structure and Function
structure, primary, secondary, tertiary, quaternary, alpha helix, beta sheet, parallel, anti-parallel, beta bend, alpha carbon, amino acids, backbone hydrogen bonding, topology, Van der Waals, charge interactions, hydrophobic effects, thermodynamics, entropy, conformation, chaperones, cleavage, post-translational modification, acetylation, phosphorylation, haemoglobin

Lipids and Membranes
lipids, biological membranes, plasma membrane, biomolecules, polar, fatty acids, triacylglycerols, glycerophospholipids, sphingolipids, cholesterol, long chain hydrocarbons, saturated fatty acids, unsaturated fatty acids, triester glycerol, micelle, lipid bilayer, gel like solid, phase transition, fluid mosaic model, membrane integral proteins, peripheral proteins, lipid anchored protein, ion pores, receptors,

Architecture of cells
organelles, prokaryotes, eukaryotes, compartmentalisation, compartmentization, nuclear envelope, endoplasmic reticulum, golgi apparatus, lysosome, perixosome, mitochondrion, mitochondria, actin filaments, microtubules, nucleus, ATP, adenosine triphosphate, cytosol, cytoplasm, chromatin, chromosomes, transcription, replication, translation, ribosomes, cell death, apoptosis, degradation, metabolism, trafficking, export, secretion,

Organisation and function of sub-cellular organelles
cellular communication, cell membrane, ion pore, sodium, potassium, calcium, organelles, nuclear envelope, chromatin, nuclear pore, rough endoplasmic reticulum, smooth endoplasmic reticulum, oxidation, glycosylation, lipid synthesis, detoxification, cellular respiration, ATP, ADP,

Cytoskeleton
actin, intermediate filaments, microtubules, muscles, contraction, mitosis, cilia, flagellae, myosin, keratins, lamins, neurofilaments, vimentins, alpha tubulin, beta tubulin, GTP, kinesins, dyneins, Charcot-Marie tooth disease, epithelial cells, connective tissue, nervous tissue, muscle tissue, smooth muscle, cardiac muscle, skeletal muscle, stratified squamous epithelium, simple squamous epithelium, basement membrane, muscle fibre, striations, atrophy, hypertrophy, hyperplasia, dysplasia, metaplasia, neoplasia, cellular injury, homeostasis, hypoxia, deficiency, intoxication, trauma

Structure and function of the gastrointestinal tract
Stomach, small intestine, large intestine, pancreas, liver, smooth muscle, enteric nerves, endocrine cells, sphincters, digestion, absorption

**Control of gastrointestinal motility**
Smooth muscle, enteric nerves, peristalsis, migrating myoelectrical complexes, gap junctions, action potential, autonomic nerves, acetylcholine, noradrenaline, peptides

**Endocrine function and control of appetite**
Hypothalamus, satiety, anorexia, orexia, neuropeptides, hormones, energy balance, enteric nervous system, ghrelin

**Digestion and excretion**
Stomach, small intestine, large intestine, pancreas, liver, enzymes, endocrine cells, sphincters, amino acids, fatty acids, sugars, proteins, fats, carbohydrates, villi, microvilli, lacteals, lymph

**Pathologies of the gastrointestinal tract**
Teeth, periodontal disease, Stomach, ulceration, pancreas, pancreatitis, small intestine, coeliac disease, large intestine, inflammatory bowel disease, rectum, haemorrhoids

**Structure and function of the lung**
Respiratory tract, lungs, alveoli, respiratory epithelium, mucociliary clearance, lung perfusion, ventilation, mechanics of breathing, control of breathing

**Ventilation and gas exchange**
Ventilation, perfusion, gas exchange, ventilation/perfusion (V/Q) matching, partial pressures of gases, oxygen transport, alveolar gas equation, carbon dioxide transport, arterial blood gases, acid-base balance, regulation of acid-base balance

**Pathophysiologies of the lung**
Type 1 and type 2 respiratory disease, lung volumes, lung function tests, pulmonary function tests, obstructive lung disease (e.g. asthma, chronic obstructive pulmonary disease, emphysema, bronchitis, cystic fibrosis), restrictive lung disease (e.g. pulmonary fibrosis, pneumonia and pulmonary oedema)

**The Structure of DNA, genes and genomes**
DNA, deoxyribonucleic acid, chromosomes, genetics, genetic information, genome, eukaryotic genomes, prokaryotic genome, intron, exon, nucleotide, purine, adenine, guanine, pyrimidine, thymine, cytosine, deoxyribose sugar, ribose sugar, double helix, major groove, minor groove, DNA structure, gene, plasmid, viral genome, bacterial genome, mitochondria, RNA, mRNA, ribonucleic acid, haploid, diploid, polyploidy, chromatin, histone, nucleosome, DNA intercalator, DNA minor groove binder, antibiotic

**Gene Function: Transcription/translation**
Gene Function, gene, transcription, translation, DNA, RNA, protein, amino acid, mRNA, codon, anticodon, genetic code, uracil, transcript, mRNA, tRNA, rRNA, RNA polymerase, DNA promoter, nontemplate DNA strand, template DNA strand, RNA processing, spliceosome, ribosome, protein synthesis inhibitor, antibiotic, Mupirocin, Streptomycin, Tetracycline, Macrolides

**Regulation of Gene Transcription**
DNA, RNA, gene regulation, transcription, promoter, operator, activator protein, repressor proteins, transcription factor, DNA-binding domain, allosteric site, lac operon, Cis-acting sequences, RNA polymerase II, DNA looping, transcriptional activator, transcriptional repressor, transcriptional coactivators, basal transcription factors, chromatin remodelling, histone acetylation, histone deacetylation, DNA methylation, Trichostatin, butyric acid, 5-azacytidine

DNA Replication and the Transmission of DNA at Cell Division
DNA replication, replication, cell division, cell cycle, mitosis, meiosis, chromosome, semiconservative, complementary DNA strand, replication fork, DNA polymerase, DNA polymerization, DNA polymerization, DNA helicase, topoisomerase, Okazaki fragments, DNA ligase, RNA primer, leading strand, lagging strand, origin of replication, sister chromatid, chromatid, G1 phase, S phase, G2 phase, cytokinesis, prophase, metaphase, anaphase, telophase, Synapsis, crossing-over, homologous chromosomes, Independent assortment, haploid gametes, reproduction, gamete, spermatogenesis, oogenesis, Recombination, alkylating agents, nitrogen mustards, cisplatin, carboplatin

Regulation of Cell Cycle
Cell cycle, cell survival, proliferation, Apoptosis, development, G1 phase, S phase, G2 phase, mitosis, cytokinesis, prophase, metaphase, anaphase, telophase, cyclin, cyclin dpenedent protein kinase, CDK, tumour suppressor gene, oncogene, growth factor, mutation

Regulation of Apoptosis
Cell cycle, proliferation, Apoptosis, Programmed cell death, necrosis, PROAPOPTOTIC PROTEIN, antiapoptotic protein, Morphogenesis, embryogenesis, death receptor, TNF, tumour necrosis factor, FAS ligand, TRAIL receptor, caspase, mitochondria, cytochrome C, PARKINSON'S DISEASE, ALZHEIMER'S DISEASE, HUNTINGTON'S DISEASE, cancer

Structure and function of cardiovascular system
Cardiovascular system, structure of cardiovascular system, heart, structure of heart, in series, in parallel, bulk transport, oxygen, carbon dioxide, nutrients, metabolites, heat, hormones, arteries, veins, arterioles, capillaries, venules, blood flow, systemic, pulmonary, heart beat, blood, vena cava, ventricle, atrium, aorta, valves, tricuspid, mitral, septum, myocardium, tunica intima, tunica media, tunica adventitia, continuous capillaries, fenestrated capillaries, discontinuous capillaries, lymphatic, lymph, lymph duct, blood pressure, blood distribution,

Electrophysiology of the heart
Heart, electrophysiology, action potential, ECG, electrocardiogram, blood, heartbeat, vena cava, ventricle, atrium, aorta, valves, tricuspid, mitral, septum, myocardium, membrane potential, ion channels, muscle contraction, sinoatrial node, SA node, AV node, atrioventricular node, bundle of his, conduction fibres, pacemaker, fibres of purkinje, pacemaker potential, sympathetic nervous system, parasympathetic nervous system, ionotrophic effect, chronotropic effect, adrenaline, noradrenaline, frank-starling mechanism

Endothelial cell physiology
Endolelial, endothelium, vasoconstriction, vasodilation, angiogenesis, transport, arteries, arterioles, capillaries, venules, veins, tunica intima, tunica media, tunica adventitia, vassal tone, EDRF, prostacyclin, adenosine, endothelin, anti-thrombin, TPA, von-willebrand factor, nitric oxide, angiotensin II, angiotensin converting enzyme, ACE, renin, aldosterone
Control of blood pressure
Blood, blood pressure, baroreceptors, chemoreceptors, high blood pressure, autonomic nervous system, sympathetic nervous system, parasympathetic nervous system, arterial baroreceptors, carotid sinus, aortic arch, oxygen, carbon dioxide, vasoconstriction, vasodilation, adrenoreceptors, beat adrenergic receptors, alpha adrenergic receptors, adrenaline, noradrenaline, acetylcholine, SA node, AV node, muscarinic receptor, vagus nerve, accelerator nerve, renin, angiotensin II, aldosterone, kidney, ACE, diuretics, ACE inhibitors, beta blockers, calcium channel blockers

Pathologies of the cardiovascular system
Heart, cardiovascular system, arrhythmia, cardiac valve disease, coronary artery disease, heart failure, tissue oedema, peripheral arterial occlusive disease, hypertension, atherosclerosis, coronary thrombosis, coronary artery bypass, myocardial infarction, atherosclerotic aneurism of the aorta, primary hypertension, secondary hypertension

Introduction to the immune system
Immune system, innate immune system, adaptive immune system, antibody, antigen, pathogen, cytokine, natural immunity, immune response, inflammation, phagocytosis, immunological memory, humoral immunity, cell mediated immunity, lymphocytes, B-cell, T-cell, memory cell, plasma cell, natural killer cell, NK cell, monocyte, macrophage, dendritic cell, major histocompatibility complex, antigen presentation, neutrophil, eosinophil, mast cell, basophil, lymph tissue, lymph nodes, hypersensitivity, immunodeficiency, autoimmunity, transplantation, antibody based drugs, self and non-self, autoimmunity, immunodeficiency, hypersensitivity

Innate immune system
Immune system, innate immune system, pathogen, immune response, inflammation, phagocytosis, monocyte, macrophage, natural immunity, basophil, eosinophil, neutrophil, dendritic cell, natural barriers, toll-like receptor, TLR, leukocyte extravasation, natural killer cells, NK cells, complement, membrane attack complex, defensins, leukoproteases, mucus, interferons, pathogen associated molecular patterns, PAMPS, C-reactive protein, collectins, antigen presentation

Adaptive immune system
Immune system, adaptive immune system, antibody, antigen, pathogen, cytokine, immune response, immunological memory, humoral immunity, cell mediated immunity, B-cell, T-cell, memory cell, plasma cell, major histocompatibility complex, antigen presentation, acquired immunity, T helper cell, cytotoxic T cell, immunisation, primary response, secondary response, antibody therapeutics, antibody mediated defence, immunoglobulin, IgA, IgG, IgD, IgE, IgM, antigen presentation, vaccine, antibody based drugs, antibody based diagnostics, transplantation, autoimmunity, immunodeficiency, hypersensitivity
PMY1014
Introduction to Pharmacy Practice Skills
Professional Development Planning
personal development planning, professional development planning, PDP, continued professional development (CPD), reflection, student centred learning, PDP e-folio, reflective diary, reflection, planning, action and evaluation, personal tutors, professionalism

Pharmaceutical Statistics
Sample, Population, Variation, Variables, Mean, Median, Mode, Variance, Standard Deviation, Range, Standard Error, Coefficient of Variation, Normal, distribution, t distribution, Chi-squared distribution, z transformations, confidence intervals, one sample t test, one sample z test, one sample Chi-squared test

Pharmaceutical Statistics (Workshops)
Statistical calculations, calculating mean, median, variance, standard deviation, calculating probability, confidence intervals, performing one sample statistical tests
Fiona Hughes

An introduction to Pharmacy Reference Sources

Introduction to communication skills
Communication, oral communication, verbal communication, sender, receiver, one-to-one, group, large audience, formal, informal, written, reading from notes, delivery, able to be heard, speaking clearly, right pace, variety of voice tone, confidence, awareness of audience, rapport, timekeeping, content, selection of material, visual aids, clear plan/structure, aims, progression, links, signposts, peer assessment, observation, listening, evaluation, critical analysis, feedback (sensitive, positive, economical, constructive, specific)

Equality and diversity

Equality and diversity in Pharmacy
Equality, diversity, pharmacist-patient communication, age, gender, race, ethnicity, cultural background, socioeconomic status, religion, sexual orientation, health beliefs, health belief model (HBM), cultural competence, cross-cultural communication, health and illness behaviour, traditional folk medicine, Chinese medicine, complementary and alternative medicine (CAM), Western medicine, language barrier, interpreter, empathy
Time management and examination preparation
Time management, setting SMART goals and objectives (Specific, Measurable, Achievable, Realistic and Time-based), setting deadlines, allocating time, review of time management, exam preparation, problems and solutions, reading skills, anxiety, managing thinking, the right 'mindset', keeping healthy, study timetable, familiarity with exam paper, sort material, reduce down and organise, prepare one exam question, prepare multiple answers, practice exams, learn from practice, memory – taking in information, retaining it, encoding it, recalling, flash cards, post its, texts, spider diagrams and mind-maps, colours, patterns e.g. using rhymes, pictures or word, study environment, taking breaks, on the day, feedback.

CV-writing workshop
Curriculum vitae, types of CV (chronological, skills-based, academic, electronic), length of CV, layout, structure, personal details, employment, education, IT skills, membership of professional bodies, other information (qualifications, prizes or awards, relevant training courses or conferences, publications, driving licence, other languages spoken), interests, references, application forms and covering letters.

Community pharmacy placement
Community pharmacy, layout of the pharmacy, General Sales List (GSL) medicines, Pharmacy (P) medicines, Prescription Only Medicines (POMs) and Controlled Drugs (CDs), controlled drug cabinet/safe and record keeping requirements, storage of medicines, fridge, temperature record book, familiarisation with dispensary and dispensing process (taking in a prescription, assessment of prescription for validity, safety and clinical appropriateness, assembly and labelling of medicine/product to be dispensed, accuracy checking procedure, transfer of medicine/product to patient or their representative), responding to symptoms, acronyms or mnemonics (WWHAM, ASMETHOD, SIT DOWN SIR and ENCORE), services delivered by community pharmacy.

Professional and Regulatory Bodies

Professionalism and Continuing Professional Development
Post-registration continuing professional development (CPD), role of post-registration facilitator, CPD cycle (reflection, planning, action, evaluation), learning needs, code of ethics, clinical and social care governance, revalidation, CPD process, benefits of CPD, current requirements of CPD, online record keeping, assessment options, scheduled and unscheduled learning.

Ethics and fitness to practise
Principles of regulation – proportionality, accountability, consistency, transparency, targeting, registration, pharmacists, pharmacies, complaints, fitness to practise issues, professional standards development, development of pharmacy practice, ethics, principles of Pharmaceutical Society of Northern Ireland (PSNI) Code of Ethics, Code of Conduct for
Pharmacy Students, conduct, convictions, registration, independent safeguarding authority, Access Northern Ireland

Medicines Governance
Role of medicines governance pharmacist, patient safety, clinical governance, quality of service, clinical guidelines, evidence-based practice, clinical audit, education and training, safe practice, risk management, high risk medicines, intravenous potassium, insulin, methotrexate, warfarin, heparin and low-molecular weight heparins, digoxin, intravenous vancomycin and gentamicin, hypotonic/hypertonic sodium chloride, opiates, physical barriers, incident reporting, root cause analysis, learning, research and development, quality and safety in healthcare, process improvement.

Terminology in Pharmacy Practice
British National Formulary (BNF) drug entry, drug name, recommended international non-proprietary name (rINN), indications, cautions, absolute contra-indications, relative contra-indications, side-effects, dose and frequency of administration, preparations, cautionary and advisory labels, maximum dose, maximum daily dose, strength, maximum strength, pharmacokinetic interactions, pharmacodynamic interactions, drug-herb interactions, drug-food interactions, drug-condition interactions, Stockley’s Drug Interactions, prescriptions, Latin abbreviations, legal check, clinical check, accuracy check, patient counselling, dose calculation.

Verbal and non-verbal communication skills
Listening, verbal communication, non-verbal communication, written communication, rapport building, effective questioning, active listening, negotiating, explaining, good non-verbal communication, good written communication, leading questions, open questions, closed/convergent questions, probing questions, reflecting responses, telephone communication (patients, doctors and other healthcare professionals), facial expression, eye contact, voice, gestures, posture, spatial relationships, personal space, use of email, cultural differences

Extemporaneous formulation and dispensing and pharmaceutical analysis
Extemporaneous formulation, dispensing, pharmaceutical analysis, prescription, mouthwash, drops, solution, topical, corticosteroid, prescription, NHS, BNF, presentation, groupwork, label, legislation, communication, powerpoint, graph, UV spectroscopy, linear, drug content, patient safety, clinical check, anti-inflammatory, legal category, dose, UV calibration plot, absorbance, light absorption

Numeracy lecture / workshop
workshop, numeracy, calculations, pharmaceutical, concentrations, units, ppm, ppb, molar, moles, percentage, weight, volume, equation, solving, rearranging, standard form, scientific notation, exponents, straight lines, linear regression, gradient, intercept, logarithm, density, balance, empirical, formula, formulae, excess, dilution, dose

Brief history of drugs
history, drug, diagnosis, cure, treatment, caffeine, alcohol, nicotine, blockbuster, Lipitor, Plavix, Lovenox, Clexane, Celebrex, Losec, Prilosec, Nexium, Telfast, Allegra, Seroquel, Seloken, Toprol, Pulmicort, Rhinocort, atorvastatin clopidogrel, enoxaparin, celecoxib, omeprazole, esomeprazole, Fexofenadine, quetiapine, metoprolol, budesonide, NCE, new chemical entity, ATC, classification, plants, animals, minerals, trepanation, medicine, Ebers, Egyptians, herbal, pessary, vaginal, recipes, health, Hippocrates, Aristotle, Dioscorides, Galen, humours, humors, miasma, bubonic
Introduction to Community Pharmacy

Community pharmacy, Northern Ireland, Pharmaceutical Society of Northern Ireland (PSNI), register, premises, pharmacist, responding to symptoms, dispensing, decriminalisation of dispensing errors, patient counselling, health promotion, repeat dispensing, Minor Ailments Service, medicines experts, pharmacy legislation, Medicines Act 1968, Misuse of Drugs Act 1971, Responsible Pharmacist Regulations 2008, General Sale List (GSL) medicines, Pharmacy (P) medicines, prescription-only medicine (POM), Code of Ethics, prescriptions, labelling requirements, patient medication records (PMRs), Controlled Drugs (CDs), Controlled drugs storage, cabinet, cupboard, time delay safe, medicine storage, fridge, Controlled Drugs (CD) register, future deregulations, pharmacy contract, robotic dispensing, accredited checking technician (ACT), electronic transfer of prescriptions (ETP), remote supervision.

Relevance of pharmaceutical science to practice

Pharmaceutics, pharmaceutical microbiology, pharmacoepidemiology, pharmacogenomics, pharmacogenetics, Pharmacognosy, pharmacology, pharmacokinetics, pharmacodynamics

An introduction to hospital pharmacy

Roles of hospital pharmacist including; dispensing, procurement, clinical trials, medicines information, formulary, education and training, research, clinical audit, aseptic preparation, quality assurance, radiopharmacy, risk management, management, clinical pharmacy. Other members of the healthcare team including pharmacy technicians, doctors, dentists, nurses, social workers etc. Activities of the hospital pharmacist; clinical check of prescription, medication history and reconciliation, medication review, patient monitoring, adverse drug reactions, ward rounds, patient counselling, prescribing, clinical audit, writing guidelines and policies. Skills required to work as a pharmacist in hospital; communication skills, interpersonal skills, IT skills, time management, knowledge of therapeutics and drugs, decision making skills. Students have 2 scenarios; one ethical and one clinical to debate in the lecture.

An overview of the work of a hospital pharmacist

Multiprofessional working, meet and interact with nurses, pharmacy technicians and other HCPs. Aseptic dispensing; nutrition, chemotherapy and CIAs preparation and suitability for patients, workflow in aseptic department, key users e.g. neonates and paediatrics, surgical, ICU patients, oncology and haematology. Technical skills of sharps manipulation, clinical skills of product suitability. Clinical pharmacy; multiprofessional interaction at ward level, patient interaction e.g. re drug management at home, orientation to ward layout—storage of notes, medication etc, process of medicines management, one stop dispensing, patients own drugs. Dispensary; workflow, dispensary team including technicians and ATOs, types of prescriptions in department, ward requisitions, CD prescriptions and storage as well as registers, robot/tracking system if available, unlicensed medications, extemporaneous dispensing, procurement and production.
Student code of conduct
Student code of conduct, fitness to practise, healthcare professionals, principles, 
Pharmaceutical Society of Northern Ireland, PSNI, GPhC, BPSA, student union, student 
support, student health, patients first concern, show respect, exercise professional 
judgement, encourage patients to participate, develop knowledge, develop skills, take 
responsibility, be honest and trustworthy, fitness to practise procedures, scenarios, group 
work, feedback, plagiarism, impersonating a pharmacist, meeting deadlines, courtesy, 
privileges, responsibilities, on and off campus, future role as a pharmacist, promote patient 
health, ensure beliefs do not compromise care, be prepared to challenge, respect diversity, 
respect cultural differences, patient rights, confidentiality, consent, ACCESSNI checks, 
enhanced disclosure check, health check, health declaration, communicate effectively, 
misconduct, reasons for concerns, fitness to practise decision, fitness to practise outcomes, 
warning, sanctions, expulsion, suspension, competence, recognise limitations, 
reflect on knowledge, reflect on competence, continuing professional development, CPD, 
honour commitments, abide by rules, obey the law, formal investigations, dress codes, 
professional dress, placements, contactable, punctual, health and safety requirements.
Non-electrolyte Solutions 1
solution, non-electrolyte, concentration expression, ideal and real solutions, colligative properties, molecular weight determination, dispersion, colloid, solute, solvent, vapour pressure, boiling point, Raoult's Law, hydrogen bonding

Non-electrolyte Solutions 2
colligative properties, molecular weight determination, vapour pressure, boiling point elevation, Raoult's Law, hydrogen bonding, freezing point depression, osmotic pressure

Electrolyte solutions
electrolyte, solution, charge, Van’t Hoff factor, osmolality, activity, ionic strength, equivalent weights, boiling point elevation, freezing point depression, osmotic pressure, Arrhenius theory of dissociation, weak electrolyte, strong electrolyte, equilibrium, Debye-Huckel Theory

pH
pH, acid, base, equilibrium, acidity constant, pKa, pH scale, solubility, electrolyte, dissociation, BrØnsted Theory, Lewis theory, proton donor, proton acceptor, electron donor, electron acceptor, Kw, pKw, hydroxyl ion, hydronium ion, conjugate acid, conjugate base, pH in the GI tract, drug ionisation, drug ionisation, drug, ampholyte, amino acid, solubility, stability

Buffers
Buffer, Henderson-Hasselbach, Henderson-Hasselbalch, pKa, buffer capacity, cells, electrolyte, salt, blood, Ka, pH, weak acid, weak base, temperature, drug, ionisation, ionization, lipid, membrane, solubility, concentration, titration, neutralisation, neutralization,

Tonicity
Tonicity, osmotic pressure, erythrocytes, blood, membrane, colligative properties, freezing point depression, hypotonicity, hypertonicity, osmolality, cell, Liso, cryoscopic equation, lacrimal fluid, eyes, electrolyte, nonelectrolyte, E values, drug, White-Vincent method, Sprowl method, USP, pharmacopoeia

Surface energy and surface tension
Surface energy, surface tension, interfacial tension, free energy, work of adhesion, work of cohesion, adhesion, cohesion, spreading, spreading coefficient, wetting, surfactants, monolayers, emulsions, suspensions, formulation, tableting, bioadhesion, drug, analytical methods, interface, surface, molecule, hydrogen bond, bonding, surface area, surface free energy, tablet, Wilhelmy plate, du Nuoy ring, capillary rise, critical micelle concentration, hydrophilic, hydrophobic, micelle, Dupré equation, mixing, thermodynamics

Adsorption
Adsorption, soluble monolayer, insoluble monolayer, lung, lipid, Surface energy, surface tension, interfacial tension, free energy, work of adhesion, work of cohesion, adhesion, cohesion, spreading, spreading coefficient, wetting, surfactants, monolayers, contact angle, surface excess, temperature, wetting, membrane, bioadhesion, Gibb's adsorption plot, Avogadro number, bilayer, phospholipid, Langmuir trough, compression, molecule, pressure, adhesion, cohesion, hydrophilic, hydrophobic, Young’s equation, drug, tablet, binder, polymer, solubility, chromatography

Disperse systems / Colloids 1
Colloid, dispersion, hydrophilic, hydrophobic, lyophilic, lyophobic, solvent, bonding, emulsions, suspensions, polymer, protein, milling, coating, inhaler, dressing, size, aerosol, foam, sol, gel, lotion, cream, spray, bone, shape, drug, liposome, microscopy, surfactant, taste masking, drug, pharmacopoeia, micelle, solvation, viscosity, stability, salting out, solubility, electrolyte, solvent sheath, solvent layer, nuclei, supersaturation, spontaneous, thermodynamics, neutralization, neutralisation, energy

**Disperse systems / Colloids 2**
Colloid, dispersion, hydrophilic, hydrophobic, lyophilic, lyophobic, solvent, bonding, emulsions, suspensions, kinetic, Brownian motion, diffusion, osmotic pressure, sedimentation viscosity, molecular weight, stability, coacervation, optical, micelle, critical micelle concentration, surfactant, HLB classification, solubilisation, polarity, bioavailability, toxicity, oxidation, hydrolysis, pH, equilibrium, Krafft point, cloud point, sol, gel, electrolyte, salting out, Faraday, Tyndall, Faraday-Tyndall, light scattering, turbidity, size, sizing, osmosis, Stokes-Einstein, radius, mass, diffusion coefficient, centrifuge, coagulation, Hofmeister series, lyotropic series, flocculation, DVLO theory, charge, microencapsulation, taste masking, controlled release, drug,

**Thermodynamics 1**
Thermodynamics, enthalpy energy, entropy, free energy, temperature, thermochemistry, first law of thermodynamics, equilibrium, standard state, surface energy, work, heat, volume, pressure, spreading, dissolution heat transfer, drying, granulation, cream, suppository, ointment, melt, sterilization, kinetic energy, potential energy, energy, magnetism, elasticity, charge, gravity, internal energy, bond energy, absolute temperature, thermometer, Kelvin, Celsius, Fahrenheit, heat of formation, heat of reaction, endothermic, exothermic, Centigrade, calorimeter,

**Thermodynamics 2**
Thermodynamics, enthalpy energy, entropy, free energy, first law of thermodynamics, second law of thermodynamics, third law of thermodynamics, zeroth law of thermodynamics, heat, work, heat of solution, heat of reaction, heat of fusion, melt, heat capacity, temperature, spontaneity, equilibrium, dissolution, drug, bonding, exothermic, endothermic, absolute energy, Kelvin, crystal, gas constant, equilibrium constant, protein, dissociation constant, association constant, metabolism, Van't Hoff equation, standard state, stability, kinetics, receptor, partition coefficient, calorimetry, chromatography,

**Buffers and pH**
Buffer, pH, acid, base, weak acid, salt, pH meter, safety, titration, buffer capacity, temperature, concentration, solution, IT skills, Henderson-Hasselbach equation, Henderson-Hasselbalch equation, pKa, Ka, equilibrium, calculation, mass, moles, weighing, accuracy, practical skills, salt

**Freezing point depression determination**
Temperature, colligative properties, freezing point depression, thermometer, solution, weighing, mass, mole, accuracy, practical skills, safety, electrolyte, non-electrolyte, drug, exothermic, endothermic, heat, melt, bond, charge, van’t Hoff factor

**Colloids**
Lyophilic, lyophobic, surfactants, association colloids, measurement, light-scattering

**Kinetics 1**
reaction rates, order of reactions, first order, molecularity of a reaction
Kinetics 2
Arrhenius equation, first order rate equation, half life, first order Rate constant, zero order reactions and their origin, zero order rate constant

Kinetics 3
Revision lecture, examination questions

Rheology
Newton’s law of flow, rate of shear, shearing stress, dynamic viscosity, kinematic viscosity, Intrinsic viscosity, Newtonian fluids, non-Newtonian fluids, pseudoplastic, plastic, dilatant, flow rheogram, yield stress, apparent viscosity, hydrophilic gels, creams, ointments, flocculated suspensions, deflocculated suspensions, thixotropy, rotational rheometer, dilute solution viscometry, drug release properties, ease of application, gel manufacture, residence time.

Solid State Properties
solid dosage forms, crystal structure, amorphates, polymorphism, enantiotropic, monotropic, DSC, process induced transformations, metastability, micromeritics, particle size analysis, unit cells, simple cubic, body-centred cubic, face centred cubic, x-ray spectroscopy, solubility, bioavailability, hydrates, solvates, glass transition temperature, melting point, moisture isotherm.

Particle Size Analysis
pharmaceutical powders, drug release, powder flow, metered dose inhalers, pharmacokinetics, dissolution, bioavailability, coarse powder, moderately fine powder, fine powder, very fine powder, equivalent diameter, projected perimeter diameter, projected area diameter, Feret's diameter, Martin’s diameter, equivalent sphere volume, equivalent sphere surface area, number-length mean, number-surface area mean, number-volume mean, moment mean, surface area moment mean, volume moment mean, particle breakage, particle agglomeration, mode, median, particle size distribution, cumulative frequency distribution, particle size methods, sieve methods, microscope, scanning electron microscope, transmission electron microscope. electron stream sensing, laser light scattering, sedimentation methods.

Emulsions
internal phase, continuous phase, oil-in-water, water-in-oil, micro-emulsion, mini-emulsion, macro-emulsion, Gibb's free energy of mixing, emulsion stability, surfactants, monomolecular adsorption, hydrophilic-lipophilic balance, multi-molecular adsorption, solid-particulate adsorption, flocculation, coalescence, creaming, breaking, phase inversion, phase-volume ratio, preservation

Suspensions
colloidal dispersion, coarse dispersion, sediment, thickening agents, oral suspensions, topical suspensions, parenteral suspensions, vaccines, particle size, wetting agents, flocculation, deflocculation, controlled flocculation, rheology, physical stability, sedimentation rate, Stoke's law, degree of flocculation, zeta potential, DLVO theory.
Karl Malcolm

Initial principles and concepts
pharmaceutics, pharmacokinetics, pharmacodynamics, pharmacology, pharmacognosy, pharmacogenomics, pharmacognosy, pharmacy practice, pharmaceutical care, medicinal
chemistry, drug, medicine, dosage form design, route of administration, biotechnology, passive diffusion, active transport, facilitated transport, drug pathways

**Intermolecular forces**
states of matter, intermolecular forces, Van der Waals, ion-dipole, ion-induced dipole, hydrogen bonding, Keeson, Debye, London, covalent, ionic, bond energy, dipole, induced dipole, instantaneous, donors, acceptors, melting point, boiling point, DNA, helix, receptor complex,

**Dissolution**
tablet, capsule, granules, aggregates, fine particles, disintegration, deaggregation, dissolution, tester, mechanism, interfacial step, diffusion, concentration gradient, Noyes-Whitney equation, surface area, diffusion layer, hydrostatic layer, sink conditions,

**Solubility**
definitions, solubility expressions, types of solutions, terms of approximate solubility, sources of information, pharmacopeia, dissolution mechanisms, thermodynamics, factors, temperature, melting point, substituent groups, solvents, pH, oral, parenteral, nasal, topical, eye-drops, infusions, irrigations, synthesis, spectroscopy, chromatography, therapeutic effect, poor solubility, poor permeability, permeation, fluid mosaic model, transcellular, paracellular, unbuffered, apparent, intrinsic, biopharmaceutics classification system, solution, solvent, solute, saturation, super-saturation, parts, molarity, molality, mole fraction, general solubility equation, types of solutions, electrolytes, non-electrolytes, Merck Index, kinetic solubility, thermodynamic solubility, lipophilicity, prodrug, particle size, surfactants, salt forms, preformulation issues, enthalpy of crystal lattice, enthalpy of solvation, Gibbs free energy, entropy, ideal, non ideal, endothermic, exothermic, dielectric constant, pH, quaternary, ionisation, body fluids, weak acids, weak bases, amphoteric

**Partitioning and Distribution**
oil, water, immiscible, partition coefficient, degree of ionisation, log P, octanol water, absorption, route of administration

**Diffusion**
Fick's laws, concentration gradient, diffusion coefficient

**Numeracy practical**
decimal places, significant figures, accuracy, precision, standard deviation, reading errors, volume measurement,

**Computer practical**
Excel, diffusion, permeation, standard deviation, mean, side-by-side cell, steroid, silicone, membrane, transdermal, trend line, linear regression, correlation coefficient, partition coefficient, diffusion coefficient, error bars, calculations, numeracy, chemical drawing

**Making measurement practical**
micropipette, volumetric flask, volume, beaker, mean, standard deviation, Excel, coefficient of variance

**Dissolution practical**
dissolution, cube root mass, temperature, chemical drawing, mass loss, Arrhenius equation, activation energy, kinetics, rate, Excel, partitioning, gastrointestinal tract, paracetamol, aspirin, ionisation
Aromatic Chemistry part 1
Aromatic, aromaticity, benzene, structure, reactivity, chemical stability, organic chemistry, unsaturated, unsaturation, Hückel rule, coal tar, hydrocarbon, Kekulé structure, orbital, p-orbital, ring, molecular orbital, FMO, anti-aromatic, planar, conjugated, conjugation, hybridisation, resonance, resonance stabilisation, functional group, alkyl, toluene, naphthalene, aniline, phenol, IUPAC, systematic nomenclature, ortho, meta, para, benzo[a]pyrene, drug, pharmaceutical, aspirin, penicillin.

Aromatic Chemistry part 2
Benzene, structure, reactivity, ring, organic chemistry, aromatic, aromaticity, substituent, electron donating, electron withdrawing, ortho, meta, para, systematic nomenclature, amphetamine, ibuprofen, reaction, electrophilic, electrophile, substitution, bromonium ion, Lewis acid, halogen, SEAr, delocalisation, activating group, deactivating group, directing group, selectivity, halogenation, nitration, sulfonation, sulphonation, acylation, alkylation, Friedel-Crafts reaction, carbocation, mechanism.

Aromatic Chemistry part 3
Benzene, structure, reactivity, aromatic, organic chemistry, ring, activating, activation, deactivating, deactivation, nucleophilic, nucleophile, substitution, SNAr, reaction, rate, diazonitisation, diazonium ion, mechanism, azo dye, amine, aniline, Sandmeyer reaction, Balz-Schiemann reaction, halogen, halogenation, substituent, reduction, hydrolysis, carbocation, electrophile, electrophilic, colour chemistry, food dye, tartrazine, asthma, hyperactivity, allergy, immune system, E number, FSA, water solubility.

Aromatic Chemistry problems
Benzene, structure, reactivity, aromatic, organic chemistry, aromaticity, reaction, mechanism, synthesis, functional group, nomenclature, nucleophilic, electrophilic, nucleophile, electrophile, substitution, oxidation, nitration, molecular formula, amine, aniline, diazonium ion, diazotisation, diazotization, halogenation, activating group, deactivating group, directing group, ortho, meta, para, selectivity, drug, pharmaceutical, chemical stability.

Heterocyclic Chemistry part 1
Organic chemistry, heterocyclic, heterocycle, heteroatom, nitrogen, oxygen, sulfur, sulphur, pyridine, quinoline, pyrrole, furan, thiophene, indole, purine, pyrimidine, cytosine, thymine, adenine, guanine, nucleobase, RNA, DNA, imidazole, oxazole, thiazole, ring, structure, reactivity, aromatic, aromaticity, inductive polarisation, mechanism, electrophilic substitution, activating group, deactivating group, pKa, acid, base, lone pair, protonation, solubility, nicotine, nicotinamide, papaverine, vitamin, B6, niacin, pyridoxine, drug, pharmaceutical, amino acid, protein, nature.

Heterocyclic Chemistry part 2
Organic chemistry, heterocyclic, heterocycle, heteroatom, nitrogen, pyridine, quinoline, pyridinium ion, Lewis acid, reactivity, reaction, mechanism, electrophilic aromatic substitution, electrophile, nitration, halogenation, inductive polarisation, pyridine N-oxide, substitution, nucleophilic aromatic substitution, nucleophile, enzyme, co-factor, NAD+, NADH, NADPH, NADP+, nicotinamide, adenine, dinucleotide, alcohol dehydrogenase, quinine, alkaloid, malaria, cinchona, synthesis, mauveine, drug, pharmaceutical.

Heterocyclic Chemistry part 3
Organic chemistry, reaction, reactivity, mechanism, heterocyclic, heterocycle, heteroatom, nitrogen, oxygen, sulfur, sulphur, pyrrole, indole, drug, pharmaceutical, vitamin, B12, B1,
porphyrin, haem, heme, chlorophyll, porphobilinogen, protein, amino acid, proline, nucleophile, electrophile, electrophilic substitution, bromination, nitrination, acylation, reduction, hydrogenation, Mannich reaction, Clopirac, NSAID, anti-inflammatory, tryptophan, serotonin, depression, indigo, LSD, Indomethacin, rheumatoid arthritis, gramine, toxin, casein, histidine, histamine, immune system, Ranitidine, thiamine.

**Heterocyclic Chemistry part 4**
Organic chemistry, reaction, reactivity, heterocyclic, heterocycle, heteroatom, nitrogen, DNA, RNA, nucleobase, nucleic acid, nucleoside, nucleotide, purine, pyrimidine, adenine, cytosine, guanine, thymine, uracil, ribose, deoxyribose, adenosine, deoxyadenosine, cytidine, deoxycytidine, deoxyguanosine, guanosine, deoxyguanosine, uridine, base pair, keto-enol tautomerism, tautomerisation, tautomer, equilibrium, hydrogen bonding, genetic code, reverse transcriptase, enzyme, caffeine, retrovirus, HIV, AIDS, drug, pharmaceutical, uric acid, AZT, Zidovudine, Abacavir, Didanosine, Stavudine, Entecavir, Apricitabine, NARTI, FDA

**Heterocyclic Chemistry problems**
Organic chemistry, reaction, reactivity, aromaticity, aromatic, mechanism, heterocyclic, heterocycle, heteroatom, pyridine, quinoline, indole, pyrrole, furan, thiophene, purine, pyrimidine, oxazole, imidazole, thiazole, synthesis, nature, alkaloid, drug, pharmaceutical

Kirill Tchabanenko

**Introduction to organic chemistry**
Nature of chemical bonding; single C-C bonds; multiple C-C bonds; hybridisation; electronegativity

**Chemical reactions and mechanism**
Classification of chemical reactions; addition reactions; substitutions, elimination; Red-Ox reactions; roles of reagents: nucleophiles and electrophiles; reaction intermediates: carbanions and carbocations; electronic factors; stabilisation via inductive effect; mesomeric factors

**Acid/base reactions**
Organic acids and bases; pKa; strength of acids and bases; equilibrium; effects of acid strength/weakness on equilibrium of acid/base reactions

**Alkanes**
Nomenclature: naming compounds; branched alkanes; cycloalkanes; introduction to naming of basic functional groups

**Halogenoalkanes: substitution reactions**
Methods for making halogenoalkanes; activation of alcohols; nucleophilic substitutions; SN1 and Sn2 reactions

**Halogenoalkanes: elimination reactions**
E1 and E2 eliminations; stability of intermediate carbocations; influence of base strength on the mechanism; stability of alkenes

**Alkenes and alkynes**
Structure and reactivity of alkenes and alkynes; methods of synthesis; addition reactions to alkenes; hydroboration of alkenes; Markovnikov rule; hydroboration of alkenes; anti-markovnikov addition products; synthesis of alcohols from alkenes
Aldehydes and ketones
Synthesis via oxidation of alcohols; reaction with metal hydrides; Grignard reaction; reaction with oxygen nucleophiles; electrophilic strength of aldehydes and ketones; Review of alpha-substitution reactions: aldol reaction;

Carboxylic acids and derivatives
Carboxylic acids, acid chlorides; anhydrides; structure and reactivity; relative reaction rates for nucleophilic substitutions; Nucleophilic acyl substitution reactions of acyl chlorides; acid anhydrides; esters; Overview of alpha-substitution reactions;

Functional groups in nature
Taxol and its binding to tubulin; pie-stacking; polar and non-polar interactions; Natural acid-base catalysis: chymotrypsin, Rhodopsin and vision; Hydride transfer in nature; why alcohol is toxic;

Functional group chemistry
Introduction to exam-type questions; Naming functional groups in real-life molecules; SN1 vs SN2 and E1 vs E2 reactions; Markovnikov vs anti-Markovnikov additions to alkenes;

Molecular spectroscopy
Electromagnetic spectrum; energy of molecular transitions; when molecules absorb radiation; absorption and transmission spectra

UV spectroscopy
Applications of UV spectroscopy; electron transitions; chromophores; conjugation; auxochromes; Lambert-Beer law; Woodward rules for calculation of UV absorptions; UV spectrum

Infrared spectroscopy
Bond stretching and bond bending; Hook’s law; characteristic absorption of functional groups; fingerprint region; IR spectrum; what can you tell about structure based on the IR spectrum of compounds; multiple examples

Seminar on molecular spectroscopy
Comparison of chromophores; which compound absorbs at a longer wavelength; Finding functional group presence/absence in the IR spectrum

Extraction of limonene from orange peel
Isolation of natural products from nature; steam distillation; azeotropic distillation; extraction of organic compounds from aqueous solutions; phase separation; solvent evaporation; finding yield of a reaction. TLC analysis of product; comparison with authentic limonene sample

Resolution of enantiomers via recrystallisation
Stereochemistry of organic compounds; enantiomers and diastereoisomers; reaction of organic bases and organic acids; formation of diastereoisomeric salts; crystallisation of a single diastereoisomer; freebasing the amine; optical rotation of organic compounds; enantiomeric purity.

Electrophilic bromination of trans-stilbene
Electrophilic addition of bromine to double bonds; control of reaction by colour change; formation of highly crystalline product; purification by recrystallisation; calculation of the yield. Measuring of the melting point

**Synthesis of paracetamol and aspirin**
Acetylation of aromatic alcohols and amines; acetylation of para-hydroxyaniline with acetic anhydride; acetylation of salicylic acid; crystallisation of products; melting point; TLC analysis against paracetamol and aspirin tablets

**Identification of oxygen containing compounds**
Difference in reactivity of alcohols, carboxylic acids ketones and aldehydes; pH test; Brady’s test; Fehling’s test; Esterification of carboxylic acids with alcohols; extraction of the product and distillation. Identification of the ester by boiling point. Preparation of the semicarbazone derivative on treatment of the ketone with semicarbazide; identification of the ketone via melting point of the semicarbazone product.

**Stereochemistry – introduction and overview**
Stereochemistry, stereogenic centre, medicines, geometric isomerism, cis, trans, E, Z, configurational isomerism, chirality, isomers, stereoisomers, constitutional isomers, enantiomers, diastereoisomers, meso, drawing techniques, Fischer projection, racemic, racemate, absolute stereochemistry, relative stereochemistry, inversion.

**Stereochemistry – Descriptors and sequence rules**
Descriptors, sequence rules, E, Z, R, S, geometric isomers, cis, trans, alkene isomers, priority rules, Cahn-Ingold-Prelog, configurational isomers, configuration, syn, anti, diastereoisomers, exo, endo, bridged bicyclic ring systems, bridge atoms, bridgehead atoms, nomenclature.

**Stereochemistry – Stereoisomerism and definitions**
Isomeric relationships, isomers, constitutional isomers, geometric isomers, stereoisomers, enantiomers, diastereoisomers, meso, racemic.

**Stereochemistry – Chirality, optical activity, resolution**
Optical isomers, enantiomers, Pasteur, optical activity, plane polarized light, racemic, resolution, polarimeter, levorotatory, dextrorotatory, specific rotation, observed rotation, optical rotation, chiral, chirality, achiral, symmetry operator, fractional crystallization, ammonium salts (diastereoisomeric), chemical modification.

**Stereochemistry – Conformation and cycloalkanes**

**Stereochemistry – review session**
All of those which appear in the lectures above.

**Introduction to Carbohydrates**
Introduction to carbohydrates: Biosynthesis, Classification; Structure of carbohydrates: Fischer projections, Haworth projections and cyclic acetal forms; Aldose configuration (D and L); Anomeric centre α and β; Mutarotation
Monosaccharides
Conformations (chair vs. Boat); Naming of monosaccharides; Ketoses; Simple reactions of monosaccharides: acetylation, etherification, glycosidation and reduction; Reducing sugars (Tollen’s, Fehling’s and Benedict’s reagents)

Polysaccharides
Glycoside bond; Disaccharide linkages; Naming of disaccharides; Starch and cellulose; Amylose, amyllopectin and glycogen; Deoxysugars; Aminosugars; Glycopeptides; Carbohydrates in blood types

Introduction to Amino Acids
Proteogenic amino acids; Stereochemistry of amino acids; α and β amino acids; Codes for amino acids (both three letter and one letter); Hydrophobic amino acids; Hydrophilic amino acids; Charged amino acids; Dipolar structure of amino acids; pKa’s and the Henderson-Hasselbalch equation; Isoelectric points

Amide Bonds and Peptide Structure
Peptides; amide bond; Naming peptides; Hydrogen bonds in peptides; Disulfide bridge; Structure of proteins (primary, secondary and tertiary) α-Helix and β-sheet

Structure and Sequencing of Peptides
Sanger’s Reagent; Dansyl Chloride; Edman Degradation; Cyanogen Bromide; Cymotrypsin; Carboxypeptidases; Aminopeptidases
PMY2001
Medicinal Substances: Characterisation and Quantification
Pharmaceutical analyses / Generalities
Chemical identity, chemical purity, active ingredient, principal component, formulation, impurities, specification, excipients, preparation, concentration, chemical analysis, physical analysis, British Pharmacopeia (BP) monographs, extraction, derivatisation, stability, shelf-life, physicochemical properties, non-chemical analytical methods, ultraviolet and visible spectroscopy, atomic spectrophotometry, molecular emission, fluorescence, Raman spectroscopy, nuclear magnetic resonance spectroscopy, mass spectroscopy, chromatography, gas chromatography, thin layer chromatography, high pressure liquid chromatography, HPLC, high performance capillary electrophoresis, elemental composition, functional groups, molecule fingerprint, scaffold, comparative analysis, stand-alone analysis.

Mass spectroscopy
Mass spectroscopy, mass spectrometer, relative atomic mass, mass spectrum, fragmentation, isotopic abundance, molecular fragment, rearrangements, fragmentation processes, molecular ion peak, relative molecular mass, ionisation mode, isotopic mixtures, multicomponent systems, ion fragmentation pattern, structure of the molecular ion, ion source, mass analyser, detector, radical cations, carbocations, kinetic energy, electron impact, single focusing mass spectrometer, magnetic field, velocity, relative abundance, detection, mass to charge ratio, base peak, histogram, alcohols, halides, aromatics, branched alkanes, cycloalkanes, alkanes, curved arrows, electron shift, covalent bond, elimination, functionalised molecules, tropylium ion, McLafferty rearrangement, acids, esters, ketones, amides, retro Diels-Alder rearrangement, allylic rearrangement, fingerprints, pollutants, residues, controlled substances, detection level, isotopes, accurate mass, exact mass, molecular formula, resolution, MALDI-TOF, FAB ionisation, bupivacaine.

Nuclear Magnetic Resonance
NMR, nuclear magnetic resonance, proton NMR, carbon NMR, phosphorus NMR, Fluorine NMR, reference, TMS, chemical environment, magnetic field, adjacent protons, prediction of structure from NMR spectrum, integration of peak areas, spin-spin splitting pattern, splitting pattern, chemically identical environment, interpretation of spectrum, non-destructive method, deuterated solvents, nuclei, spin number, frequency, radiation, proton signal, ppm, parts per million, shielding effect, chemical shift, resonance, MRI, deuterium labelled solvents, D2O, DMSO-d6, acetone d6, chloroform, CDCl3, inductive effect, signal intensity, proton exchange, anisotropic effect, pascal’s triangle, high field NMR, NMR applications, drug metabolism, HPLC-SPE-NMR, HPLC, HPLC coupled NMR, drug discovery, natural compounds, mass spectroscopy, coupling pattern, peak area, relative ratio.

Chromatographic Methods of Analysis
Chromatography, Gas Chromatography, Liquid Chromatography, Separation, Mobile phase, Column, pH, Plate theory, Rate theory, Van Deemter, Diffusion, Partition, Peak, Qualitative, Quantitative, Peak resolution, Theoretical number of plates, Pumps, Chromatogram, Validation, Injectors, pharmaceutical Analysis, High Pressure Liquid Chromatography, High Performance Liquid Chromatography, Normal phi, Reverse Phase, Adsorption, Ion exchange, Size exclusion chromatography, Solvent, Flow rate, Gradient Flow, Isocratic Flow, Elution, Retention, Silica, Bonded-phase, Symmetry, Asymmetry, Tailing, Fronting, Capacity Factor, Column Efficiency, Derivatization, Flame-Ionisation detector, Detector, Thermal Detector, Carrier Gas, Open column, Capillary Column, Packed column.
Pharmacopoeial Aquametry
Dead-stop end point techniques, Karl Fischer, Aquametry, Sodium nitrite, titration, Amperometric, Voltammetric, pharmaceuticals, Free water, Bound Water, Coulometric, Visual end-point detection

Introduction to the British Pharmacopoeia
British Pharmacopoeia, BP, standards, legal definition, identification, monograph, pharmaceutical standards, European Pharmacopoeia, medicines, MHRA, British Pharmacopoeial Commission, EP, analysis, quantification, quantitative analysis, qualitative analysis

Basic aspects of pharmaceutical analysis
COSHH, laboratory safety, numeracy, significant figures, calculations, pharmaceutical, concentrations, units, molar, moles, percentage, weight, volume, equation, solving, dilution, dose, pipette, volumetric flask, accuracy, precision, accident, analysis, analytical chemistry, error, systematic error

UV-visible spectroscopy
pharmaceutical analysis, spectroscopy, UV-visible, quantitative analysis, data interpretation, electromagnetic spectrum, electronic excitation, wavelength, calibration, calibration curve, absorbance, drug concentration, chromophore, conjugation, analysis, Beer-Lambert law, molar extinction coefficient, pathlength, specific absorbance, peak height, determination, correlation coefficient, background correction, derivative spectroscopy, multicomponent systems, simultaneous determination, spectrophotometry, molecular orbital, auxochrome, British Pharmacopoeia, reproducibility, dilution, ionisation, protonation, dimerisation, interaction, isosbestic point, natural products, additivity, nicotinic acid, drotaverine, benzoic acid, papaverine, Dolor, phenacetin, aminopyrine

Infrared and Raman spectroscopy
spectroscopy, Raman, infrared, quantitative analysis, qualitative analysis, data interpretation, electromagnetic spectrum, determination, transmission, Hooke's law, scattering, laser, molecular vibration, vibration, mode of vibration, inelastic scattering, light scattering, Rayleigh scattering, lactose, sucrose, mixtures, fingerprint, interaction, spectrum, sample preparation, interference, reaction monitoring, identification, Mull, excipients, polymorph, polymorphism, polymer analysis, conformation, identification, sorbitol, aspirin, acetyl salicylic acid, caffeine, paracetamol, acetaminophen, tablet, mapping, ranitidine, covalent bond, database, functional group analysis, amine, alcohol, ester, carbonyl, Anadin Extra, attenuated total reflectance, diffuse reflectance, potassium chloride, quantisation, dipole moment, polarisability, database, amine, carbonyl, alcohol, continuous wave, Fourier Transform, FTIR, interference, Nujol, paraffin, pharmacopoeia, identification, film, coating, gel, cream, excipient

Fluorescence spectroscopy
spectroscopy, fluorescence, analysis, pharmaceutical analysis, quantitative analysis, emission, excitation, electronic excitation, Jablonski, internal conversion, relaxation, excited state, phosphorescence, vibrational relaxation, singlet, triplet, excitation spectrum, emission spectrum, quinine, planar, quantum yield, Stokes shift, sensitivity, determination, standard solution, calibration curve, quenching, fluorophore, pH, extraction, derivatisation

Atomic absorption and emission spectroscopy
Bohr, atom, orbital, excited state, energy level, absorption, emission, excitation, atomic absorption, atomic emission, spectroscopy, spectrophotometry, metal, metal ion, flame
cell, photomultiplier, detector, calibration curve, calibration, standard solution, ionisation, viscosity, interference, analysis, quantitative analysis, determination, hollow cathode tube, volatilisation, dynamic range, inductively coupled plasma

**Pharmaceutical analysis**
British Pharmacopoeia, BP, standards, identification, monograph, pharmaceutical standards, pharmaceutical analysis, medicines, analysis, quantification, quantitative analysis, qualitative analysis, calibration, calculation, concentration, fluorescence, quinine, testosterone, UV-visible, spectroscopy, gas liquid chromatography, retention time, elution, chromatography, mixture, multicomponent systems, simultaneous determination, spectrophotometry, Karl Fischer, aquametry, thin layer chromatography, Rf, solvent, solute, dilution, pipette, volumetric flask, data interpretation, data analysis, infrared, Nujol, paraffin, mull, water content, retention factor, resolution, related substances, sulphonamide, absorptivity, specific absorbance, mole, lignocaine, Avicel, diclofenac, flurbiprofen
PMY2002
Medicinal Substances: Structure and Function
Growth factors and cancer 1
Definition of growth factors, ligand-receptor specificity, examples of peptide growth factors, relationship between autocrine and paracrine production, examples of cancer-specific expression of growth factors.

Growth factors and cancer 2
Bombesin/GRP expression in lung tumours, identification of core peptide sequence necessary for activity, generation of shortest agonist peptides, modification of agonist sequence to produce antagonist, discussion of growth inhibitory activity against lung tumours.

Growth factors and cancer 3

Proteases as therapeutic targets 1
Definition of protease, discussion of catalytic classes and mechanisms, substrate recognition, proteases and disease.

Proteases as therapeutic targets 2
Cathepsin K, bone resorption, osteoporosis, catalytic mechanism, inhibitor design, pharmacophore, cathepsin K inhibitors in clinical use.

Proteases as therapeutic targets 3
DPP-IV, role of incretin peptides (GLP-1 & GIP) in insulin secretion, role of DPP-IV in the degradation of GLP-1 and GIP, catalytic mechanism of DPP-IV, inhibitor design, pharmacophore, DPP-IV inhibitors in clinical use.

Thrombolytic enzymes 1
Discussion of thrombotic disease, clotting and fibrinolytic systems, therapeutic intervention approaches, advantages and drawbacks of currently employed therapies (heparin, warfarin).

Thrombolytic enzymes 2
Thrombolytic/fibrinolytic enzymes (mammalian and bacterial), advantages and drawbacks with their use, acyl-enzymes as prodrugs, thrombolytic enzymes in clinical use.

Enzymatic semi-synthesis
Definition of enzymatic semi-synthesis and discussion of the manipulation of reaction conditions to favour synthesis over hydrolysis. Preparation of insulin analogues using this approach.

Peptoids and peptide mimetics
Peptide instability, bioavailability issues, modification of amide bonds, concept of amide isosteres and examples (peptoids), incorporation of D-enantiomers and modified amino acids to enhance stability and activity, reduction of peptide character (mimetics)

Small molecule enzyme inhibitors
Discussion of non-peptide inhibitors of enzyme targets, advantages of small molecules over peptides in terms of bioavailability. Examples of direct acting Factor Xa inhibitors (Rivaroxaban) in clinical use.
Cell cycle
- therapeutic drug targets, phosphorylation, post-translational modification, therapeutic intervention, genetic basis of disease, S phase, G phases, G0 phase, M phase, mitosis, cytokinesis, gap phase, cyclin dependent kinase, CDK, yeast, genetic mutations, cyclin, cell cycle checkpoint, cancer, tumours

Therapeutic intervention of cell cycle
- flavopiridol, UCN-01, velvade, clinical trials, FDA, ATP binding site, IC50, competitive inhibitors, anti-cyclin, angiogenesis, cell cycle arrest, anti-apoptotic protein

BCR-ABL - inhibition of cancer specific proteins
- chronic myeloid leukaemia, CML, Philadelphia chromosome, Bcr-Abl, Gleevac, Glivac, Imitinib, chromosome translocation, genetic instability, constitutively active, kinase inhibitor

Velcade - inhibition of the proteasome
- velcade, bortezamib, cell cycle, ubiquitin, ubiquitination, ubiquitylation, dipeptide boronate, proteasome, degradation, transcription, anti-apoptotic proteins, cell cycle arrest

Speeding up scientific discovery - DNA technologies
- DNA, sequencing, DNA microarray, high throughput screening, human genome project, shotgun sequencing, genomics, proteomics, transcription, mRNA

Protein Technologies
- transcription, translation, edman degradation, proteomics, mass spectrometry, peptide fingerprinting

Molecular Modelling and Drug Discovery
- Molecular modelling, ligand-protein interactions, pharmacophore, structure-based drug design, molecular mechanics, molecular dynamics, structure-activity relationships, structure-function relationships, lead, hit, drug selectivity, van der Waals, electrostatics, x-ray crystallography, NMR spectroscopy, electron density, chemokine, HIV, de novo, virtual screening, molecular docking

HIV Infection
- HIV protease, reverse transcriptase, inhibitor, life cycle, drug targets, HIV-1, HIV-2, HTLV3, DNA, RNA, virus, transcription, nucleoside inhibitors, non-nucleoside inhibitors, polyprotein precursor, transition-state mimetics, dimer destabilizer, hydroxyethylene group, tetrahedral adduct, non-scissile, knock-out, prodrug conjugates

Membrane proteins
- G protein coupled receptors, transporters, pumps, carriers, enzyme, ion channel, Raman spectroscopy, Fourier infrared transform spectroscopy, infrared, spectroscopy, Raman, molecular vibration, circular dichroism, electron microscopy, X-ray crystallography, NMR spectroscopy, homology modelling, ab initio modelling, sequence alignment, molecular mechanics, mutagenesis, structure-based drug design, signal transduction, downstream effectors, second messenger, desensitization, internalization, agonists, antagonists, partial agonists, inverse agonists, biased ligands, allosteric binding site, orthosteric ligand, activation, cascade

Molecular modelling
Molecular modelling, molecular graphics, PDB, hydrogen bonds, ionic salts, hydrophobic interactions, ligand-protein interactions, secondary structure, 3D-structure, beta-sheets, alpha-helices, loops, molecular surface, binding site, binding cavity

Marie Miguad

**COPD1**
Chronic obstructive pulmonary disease, COPD, lung, pulmonary, respiratory epithelium, bronchi, alveoli, cough, emphysema, bronchitis, bronchiolitis, airway obstruction, fibrosis, hypoxia, mucus, inflammation, smoking, bronchodilation, bronchodilators, inhaler, β-2 agonists, beta-2 agonists, anticholinergic bronchodilator, muscarinic receptors, Spiriva, Tiotropium bromide, Seretide, Advair, Darifencin, Revatropate, very long-acting beta-2 agonist, Carmoterol, pressurised metered dose inhaler, pMDI

**COPD2**
Chronic obstructive pulmonary disease, COPD, lung, smoking, nicotine-free replacement therapies, Chantrix, varenicline tartrate, nicotine receptors, steroids, neutrophils, inflammation, proteases, proteolytic enzymes, oxidative burst, recombinant proteins, synthetic inhibitors, inhibitors, adhesion molecule antagonists, leukotriene B4 antagonists, chemokine inhibitors, interleukin-8, IL-8, NF-κB inhibitors, TNFα inhibitors, PDE4, Phosphodiesterase 4 inhibitors, Prostaglandin E analogues, alpha1 antitrypsin, antioxidants, N-acetyl cysteine

**Oestrogens and Breast Cancer**
Oestrogens, estrogens, Breast Cancer, anti-estrogens, SERMs, SERDs, selective oestrogen receptor modulator, selective oestrogen receptor downregulator, breast cancer risk factors, estrogen receptor, ER, transcription factor, steroid, estradiol, estrone, ovary, adrenal gland, Tamoxifen, cholesterol, cell proliferation, menstrual cycle, estrogen receptor-positive, menopausal, breast cancer prevention, uterine cancer, Fulvestrant, aromatase, Aromatase inhibitor, anastrozole, letrozole, exemestane, HER2, human epidermal growth factor receptor2, herceptin, trastuzumab, Poly(ADP-ribose) polymerase, PARP, PARP inhibitor

**Angiogenesis: regulation and basic mechanisms**
Angiogenesis, Vasculogenesis, endothelial cells, blood vessel development, reproduction, wound healing, angiogenesis activator, angiogenesis inhibitor, anti-angiogenic drug, diabetic retinopathy, rheumatoid arthritis, Atherosclerosis, endometriosis, Psoriasis, cancer, endothelial cell migration, endothelial cell proliferation, Vascular endothelial growth factor, VEGF, Angiopoietin 1, Basic fibroblast growth factor, FGF-2, Platelet derived growth factor, PDGF, Pro-angiogenic therapy, anti-angiogenic therapy, Recombinant growth factor proteins, becaplermin, gene therapy, peripheral vascular disease, ischaemic leg ulcers, angina, Avastin, Bevacizumab, Nexavar, Sorafenib, Sutent, Sunitinib, Bortezomib, Velcade, Thalidomide, vascular disrupting agent

**Course Introduction; Biological Systems Interacting with Drug Substances**
Biological systems, drug substances, source of drug, structure of drugs, properties of drugs, optimisation of drug substance’s properties, primary metabolites, secondary metabolites, RNA, DNA, peptides, proteins, amino acids, sugar, carbohydrates, lipids, steroids, phospholipids, marine natural products, salicylic acid, proteins as biological targets, nucleic acids as biological targets, structural representation, ribbon structure, ball and stick, CPK representation, enzymes, receptors, ligand, substrate, product, agonist, antagonist, inhibitor, stability, pH, temperature, catalysis, membrane bound proteins, acetyl choline, 5-HT, noradrenaline, histamine, tricyclic antidepressant, synapse, synaptic cleft,
histamine receptor, muscarinic receptor, adrenergic receptor, 5-HT receptor, cofactors, free energy, transition state, course of reaction, enzyme-substrate complex, enzyme catalysed reaction, insulin, diabetes, pancreas, beta cells, glucose, glycogen, protein-protein interaction, hormones, coenzymes, vitamins, adrenaline, noradrenaline, testosterone, oestrogen, cortisol, insulin like growth factor.

Sources, Structures and Properties of Drug Substances
Drug substances, natural origin, synthetic drug, semi-synthetic drugs, mode of action, pharmaceutical effect, potency, toxicity, therapeutic index, lead compounds, analogues, SAR, structure activity relationship, me too drugs, receptor, ligands, physiological response, electronic distribution, shape, conformation, pharmacophore, tubocaraine, quaternary ammonium salts, drug discovery from natural sources, desirable properties, bioavailability, solubility, stability, Lipinski rules, partition coefficient, H-bond acceptors, H-bond donor, rotatable bonds, ethnopharmaceutical sources, folks remedies, quinine, digitoxin, reserpine, cardiac stimulant, antiperitic, analgesic, anti-inflammatory, antidepressant, plant sources, extraction, purification, pharmacological activity, taxol, pilocarine, morphine, vincristine, allosteric effect, tubulin, marine sources, microorganisms, animal sources, compound collections, compound libraries, high throughput screening, HTS, hit compounds, isolation, purification, structural determination, drug discovery, drug design, drug analogue synthesis.

Challenges in Optimising the Properties of Drug Substances
Pharmacokinetic property, delivery, stability, toxicity, drug discovery, pharmacodynamics property, drug discovery processes, FDA approval, pre-clinical, clinical trials, FDA review, synthetic sequence, starting materials, synthetic steps, product isolation, characterisation, stereochemistry, stereospecificity, functional groups, functionality, divergent synthesis, sub-structure, primary literature, data minig, scifinder, web of knowledge, nevirapine, anti-HIV, zidovudine, didanosine, reagent, scale, solvents, reaction conditions, temperature, concentrations, reaction time, work-up, extraction, separation, side products, purification, chromatography, crystallisation, structure, combinatorial chemistry, lead identification, dynamic combinatorial chemistry, high affinity compounds, ADME properties, DMPK, drug metabolism, pharmacokinetics, pharmacodynamics, drug candidate, large scale production.

Reviewing the general principles of enzyme mechanisms
Enzyme inhibitors, Viagra, Cialis, pulmonary hypertension, male erectile dysfunction, cGMP phosphodiesterase inhibitor, protein complex, protein crystal structure, specificity, potency, concentration, toxicity, natural inhibitor, metabolic pathways, feedback inhibition, homeostasis, proteases, nucleases, poison, enzyme nomenclature, international classification of enzymes, oxidoreductases, transferases, hydrolases, lyases, isomerases, ligases, peptide chains, proteins, amino acids, visualisation of proteins, alpha helix, beta sheets, side chain interactions, functional group interaction, ionic interaction, H-bond interaction, dipole-dipole interactions, van der waals interactions, pi-pi interactions, function/structure relationship, CPK, directionality of proteins, enzyme reaction, active site, catalytic site, allosteric site, stereo-specificity, lock and key, rate enhancement, conformation in catalysis, acid-base catalysis, nucleophilic catalysis, electrophilic catalysis, induced conformational change, rate enhancement in catalysis, rate constant, diffusional rate constant, enzymatic turnover number, turnover, non-covalent catalysis, covalent catalysis, proximity effect, orientation, polarisation, physiological pH, concentration, biomolecular collision, pKa, curved arrow mechanism, serine proteases, esterases, alkaline phosphatases, cysteine proteases, acyl transferases, kinases, DNA ligases, RNA ligasescarboxypeptidase, metal ion catalysis.
Reviewing the general principles of enzyme kinetics
Michaelis Menten equation, michaelis Menten constant, differential equation, steady state kinetics, dissociation constant, measurement, graph, equilibrium, initial velocity, variable concentration, saturation kinetics, Km, equilibrium constant, strong binding, weak binding, theoretical maximum velocity, Vmax, catalytic activity, kcat, turnover number, catalytic efficiency, enzyme regulation, allosteric effect, inhibition, competitive inhibition, uncompetitive inhibition, non-competitive inhibition, mixed inhibition.

Classes of drugs according to their pharmacophores
Pharmacophores, common conditions, diseases, asthma, cancer, flu, cold, COPD, diabetes, hypertension, heart disease, pain, classes of chemicals in diseases, anti-infectives, antidiabetics, antineoplastics, CNS agents, respiratory agents, antibacterial, bacterial cell wall, peptidoglycans, gram positive, gram negative, beta-lactams, penicillins, cephalosporins, carbapenems, phosphomycin, vancomycin, glycopeptides, aminoglycosides, tobramycin, cystic fibrosis, kanamycin, streptomycin, macrolides, erythromycin, ribosome, tetracyclines, antiprotrozoal, antibacterial, antiantiemic, broad spectrum antibiotics, bacterial resistance, DNA synthesis inhibitors, Quinolones, fluoroquinolones, MRSA, DNA unwinding, nitrofurantoin, nitrimidazole., prodrug, folic acid biosynthesis, Prontosil, sulfonamide, antivirals, replicative cycle, retrovirus, virus, nucleoside reverse transcriptase inhibitors, NRTIs, non-nucleoside reverse transcriptase inhibitors (NNRTIs), viral protease inhibitors, amprenavir, atazanavir, indinavir, amantadine, antidiabetics, secretagogues, sulfonyleureas, sensitizers, sensitisers, thiazolidinediones, Biguanides, Avandia, alpha-glucosidase inhibitors, incretin mimetics, antineoplastics, alkylation agents, antimetabolites, antimitotics, topoisomerase II inhibitors, lidocaine, morphine, opiate receptors, antipyretics, analgesics, non-steroidal anti-inflammatory drugs, psychoactive drugs, benzodiazepines, diazepine ring, Librium, valium, diazepam, barbiturates, therapeutic index, hypnotics, GABA receptor, nicotinic receptor, neurodegenerative diseases, leudopa, Parkinson’s disease, bronchodilator, aminophylline, ephedrine, noephedrine, mechanism of action, physicochemical properties, scaffold.

DNA-interacting anticancer drugs
DNA, RNA, polymerisation, cell life cycle, antimetabolites, plant alkaloids, alkylation agents, cell cycle specific agents, cell cycle non-specific agents, cisplatin, antibiotics, nitrosoureas, podophyllin alkaloids, bleomycin, double stranded DNA, phosphodiester linkage, nucleobase, hydrogen bonds, purines, pyrimidines, nucleotides, nucleosides, phosphate, diphosphate, triphosphate, folic acid, methotrexate, trimetrexate, pemetrexed, 5-fluoro uracil, 5-FU, gentacibine, cytarabine, mercaptopurine, cladribine, prodrugs, kinase, electrostatic interaction, intercalation, chlorambucil, cyclophosphamide, bisulfan, chemotherapy, secondary cancer, nitrogen mustards, ethylenimines, alkylsulfonates, nitrosoureas, triethylenemelaneline, carboquonone, diazoquonone, DNA cross linkage, lipophilicity, cell type delivery, carboplatin, cisplatin, dacarbazine, duocarmycins, mitomycin, anthracyclines, actinomycin, cyclopeptide, picamycin, glycosides, etoposides semi-synthetic derivative, paclitaxel, docetaxel, hormonal agents, tamixofen, leuprolide, aromatase inhibitors, oestrogen inhibitors, antagonen inhibitors.

Drug Metabolism and impact on drug discovery processes
Phase 1, phase 2 metabolism, detoxification, inactive metabolite, active metabolite, prodrug, drug activation, metabolic transformations, rational drug design, metabolic processes, synthetic processes, conjugation processes, xenobiotics, water solubility, elimination, half-life, metabolite, biotransformed metabolite, oxidation, reduction,
hydrolysis, alkylation, coupling to endogenous polar components, liver, GI tract, recirculation, pharmacological activity, fosphenytoin, phenytoin, Prontosil, AZT, pharmacokinetics, drug interactions, pharmacogenetics, cytochrome P450, NADH, cofactor, oxidative reactions, reductive reactions, carboxylation reactions, hydrolytic reactions, benzene, phenol, epoxide, chirality, metabolic outputs, substrate orientation, enzyme catalysis, stereospecificity, chemoselectivity, racemic mixture, desymmetrisation, glucuronic acid conjugation, sulphate conjugation, amino acid conjugation, glutathione conjugation, water conjugation, acetyl conjugation, fatty acid conjugation, cholesterol conjugation, methyl conjugation, cofactors, alcohol, amine, glutathione, glycine, glutamine, glucuronide conjugation, elimination, transactivation, absorption, biodistribution, patient’s acceptability, lipophilicity, penicillins, anticonvulsant, bio-active, nucleoside prodrugs, protide, activation mechanism, drug latentiation, carrier-linked prodrugs, promoiety, chemical release, intramolecular reaction, site of action, side effect, increased effectiveness, ADEPT, antibody directed enzyme prodrug therapies.

Scientific Data mining
Accelrys draw, molecules, drawing, reactions, query, IUPAC, ISIS-Draw, PDB, Swiss-Prot, FASTA, EMBL files, SYMYX, chirality, functional group, alkanes, sugar, reagents, valency, British pharmacopeia, BP, maprotiline hydrochloride, desogestrel, vedaprofen, chemical nomenclature, therapeutic application, aspirin, synthesis of aspirin.

Virtual chemistry laboratory
Organic chemistry practice, experimental procedures, reaction, reaction conditions, exothermic reactions, reaction rates, solvent, reagent selection, purification, characterisation, identification, Infrared spectroscopy, NMR spectroscopy, molarity, limiting reagents, thin layer chromatography, ultraviolet and visible spectroscopy, quench, work up, crystallisation, distillation, contamination, purity.

Synthesis
COSHH, safety, hazardous materials, yields, melting points, boiling points, physicochemical properties, NMR spectroscopy, IR spectroscopy, UV and visible spectroscopy, liquid-liquid extraction, crystallisation, filtration, spectroscopic analysis, distillation, sample preparation, deuterated solvents, thin layer chromatography, pharmaceutical preparation, BP, merck’s index, identification, isolation, synthesis, characterisation, purification, analysis, purity, lidocaine, phenytoin.

Natural product isolation
COSHH, safety, hazardous materials, yields, melting points, boiling points, physicochemical properties, NMR spectroscopy, IR spectroscopy, UV and visible spectroscopy, liquid-liquid extraction, spectroscopic analysis, sample preparation, deuterated solvents, thin layer chromatography, pharmaceutical preparation, alkaloid extraction, natural product, isolation, characterisation, purification, analysis, purity.
PMY2004
Principles of Drug Action 1
Introduction to Pharmacology
Pharmacology, therapeutics, pharmacotherapy, aspirin, acetylsalicylic acid, generic, brand, mechanism of drug action, chemistry, physiology, pathology, clinical effect, history, mathematics, quantitation, BNF, British National Formulary

Quantitative Pharmacology
Quantitation, drug-receptor interactions, stereochemistry, structure-activity relationships, potency, EC50, occupancy, affinity, efficacy, agonist, antagonist, competitive antagonist, non-competitive antagonist, allosterism, spare receptors, receptor reserve, cooperativity, desensitisation, radioligand binding, Scatchard plot, Schild Plot, Cheng-Prusoff analysis, Hill plot, concentration-response curve, dose-response curve, saturable response, receptors, logs, acetylcholine, stereoisomerism, Hill-Langmuir Equation, equilibrium constants, rate constants, affinity constant, dissociation constant, specific binding, non-specific binding, dopamine, iloprost, morphine, salbutamol, atenolol, atracurium, cimetidine, fexofenadine, hyoscine, ipratropium, naloxone, prazosin, zafirlukast, Archibald Vivian Hill, John Henry Gaddum, Gaddum Equation, Heinz Otto Schild, parallel rightward shift, dose ratio, pA2, IC50, irreversible antagonism, full agonist, partial agonist, Hill coefficient, multiple binding sites, tachyphylaxis, fade, homologous desensitisation, heterologous desensitisation, β-receptor, 2-state model, orthosteric, syntopic, allosteric, allotropic, GABAA receptor, nicotinic receptor, benzodiazepines, barbiturates, ethanol, general anaesthetics, co-agonism, channel blocking drugs, lidocaine, enzyme inhibitors, TNF, infliximab, etanercept,

Receptors and Drug Targets
Drug target, receptors, 7-transmembrane, 7TM, GPCR, G-protein-coupled receptor, catalytic receptors, nuclear receptors, enzymes, transporters, ligand-gated ion channels, voltage-gated ion channels, CD antigens, GRAC, Guide to Receptors and Channels, IUPHAR database, ligands, peptides, organic molecules, biologics, β2 receptor, orphan receptors, Nobel Prize, G-proteins, GTP-binding proteins, Gs, Gi, Gq, intracellular signalling, adenylate cyclase, cyclic AMP, cAMP, protein kinase A, PKA, ion channels, nicotinic receptor, src, SH domains, oncogenes, tyrosine phosphorylation, phosphatase, collagen, GpVI signaling, phospholipases, PLC, inositol 1,4,5-trisphosphate, IP3, DAG, diacylglycerol, steroids, transactivation, transrepression,

Neuro-degenerative Disorders
Alzheimer’s Disease, Parkinson’s Disease, Huntingdon’s chorea, dopamine, acetylcholine, acetylcholinesterase, anticholinesterase, L-DOPA, neurotransmitter, nigrostriatal pathway, substantia nigra, MAO-B inhibitors, bromocriptine, selegiline, entacapone, COMT inhibitor, neurotransmitter synthesis, amantadine, anti-muscarnic, orphenadrine, donezepil, memantine, rivastigmine, psychosis

Introduction to autonomic nervous system
Autonomic nervous system, peripheral nervous system, sympathetic nervous system, parasympathetic nervous system, neuron structure, neuron function, nerve transmission, ion channel, action potential, voltage gated ion channel, sodium ion channel, depolarisation, depolarization, repolarisation, repolarization, atp dependant ion pumps, visceral smooth muscle, glands, heart accelerator nerve, vagus nerve, heart rate, blood pressure, iris, digestive system, breathing, pre-ganglionic axons, post ganglionic neurones, neurotransmitters, acetylcholine, noradrenaline, cholinergic receptors, nicotinic receptors, muscarinic receptors, adrenergic receptors, alpha adrenergic receptors, beta adrenergic receptors
Parasympathetic nervous system
Parasympathetic nervous system, neurotransmitter, acetylcholine, nicotinic receptors, muscarinic receptors, synaptic vesicles, choline acetylase, choline acetyltransferase, action potential, calcium channels, acetylcholinesterase, butyrylcholinesterase, nicotine, sodium ion channel, potassium ion channel, muscarine, vagus nerve, g-protein coupled receptor, blood pressure, atropine

Drugs acting on the parasympathetic system 1
Parasympathetic nervous system, acetylcholine, acetylcholine synthesis inhibitors, vesicle uptake inhibitor, acetylcholine release blocker, botulinum toxin, blepharospasm, muscarinic receptor agonist, parasympathomimetic, muscarinic receptor, miosis, carbachol, pilocarpine, glaucoma, aqueous humour, intraocular pressure

Drugs acting on the parasympathetic system 2
Parasympathetic nervous system, acetylcholine, nicotinic receptor, nicotinic receptor agonist, nicotine, autonomic ganglia, parasympathetic nervous system, sympathetic nervous system, motor end plates, skeletal muscle, CNS, suxamethonium, scoline, decamethonium, neuromuscular junction, neuromuscular blocker, depolarising, depolarizing, intubation, muscle relaxant, reversible antagonist, competitive blocker, irreversible antagonist, non-competitive blocker, muscarinic receptor, atropine, hyoscine, tiotropium, scopolamine, atropine, COPD, asthma, methonitrate, mydriasis, tropicamide, ciliary muscle, cycloplegia, bronchodilator, antispasmodics, Parkinson's disease

Drugs acting on the parasympathetic system 3
Parasympathetic nervous system, nicotinic receptor, nicotinic receptor antagonist, autonomic ganglia, acetylcholinesterase, butyrylcholinesterase, cholinesterase, anticholinesterase drugs, acetylcholine, myasthenia gravis, glaucoma, Alzheimer's disease, neuromuscular block, reversible anticholinesterase, irreversible anticholinesterase, organophosphates, nerve agents

Neuromuscular blockers
Neuromuscular junction, skeletal muscle, neuromuscular blocker, depolarising blocker, non-depolarising blocker, depolarizing blocker, non-depolarizing blocker, action potential, nicotinic receptor, muscle contraction, voltage gated ion channel, acetylcholine, motor end plates, neuromuscular transmission, membrane depolarisation, membrane depolarization, agonist, antagonist, competitive antagonist, phase 1 block, titanic contraction, titanic fade, anaesthesia, muscle relaxant, intubation, ventilation, desensitisation, tachyphylaxis, singly innervated muscle, multiply innervated muscle

Sympathetic nervous system
Sympathetic nervous system, noradrenaline, adrenergic receptor, alpha adrenergic receptor, beta adrenergic receptor, noradrenaline synthesis, noradrenaline release, uptake 1, uptake 2, G protein coupled receptor

Drugs acting on alpha adrenoreceptors 1
Sympathetic nervous system, noradrenaline, adrenoreceptor, alpha adrenoreceptor, beta adrenoreceptor, alpha adrenoreceptor agonist, unspecific alpha agonists, alpha 1 specific agonists, alpha 2 specific agonists, adrenaline, anaphylactic shock, septic shock, hypotension, decongestant, mydriatic, mydriasis

Drugs acting on alpha adrenoreceptors 2
Sympathetic nervous system, noradrenaline, adrenoreceptor, alpha adrenoreceptor antagonist, unspecific alpha antagonist, alpha 1 specific antagonist, alpha 2 specific antagonist, pheochromocytoma, adrenaline, tyrosine hydroxylase inhibitor, hypertension, benign prostatic hyperplasia, Reynaud’s syndrome,

**Drugs acting on beta adrenoreceptors 1**
Sympathetic nervous system, noradrenaline, adrenoreceptor, beta adrenoreceptor, beta adrenoreceptor agonist, unspecific beta agonist, beta 1 specific agonist, beta 2 specific agonist, asthma, aerosolising inhaler,

**Drugs acting on beta adrenoreceptors 2**
Sympathetic nervous system, noradrenaline, adrenoreceptor, beta adrenoreceptor, beta adrenoreceptor antagonist, unspecific alpha beta antagonist, unspecific beta antagonist, beta 1 specific antagonist, beta blocker, angina pectoris, myocardial infarction, dysrhythmia, heart failure, hypertension, glaucoma

**Other drugs acting on the noradrenergic system**
Sympathetic nervous system, noradrenaline, adrenoreceptor, alpha adrenoreceptor, beta adrenoreceptor, adrenergic neurone blocker, hypertension, noradrenaline synthesis inhibitors, pheochromocytoma, inhibitors of vesicular transport, reuptake inhibitors, uptake 1, tricyclic antidepressant, indirect sympathomimetic, ganglion blockers, nicotinic receptor

**Autonomic nervous system review**
Autonomic nervous system, sympathetic nervous system, parasympathetic nervous system, acetylcholine, noradrenaline, nicotinic receptor, muscarinic receptor, adrenergic receptor, alpha adrenergic receptor, beta adrenergic receptor, acetylcholinesterase, ion channel, G protein coupled receptor, glaucoma, mydriasis, miosis, asthma, COPD, congestion, angina pectoris, myocardial infarction, dysrhythmia, heart failure, hypertension, hyponatremia, myasthenia gravis, benign prostatic hyperplasia, pheochromocytoma, ADHD, depression, tourette’s, anticholinesterase, muscarinic receptor agonist, beta blocker, muscarinic receptor antagonist, alpha 1 adrenergic agonist, beta 2 agonist, decongestant

**Central Nervous System I: Antidepressants**
Depression, suicide, symptoms of depression, monoamine theory of depression, Step care model of treating depression, MAOIs, Monoamine oxidase inhibitors SSRIs, Selective serotonin reuptake inhibitors, TCAs, Tricyclic and tetracyclic antidepressants

**Anti-psychotic drugs**
Insanity, schizophrenia, depression, dementia, lunacy, OCD, psychosis, neurosis, dementia praecox, cognitive processes, mental disorder, DSM, Diagnostic and Statistical Manual, positive symptoms, hallucinations, delusions, negative symptoms, cognitive dysfunction, lobotomy, ECT, ICT, Freud, Kraepelin, bromide, barbiturates, chlorpromazine, psychopharmacology, psychiatry, haloperidol, dopamine, mesocorticolimbic pathways, tubero-hypophyseal pathway, Parkinsonism, Shaking Palsy, dopamine receptors, amphetamines, dopamine hypothesis, extra-pyramidal side effects, typical antipsychotics, atypical antipsychotics, sulpiride, clozapine, aripiprazole, prolactin, glutamate hypothesis, ketamine, NMDA receptor, ADHD, methylphenidate, Ritalin, emesis, nausea, metoclopramide, dopamine

**Opioids**
Poppy, opium, laudanum, morphine, paregoric, codeine, heroin, etorphine, pethidine, fentanyl, methadone, endorphin, enkephalin, dynorphin, phenanthrene, analgesia, GI motility, respiratory depression, anti-tussive, pupil constriction, formation, nausea, vomiting, sedation, euphoria, dependence, structure-activity relationships, receptor antagonists, metabolism, glucuronidation, prodrug, diamorphine, μ receptors, δ receptors, κ receptors, ketocyclazocine, opioid peptides, agonist, antagonist, naloxone, partial agonist, buprenorphine, GPCR, G-protein-coupled receptor, Gi, adenylate cyclase, supraspinal, spinal, peripheral, pain, hyperalgesia, allodynia, neuralgia, afferent, efferent, central nervous system, axon diameter, spinal cord, spinothalamic tract, thalamus, brain, limbic system, nociceptors, C fibres, Aδ fibres, dorsal horn, substantia gelatinosa, substance P, gate control, inhibitory pathways, anatomical receptor distribution, neurotransmitter release, local anaesthetics, NSAIDs, palliative care, anti-diarrhoeal, loperamide, blood brain barrier, first pass effect, diphenoxylate

Cancer – cell cycle I
Cancer, cell cycle, proliferation, Cell division, cell growth, DNA replication, G1 phase, S phase, G2 phase, mitosis, cytokinesis, prophase, metaphase, anaphase, telophase, Interphase, cyclin, cyclin dependent protein kinase, CDK, tumour suppressor gene, oncogene, growth factor, mutation, cell cycle checkpoint, DNA damage, mitosis promoting factor, p21, growth factor

Cancer – cell cycle II

Cytotoxic Drugs and Classification of Cytotoxic Drugs
Cytotoxic Drugs; Cancer Progression; Cancer Incidence; Cancer Risks; Classification; Lifestyle; Infectious Agents; Viruses; Proto-oncogenes; Tumour Suppressor Genes; Mutations; Metastatic Spread; Multi-step process; Apoptosis; Cytotoxic Action; Proliferating Cells; DNA damage: S-Phase Drugs; M-Phase Drugs; Disadvantages; Acute Toxicity; Chronic Toxicity; Mucous Membranes; Dermatological; Bone Marrow Suppression; Gastro-intestinal; Renal and Hepatic; Neurotoxicity; Hypersensitivity Type 1; Chills and Fever; Infertility; Classical Anti-Cancer Agents; Alkylating Agents; Anti-Metabolites; Cytotoxic Antibiotics; Natural Product Agents; Hormonal Agents; Novel Anti-Cancer Agents; Bioreductive Agents; Tyrosine Kinase Inhibitors; Proteosome Inhibitors; mTor Inhibitors

Cytotoxic Drugs
Alkylating Agents; Mechanism of Action; Alkyl Groups; Covalent Bonds with DNA; Two Reactive Groups; Donate electrons; Intramolecular cyclization; Loss of Chloride Radical; ethyleneimine ion; Bi-functional; N7 Guanine; Intra and Inter Cross Linkage; Defective Replication; S-Phase Drug; Nitrogen Mustard – Cyclophosphamide; 2-chloroethyl side chains; carbonium ion; metabolized by P450 enzymes; Nitrosoureas – Carmustine; Platinum Based – Cisplatin; diamine-platinum complex; inorganic metal complex; oral availability; half-life; excretion; clinical application; acute toxicity; delayed toxicity; Anti-metabolites, Folate Analogues – Methotrexate; Purine Analogues - 6-mercaptopurine; Pyrimidine Analogues – Fluorouracil

Cytotoxics 3- Antibiotics and Hormonal Agents
antibiotics action includes - Inhibition of topoisomerase II, DNA intercalation, generation of semiquinone free radicals and oxygen free radicals, binding to cellular membranes; Anthracyclines – Doxorubicin; Dactinomycin; Minor groove binding; Bleomycin; Natural Product Agents; Mitotic inhibitors that target tubulins; Cell cycle dependent acting in M-Phase; Vinca alkaloids – Vinblastine; Inhibits tubulin polymerization; Vincristine; Taxanes; Stabilizes the microtubule and increases polymerization; M Phase drugs; Paclitaxel; Docetaxel; Hormonal Agents; Oestrogen antagonists – Tamoxifen; selective estrogen receptor modulator (SERM); agonist inhibitor of estradiol at the estrogen receptor; Fulvestrant -2nd generation; ER dimerization is impaired; Aromatase inhibitors – Letrozole Blocks the aromatization of androgens; Anti-androgens – Flutamide; Accelerates the degradation of the Androgen Receptor;

Cytotoxics 4- Novel Anti-Cancer Agents
Tumour hypoxia; bioreductive agents; reducing enzymes include NADPH, cytochrome P450 and nitric oxide synthase; Quinones – Mitomycin C; Nitroaromatics – PR-104 (dinitrobenzamide prodrug); Aliphatic N-Oxides – AQ4N (Banoxantrone); Heteroaromatic N oxide – Tirapazamine; Tyrosine Kinase Mechanism; Gefitinib; Also known as Iressa®; Attaches to the EGF receptor on the cell; Prevents the receptor being activated; Stops the tyrosine kinase cascade; Bortezomib; potent and selective proteosomal inhibitor; inhibits an important cellular mechanism that regulates the cell cycle through the activation of nuclear factor-kB (NF-kB). Mammalian target of rapamycin – mTOR; Temsirolimus.

Pathophysiology
Disorders of the cardiovascular system, nervous system, inflammatory diseases, renal diseases

Quantitative Pharmacology
Quantitation, affinity constant, dissociation constant, EC50, pA2, Scatchard Plot, Schild Plot, radioligand binding, specific binding, non-specific binding, partial agonism, competitive antagonism, Cheng-Prusoff, mathematics, calculation, logs, graphs,

Frog rectus abdominis practical and suxamethonium cal package
Frog rectus abdominis muscle, neuromuscular blocker, non-deploarising, non-depolarizing, depolarising, depolarizing, acetylcholine, muscle contraction, acetylcholinesterase, multiply innervated muscle, focally innervated muscle, sub-maximal dose, anticholinesterase, motor end plate

Guinea pig ileum practical
Guinea pig ileum, smooth muscle, muscle contraction, acetylcholinesterase, butyrylcholinesterase, sub-maximal dose, anticholinesterase, acetylcholine, muscarinic receptor

Rabbit jejunum practical
Rabbit jejunum, spontaneous rhythmic contraction, acetylcholine, adrenaline, noradrenaline, isoprenaline, anticholinesterase, muscarinic receptor, muscarinic receptor antagonist, adrenergic receptor, alpha adrenergic receptor, beta adrenergic receptor, unspecific alpha adrenergic antagonist, alpha blocker, unspecific beta adrenergic antagonist, beta blocker
ADME - Routes of drug administration
Pharmacology, drug administration, pharmacokinetics, drug absorption, oral, buccal, sublingual, topical, rectal, inhalation, parenteral, intravenous, intramuscular, subcutaneous, intraarterial, intraperitoneal, Intrathecal, patient compliance, drug ionisation, lipid solubility, first pass metabolism

ADME - Drug absorption from the GI tract

ADME - Drug distribution
Drug distribution, plasma protein, plasma protein binding, drug absorption, drug equilibrium, perfusion limited distribution, Lipid solubility, body fluid compartment, Plasma, Interstitial fluid, Intracellular fluid, Transcellular fluid, tissue permeability, tissue perfusion, perfusion limited distribution, volume of distribution, Vd, pH partition, blood brain barrier, tissue compartment barriers, tissue binding, fat/water partition

ADME - Drug metabolism
Drug metabolism, liver, cytochrome p450, phase I metabolism, phase II metabolism, Pharmacogenetics, water solubility, drug polarity, functionalisation reactions, conjugative reactions, hepatic smooth endoplasmic reticulum, Microsomes, Alcohol dehydrogenase, Monoamine oxidase, Induction of Microsomal Enzymes, Inhibition of Microsomal Enzymes, reversible inhibition, first pass metabolism, Cirrhosis of the liver, Alcoholic liver disease, Cholestatic jaundice, Liver carcinoma, Endocrine disorders

ADME - Drug excretion
Drug excretion, renal excretion, drug elimination, kidney, lipid solubility, drug ionisation, faecal excretion, bile, Glomerular filtration, Active tubular secretion, Passive diffusion, Physiochemical properties of the drug, Plasma protein binding, Kidney physiology, Nephron, glomerulus, renal tubule, Clearance rate, creatinine clearance, Glomerular filtration rate, pKa, pH, urine, reabsorption, renal function, Expired air, sweat, milk excretion

Central nervous system II: hypnotics and anxiolytics
Hypnotics, anxiolytic, sleep disorder, anxiety disorder, orthodox sleep, paradoxical sleep, rapid eye movement, REM, NREM, raphe nuclei, diencephalon, reticular activating system, 5-hydroxytryptamine, 5-HT, insomnia, hypersomnia, dysomnia, benzodiazepine, chloral hydrate, %-HT receptor agonists, beta adrenoceptor antagonists, barbiturates, GABA receptor, gamma-aminobutyric acid, GABAA receptor, zopiclone, zolpidem, zaleplon, buspirone

General Anaesthetic Mechanism of Action
General anaesthetic, anaesthesia, ether, unconsciousness, immobility, amnesia, analgesia, unresponsiveness, depress electrical excitability, GABAA receptor, NMDA receptor, epilepsy, nitrous oxide, chloroform, chloral hydrate, laughing gas, halothane, thiopental, alphaxalone, ketamine, etomidate, propofol, isoflurane, xenon, partition coefficient, solubility, oil, water, Meyer-Overton correlation, righting reflex, minimum alveolar concentration, MAC, oil:gas partition coefficient, oil:water partition coefficient, anaesthetic potency, lipid hypothesis, stereoselectivity, pressure reversal, potassium channels, protein hypothesis, luciferase, hydrophobic pocket, allosteric binding sites, cys-
loop receptors, ligand-gated ion channel, nicotinic receptor, glycine receptor, 5HT3 receptors, chloride conductance, barbiturates, benzodiazepines, volatile, gaseous, GABAA subunits, NMDA receptors, strychnine, glutamate, ionotropic calcium channel, channel blocking drugs

**General Anaesthesia and Pharmacokinetics**
General anaesthesia, thiopental, Pearl Harbour, pharmacokinetics, lipid solubility, metabolism, short-acting, terminal phase half-life, induction, volume of distribution, extracellular fluid, intracellular fluid, partition coefficients, elimination, distribution, minimum anaesthetic concentration, rapid distribution phase, slow elimination phase, tissue blood flow, blood distribution, multiple dosing, anaesthetic hangover, blood:gas partition coefficient, minimum alveolar concentration, halothane, methoxyflurane, isoflurane, desflurane, nitrous oxide, rapid onset/offset, slow onset/offset, kinetics, potency, ether

**Local Anaesthetics**
Local anaesthetics, pain, cocaine, coca-cola, John Pemberton, numbness, nerve transmission, ester, amide, lidocaine, excitable tissues, voltage-gated sodium channels, Hodgkin & Huxley, activation, inactivation, use-dependence, pH-dependence, voltage-dependence, TEA, procaine, weak base, QX-314, benzocaine, hydrophobic pathway, hydrophilic pathway, action potential, depolarisation, repolarisation, resting membrane potential, binding sites, voltage sensor, molecular biology, anti-epileptic, anti-dysrhythmic, bonjela, dequacaine, germolene, strepsils, applications, hexylresorcinol, phenol, anorectal, mouth ulcers, teething, cough, epidural, endoscopy, intubation, diagnosis, dental, ophthalmology, phenytoin, carbamazepine, lamotrigine, Vaughan-Williams classification, Class I anti-dysrhythmic, cardiac rhythms, ischaemia, electrical conduction, refractory tissue, ectopic beat, fibrillation, sub-types of voltage-gated sodium channel, Nav1.1, potential novel targets, Nav1.8, A-803467, neuropathic pain, bupivacaine, procaine penicillin,

**Anti-epileptic drugs**
Epilepsy, SUDEP, seizure, fit, sacred disease, falling sickness, Hippocrates, Lucretius, De Rerum Natura, Jesus, Gospel, St Valentine, St Paul, religion, John Hughlings Jackson, John Russell Reynolds, Richard Caton, EEG, electroencephalogram, neurology, neurological disorder, partial seizure, generalised seizure, focal seizure, grand mal, petit mal, status epilepticus, simple seizure, complex seizure, primary, secondary, parietal lobe, occipital lobe, frontal lobe, temporal lobe, aura, tonic-clonic seizure, absence seizure, myoclonic seizure, tonic seizure, atonic seizure, sodium pump, potassium channels, use dependent block, anti-dysrhythmic, GABA, glycine, ligand-gated ion channel, general anaesthetics, ethanol, voltage-gated calcium channels, suicide, Dilantin, gingival hyperplasia, hirsutism, zero-order pharmacokinetics, trigeminal neuralgia, Valium, lorazepam, GABA transaminase, T-type, drug interactions, hepatic inducers, hepatic inhibitors, plasma protein binding, warfarin, tiagabine, vigabatrin, GABA uptake inhibitor, neurotransmission, NMDA antagonist, epileptogenesis, mutations, neuroinflammation, gliosis, rapamycin, COX-2 inhibitors, cycloheximide, anti-inflammatory drugs,

**Inflammation**
Inflammation, acute inflammation, chronic inflammation, complement system, adaptive and innate immunity, proinflammatory cytokine, inflammatory disease, anti-inflammatory drug, natural killer cells, phagocytic cells, epithelial barriers, IgM, IgG1, IgG3, C3b, C5b, T cell, TCR, T cell receptor, antigen, Th1, Th2, antibody, histamine, serotonin, bradykinin, inflammatory bowel disease, corticosteroid, anti-histamine, biological agent, anti-TNF.

**NSAIDs**

NSAIDs, non-steroidal anti-inflammatory drugs, Mechanism of action, Pharmacokinetics, Interactions, Antipyretic, Analgesic effect, Anti-inflammatory, cyclooxygenase, COX, prostaglandins, Prostaglandin Synthesis, Membrane Phospholipids, Phospholipase A2, Arachidonic acid, PGG2, prostaglandin G2, PGH2, prostaglandin H2, PGD2, prostaglandin D2, PGF2a, prostaglandin F2a, PGE2, prostaglandin E2, PGI2, prostaglandin I2, prostacyclin, TXA2, thromboxane A2, Vasodilatation, Swelling, Pain, bradykinin, Ibuprofen, Piroxicam, Enterohepatic circulation, NSAID side-effects, gastrointestinal complications, heartburn, nausea, dyspepsia, abdominal pain, mucosal lesions, perforated ulcers, bleeding, death, reversible renal failure, platelet dysfunction, bronchospasm, cyclooxygenase 1, COX-1, cyclooxygenase 2, COX-1/ COX-2 selectivity, COX-1 specific inhibitors, aspirin, Nonspecific COX inhibitors, diclofenac, ibuprofen, Preferential COX-2 inhibitors, meloxicam, nabumetone, etodolac, COX-2 Specific Inhibitors, Celecoxib, Etoricoxib, Parecoxib, Cardiovascular toxicity, Naproxen, diclofenac, ibuprofen, peptic ulceration, aspirin

**Aspirin & Paracetamol**

Aspirin, paracetamol, willow tree, salicylic acid, rheumatism, Bayer, acetylsalicylic acid, pain, fever, inflammation, analgesic, anti-pyretic, anti-inflammatory, platelets, anti-thrombotic, heart attack, bradykinin, complement, coagulation cascade, cytokines, TNF, IFN, interferon, tumour necrosis factor, histamine, ATP, serotonin, free radicals, nitric oxide, reactive oxygen species, eicosanoid, prostaglandin, leukotriene, lipoxin, platelet-activating factor, PAF, membrane phospholipids, arachidonic acid, glyceral, diacylglycerol, phosphatidic acid, choline, inositol, serine, ethanolamine, phospholipase, PLA2, PLC, PLD, PLA1, PGG2, PGH2, cyclo-oxygenase, COX, COX-1, COX-2, PGD2, PGE2, PLA2, PGI2, prostacyclin, thromboxane A2, haemostasis, Sir John Vane, prostanoid receptors, EP, DP, FP, IP, TP, NSAID, non-steroidal anti-inflammatory drugs, irreversible inhibitor, Reyes syndrome, cancer, arterial thrombosis, Alzheimer's Disease, acetaminophen, methaemoglobinaemia, phenacetin, Calpol, COX-3, glutathione, N-acetylcysteine, antioxidant, NAPQI, glucuronidation, sulphation, metabolism,

**Anti-Platelet Drugs**

Aspirin, platelets, megakaryocytes, dense granules, alpha granules, adhesion, aggregation, release reaction, coagulation, pro-coagulant activity, thrombin generation, ADP, TXA2, thromboxane, collagen, GPCR, G-protein-coupled receptor, integrin, Gβ3, Gαβ3, Gβ1, GPVI, glycoprotein VI, PAR1, PAR4, P2Y1, P2Y12, TP, IP, inside-out signalling, fibrinogen, von Willebrand Factor, haemostasis, thrombosis, GpIba, blood vessel damage, extra-cellular matrix, clopidogrel, ticagrelor, ReoPro, Integrilin, Aggrastat, tiopronin, eptifibatide, abciximab, Plavix, Brilique, clotting, arterial thrombosis, venous thrombosis, warfarin, Dr Lawrence Craven, meta-analysis, anti-thrombotic trialists, aspirin dilemma, pro-aggregatory, anti-aggregatory, prostacyclin, endothelium, irreversible inhibitor of COX, cyclooxygenase, COX-1, prostaglandins, thromboxane synthase, ticlodipine, prasugrel, CYP2C19, ADP antagonists, purinoreceptor, cangrelor, oral, peptide, GpIIbIIIa, orbofiban, lotrafiban, sibrafiban, xemilofiban, Phase III trials,

**Immunosuppressant drugs & Steroids**
Steroids, immune system, immunosuppressant, cyclopentaphenanthrene, pancuronium, alphaxalone, digoxin, spironolactone, cholesterol, bile acids, vitamin D, statins, HMG CoA reductase, hormones, sex steroids, glucocorticoids, mineralocorticoids, anti-inflammatory, metabolic, testosterone, estradiol, progesterone, cortisol, aldosterone, adrenal gland, medulla, adrenaline, epinephrine, zona glomerulosa, zona fasciculate, zona reticularis, corticosterone, aromatase, androgens, estrogens, progestagens, ACTH, adrenocorticotropic hormone, hypothalamo-pituitary-adrenocortical axis, CRF, corticotrophin-releasing factor, stress, circadian secretion, renin-angiotensin, catabolic, increase blood pressure, gluconeogenesis, inflammation, dropsy, foxglove, rheumatoid arthritis, pregnancy, cortisone, Edward Kendall, Tadeus Reichstein, Philip Hench, Nobel Prize, nuclear receptors, cytoplasmic receptors, gene transcription, transactivation, transrepression, glucocorticoid receptor, heat shock protein, transcription factors, lipocortin, annexin-1, COX-2, iNOS, PLA2, TNFα, IL-1, interleukin, IL-1ra, anakinra, IL-10, T-cell, B-cell, prostaglandin synthesis, histamine release, nitric oxide generation, neutrophil migration, asthma, adrenal suppression, atrophy, circulatory collapse, Cushing’s syndrome, cytokine modulators, infliximab, etanercept, psoriasis, inflammatory bowel disease, tumour necrosis factor, cyclosporin, tacrolimus, organ transplantation, calcineurin inhibitors, IL-2 inhibition, FK506-binding protein, immunophilin, cyclophilin, T cell receptor, TCR, NF-AT, NSAIDs, non-steroidal anti-inflammatory drugs, leukotriene antagonist, lipoxygenase inhibitors

**Inflammation: Histamine and anaphylaxis**
Histamine, allergic response, allergic reaction, anaphylaxis, hypersensitivity reaction, acute inflammatory response, histamine receptor, H1 receptor, H2 receptor, mast cells, basophils, triple response test, IgE, slow reacting substance of anaphylaxis, smooth muscle contraction, bronchial smooth muscle, blood pressure, capillary permeability, oedema, Anaphylactoid, adrenaline, adrenal corticosteroids, sodium cromoglycate, 2 agonist, salbutamol, hydrocortisone, Mast Cell Stabilizer, Nedocromil, Albuterol, H1 Receptor Antagonists, H2 Receptor Antagonists, anti-histamine, anti-emetic, anti-vertig, anti-tussive, Anti-acid medicines, peptic ulcer disease, reflux oesophagitis

**Toxicology**
Drug toxicity, therapeutic range, Paracetamol toxicity, Medical Regulation, COSHH, Health and Safety Regulation, Mutagenicity, teratogenicity, teratogen, Carcinogenic, carcinogen, cytotoxic, genotoxic, nephrotoxic, toxicity testing, Pesticides, Cigarette Smoking, lead poisoning, production phase, environmental kinaetic phase, exposure phase, toxicokinetic phase, toxicodynamic phase, organ specific toxicity, multiple organ toxicity

**Hepatotoxicity and Nephrotoxicity**
Hepatotoxicity, Nephrotoxicity, Liver structure and function, liver, liver physiology, Alcohol toxicity, ethanol, Halothane toxicity, isoniazid, fast acetylator, slow acetylator, carbon tetrachloride, cholestasis, biochemical hepatotoxicity, immunological hepatotoxicity, Renal injury, kidney physiology, Kidney structure and function, creatinine, mercury toxicity, nephrotoxicant, co-trimoxazole, rifampacin, paracetamol, tetracycline, laxative, cyclosporine A, aminoglycoside, mercury, non-narcotic analgesic, benoxaprofen, platinum, creatinine clearance

**Diuretics**
Diuretics, High efficacy diuretic, medium High efficacy diuretic, low efficacy diuretic, dieresis, kidney, glomerular filtration rate, cardiac glycosides, xanthine derivatives, plasma volume expanders, dopamine, osmotic diuretics, sodium reabsorption inhibitors, organomercurials, mersaly, phenoxyacetic acids, ethacrynic acids, sulphamoyl benzoates,
furosemide, bumetanide, piretamide, torasemide, renal failure, nephritic syndrome, benzothiadiazines, potassium balance, osmotic agents, carbonic anhydrase inhibitors, potassium supplements, spironolactone, amiloride

Pathophysiology
Disorders of the: Respiratory system, Eye, Ear, Nose Throat, Gastrointestine and Biliary system, Endocrine system.

Drug pharmacology
Powerpoint presentation, ADME, absorption, distribution, metabolism, excretion, pharmacology, pharmacokinetics, pharmacodynamics

Effect of pH on absorption
pH, absorption, acid, base, Henderson-Hasselbalch equation, ionisation, H+, proton, salicylic acid, quinine, weak acid, weak base, local anaesthetic, lipid membranes, calculations, lipid solubility, perfusate, intestinal absorption

Metabolism
Paracetamol, glutathione, glucuronidation, sulphation, absorbance, urine, glusulase, glucuronidase, pH, excretion, metabolism, conjugation, oxidation,

Histamine/Anaphylaxis
Histamine, anaphylaxis, hypersensitivity, acetylcholine, albumen, mepyramine, contraction, sensitisation, inflammation, IgE, immunoglobulin, first generation, second generation, third generation, antihistamines, triple response, slow-reacting substance of anaphylaxis, SRS-A, anaphylactic shock, adrenaline, loratadine, chlorpheniramine, diphenhydramine, guinea-pig ileum

Clinical placement
Clinical pharmacy, skills, techniques, pharmacy practice, community pharmacy, hospital pharmacy, therapeutics, program of placements, teacher practitioners, portfolio, student responsibilities, consolidate knowledge, put learning into practice, pathophysiology of disease, medicines use, pharmacy specific skills, communication skills, interact with patients, professional role models, pharmacists, pharmacy technicians, healthcare team, patient care, professional behaviour, interactive, participation, lectures, workshops, ward-based clinical teaching, appropriate dress, infection control procedures, BNF, work-based etiquette, pharmacist tutor, health and safety, handwashing, patient confidentiality, AccessNI, vulnerable patients, hospital dispensary, aseptic, specialist technical services, medicines information, inpatients, outpatients, discharge, admission, patient journey, procurement, medicines distribution, automation, robotic dispensing, patient counselling, parenteral administration, TPN, IV additives, chemotherapy, patient controlled analgesia, ocular injections, formulary development, NHS plan, quality, shape care around patient, patient access to medications, reduce wastage, advice to patients, other healthcare professionals, pre-admission clinics, medication history, OTC medications, herbal preparations, allergy status, ADRs, Trust guidelines, SIGN guidelines, NICE guidelines, GAIN guidelines, evidence based medicine, GPs, community nurses, seamless care, primary care, secondary care, patient support groups, medication compliance, drug formulation, pharmacist prescribing, monitor treatment response, therapeutic drug monitoring (TDM), organ function, interactions, side-effects, yellow card scheme, audit, transferable skills, self-directed learning, CPD, ward layout, patient unique identifiers, hospital number, wristband, patient medical notes, nursing notes, medication kardex, other medicines kardexes, observation charts (MEWS), fluid balance charts, ward medicine
cupboards, CD cabinet, medicines trolley, laboratory results database, past medical history, reason for admission, social factors, co-morbidities, purpose of interview, appropriate language, medical jargon, negative questions, work shadowing, clinical check, accuracy, decision making, accuracy checking technician (ACT), patient safety, therapeutic appropriateness, legal prescription requirements, drug-drug interactions, drug-food interactions, correct patient, transcription errors, dispensing errors, unnecessary medications, legal signature, legible prescription, final accuracy checking, strength, drug quantity, directions to patient, 28 day supply, prescribing errors, role of MI service, medicines administration, formulation, alternative agent, aseptic preparation, infusion rate, diluents, cytotoxic drugs, chemotherapy mat, cytosafe needles, body surface area, renal function, liver function, adjuvant drugs, chemotherapy cycle, code of conduct, central intravenous additive service (CIVAs), controlled environment, negative pressure, neonatal, oncology, haematology, parenteral nutrition, blood analysis, laboratory results, product release, stability, quality assurance, validation, microbial monitoring, home TPN, dietician, biochemist, consultant intensivist, nutrition team, isolator, personal protective equipment, sealed container, cytotoxic warning label, cytotoxic burn bin, intrathecal, extravasation, drug protocols, specialist services, COSHH, unlicensed medicines, waste disposal, quality control, medical gases, standard operating procedures (SOPs), no blame culture, Farwell report, process validation, operator validation, product validation, monitoring, environmental tests, settle plates, air sampling, glove integrity, finger dabs, product license, traceability of product, translation of foreign language, European legislation, safe and effective, United Kingdom Medicines Information group (UKMI), poisons queries, drug and therapeutics committee, pregnancy, breast-feeding, listening skills, questioning skills, Mi Databank, judgement, primary sources, secondary sources, tertiary sources, ethical dilemmas, medicines reconciliation, adherence, patient health beliefs, patients own drugs (PODs), accurate list of medicines, OSCE, role play, pharmaceutical care, hepler and strand, protect patient, demonstrable harm, sub-optimal drug therapy, moral responsibility, legal responsibility, definite patient outcomes, off-label, treatment goal, QOL, reduce symptoms, slow disease progression, prevent disease, cure disease, unintentional omissions, intentional omissions, rationalisation of drug regimen, appropriate medication, concordance, patient agreement, patient partnership, paternalistic, cost to NHS, patient medication record (PMR), return of unused medicines, prescription re-order records, record doses on calendar, medicines use review (MUR), patient perspective, open ended questions, reflective listening, check patient understanding, non-pharmacological alternatives, social circumstances, clic lock lids, patient information leaflets (PIL), NHS net, high risk patients, patient support groups
Aseptic Dispensing
Sterile products, aseptic, aseptic technique, aseptic formulation and dispensing, cleanroom, laminar flow cabinet, class 2 cabinet, contamination, pathogen, microbial, bacteria, infection, contamination, bioburden, environmental monitoring, IV admixture, eye drops, membrane filtration, BP Sterility Test, Process validation, Contamination Control, Clean Room Clothing, Handwashing, Skills Development, risk management, terminal sterilisation, total parenteral nutrition (TPN), ophthalmics, cytotoxic drugs, eye drops, preservative, aseptic handling, process control, process validation, environmental control, decontamination, HEPA Filter, HEPA Screen, Operators, Aseptic manipulation, Sterile Fluid Path, Manchester incident, Enterobacter cloacae, handwashing, gowning, transfer procedures, laminar air flow, turbulent flow, dead zones, bounce zones, particulate contaminants, work surfaces, airborne contaminants, Amoxicillin, Ticarcillin, Benzalkonium Chloride, Preservative, multiple-use container, eye, Intravenous Additives, BP Monographs, batch samples, sterility assurance levels, antibiotic, parenteral

Introduction: Aseptic Formulation of Pharmaceutical Products
aseptic, aseptic technique, aseptic formulation and dispensing, cleanroom, laminar flow cabinet, class 2 cabinet, contamination, pathogen, microbial, bacteria, infection, contamination, risk management, terminal sterilisation, total parenteral nutrition (TPN), ophthalmics, cytotoxic drugs, eye drops, preservative, aseptic handling, process control, process validation, environmental control, decontamination, HEPA Filter, Operators, Aseptic manipulation, Sterile Fluid Path, Manchester incident, Enterobacter cloacae, handwashing, gowning, transfer procedures, laminar air flow, turbulent flow, dead zones, bounce zones, particulate contaminants, work surfaces, airborne contaminants

Sterile Products
Destructive Sterilisation processes, kill kinetics, D-Value, Biovalidation, Z-value, F-value, moist heat sterilisation, dry heat sterilisation, ethylene oxide, low temperature steam/formaldehyde, radiation, filtration, Good Manufacturing Practice (GMP), Orange Guide, QP, Quality Assurance (QA), Quality Control (QC), product contamination, hygiene, process design, clean areas, environmental standards, Grade A, B, C, D environments, sanitation, Sterility Assurance Levels (SAL), Microbial Safety Index (MSI), British Pharmacopoeia (BP), thermal resistance, biological indicator, quality assurance factor, validation of sterilisation, Validation test, growth promotion test, parametric release, lethality, zero survival, logarithmic death curve, Sterile products, aseptic, aseptic technique, aseptic formulation and dispensing, cleanroom, laminar flow cabinet, contamination, pathogen, microbial, bacteria, infection, contamination, bioburden, environmental monitoring, membrane filtration, BP Sterility Test, Process validation, Contamination Control, Clean Room Clothing, Handwashing, risk management, terminal sterilisation, total parenteral nutrition (TPN), ophthalmics, cytotoxic drugs, eye drops, preservative, aseptic handling, process control, process validation, environmental control, decontamination, HEPA Filter, HEPA Screen, Operators, Aseptic manipulation, Sterile Fluid Path, handwashing, gowning, transfer procedures, laminar air flow, turbulent flow, dead zones, bounce zones, particulate contaminants, work surfaces, airborne contaminants, Amoxicillin, Ticarcillin, Benzalkonium Chloride, Preservative, multiple-use container, eye, Intravenous Additives, BP Monographs, batch samples, sterility assurance levels, antibiotic, parenteral

Manufacture of Sterile Pharmaceutical Products
Destructive Sterilisation processes, kill kinetics, D-Value, Biovalidation, Z-value, F-value, moist heat sterilisation, dry heat sterilisation, ethylene oxide, low temperature steam/formaldehyde, radiation, filtration, Good Manufacturing Practice (GMP), Orange Guide,
QP, Quality Assurance (QA), Quality Control (QC), product contamination, hygiene, process design, clean areas, environmental standards, Grade A, B, C, D environments, sanitation, Sterility Assurance Levels (SAL), Microbial Safety Index (MSI), British Pharmacopoeia (BP), thermal resistance, biological indicator, quality assurance factor, validation of sterilisation, Validation test, growth promotion test, parametric release, lethality, zero survival, logarithmic death curve, Sterile products, aseptic, aseptic technique, aseptic formulation and dispensing, cleanroom, laminar flow cabinet, contamination, pathogen, microbial, bacteria, infection, contamination, bioburden, environmental monitoring, membrane filtration, BP Sterility Test, Process validation, Contamination Control, Clean Room Clothing, Handwashing, risk management, terminal sterilisation, total parenteral nutrition (TPN), ophthalmics, cytotoxic drugs, eye drops, preservative, aseptic handling, process control, process validation, environmental control, decontamination, HEPA Filter, HEPA Screen, Operators, Aseptic manipulation, Sterile Fluid Path, handwashing, gowning, transfer procedures, laminar air flow, turbulent flow, dead zones, bounce zones.

**Parenterals**
Systemic circulation, aseptic technique, sterility, Pyretic, pyresis, bioavailability, anaphylaxis, first pass metabolism, dysphagia, compliance, insulin, Depot injection, controlled release, electrolyte imbalance, operator skill, pain on administration, needle phobia, allergic reaction, particulate matter, pyrogen, stability, route of administration, small volume parenteral (SVP), Large Volume parenteral (LVP), vehicle, osmotic potential, preservative, preservation, pH, solution, suspension, emulsion, subcutaneous, intramuscular, intravenous, routes of administration, hyaluronidase, intradermal, ophthalmic preparations, diagnostic formulations, radiopharmaceuticals, TPN, venous administration, single dose container, multiple dose container, bacteria, distillation, reverse osmosis, propylene glycol, limulus amoebocyte lysate test, osmotic pressure, colligative property, isotonicity, hypertonicity, hypotonicity, intrathecal, bactericides, multi-dose container, buffer systems, pKa, Henderson Hasselbach Equation, membrane filtration, sterilisation, aseptic conditions, depot injection, Insulin delivery.

**Preservation of Non-Sterile Pharmaceutical Products**
Preservative, preservative efficacy test, in-use conditions, contamination source, simple preservation, water activity (Aw), spoilage, deterioration, GMP, BP, multiple phase formulations, interactions, drug release pattern, toxin, degradation, metabolites, pH, pKa, ionization state, Henderson Hasselbach Equation, prediction bioavailability, concentration exponent, dilution, preservative attenuation, formulation interactions, weak acid preservatives, MIC, biocides, antimicrobial, partitioning effects, adsorption, oil-water partition coefficient, temperature effects, Q10 value, cresol, chlorocresol, phenol, parabens, phenoxyethanol, sorbic acid, benzoic acid, chlorhexidine.

Brendan Gilmore

**Pharmaceutical Statistics and Experimental Design**
Sample, Population, Variation, Variables, Null/Alternative hypotheses, paired/unpaired experimental designs, paired/unpaired t tests, Wilcoxon Signed Rank test, Mann Whitney U test, Linear Regression.

**Pharmaceutical Statistics and Experimental Design Workshops**
Calculations involving one sample and two sample statistical tests.

**Pharmaceutical Engineering (Mixing)**
Fluid flow, viscosity, Reynolds number, laminar flow, turbulent flow, power requirements, Froude Number, mixing vessel design, impeller/turbine/propeller design, mixing of low viscosity and high viscosity systems, in line mixers

**Pharmaceutical Engineering (Milling)**
Particle size determination, shear stress, solid deformation, Young’s modulus, Kick’s equation, von Rittinger’s equation, energy requirements of milling, hammer mill, ball mill, colloid mill, jet mill, milling requirements for solids, semi-solids, suspensions

**Pharmaceutical Engineering (Filtration)**
Cake filtration, clarification filtration, mathematical modeling of filtration, filter aids, viscosity, temperature effects on filtration, cartridge filtration, filter press, vacuum filtration,

**Solid Dosage Forms**
Advantages/Disadvantages of solid dosage forms, types of solid dosage forms, Manufacture, direct compression, wet granulation, dry granulation, particle-particle interactions during compression, roller compaction, tablet press design (single/rotary), Tooling, finished product specifications, tablet coatings, pan coater, air suspension coater, polymers

**Oral Biopharmaceutics**
Bioavailability, oral drug absorption, gastrointestinal physiology, GI motility, gastric emptying, migrating myoelectric complex, small intestine, gastric secretions, small intestine secretions, GI tract pH profile, large intestine structure and function, cell membrane structure, drug absorption from GI lumen, transcellular transport, paracellular transport, particle absorption via GALT, passive diffusion, active transport, facilitated diffusion, tight junctions, Fick’s law of diffusion, pKa, drug ionisation, Log P, endocytosis, cytochrome P450, first-pass metabolism, P-glycoprotein efflux, disintegration, dissolution, drug solubility, polymorphism, Noyes-Whitney equation, sink conditions, food effects on drug absorption, gamma scintigraphy, in vivo GI perfusion, bioequivalence, dissolution testing.

**Advanced Rheology**
Destructive rheology, non-destructive rheology, linear viscoelastic region, viscoelasticity, Maxwell model, Kelvin-Voigt model, viscoelastic relaxation, creep analysis, Burgers model, oscillatory analysis, storage modulus, loss modulus, loss tangent, vaginal gel products, drug release, gel retention, temperature gelling polymers, triggered gel systems.

**Capsules**
hard capsules (two-piece), soft gel capsules (one-piece), gelatine, hydroxypropylmethylcellulose, capsule manufacture, liquid-filled hard capsules, viscosity, capsule sealing, equilibrium moisture content, solid filled capsules, capsule powder filling methods, dependent dosing, independent filling methods, powder capsule fill excipients, bloom strength, self-emulsifying systems, microemulsions, lipolysis.

**Pharmaceutical Packaging**
Package function, spoilage mechanisms, drug hydrolysis, drug oxidation, primary packaging, secondary packaging, glass, soda glass, amber glass, borosilicate glass, hydrolytic resistance of glass, glass types I - IV, plastic containers, drug packaging interactions, sorption of drugs, PVC infusion bags, drug adsorption to plastic, drug absorption to plastic containers, Log P, pKa, drug ionisation, aluminium contamination of drug products from glass and rubber closures.
Powders
Tablets, capsules, particle size analysis, sieve analysis, microscope methods, coulter counter, particle size distribution, mode, median, arithmetic mean diameter, logarithmic mean diameter, harmonic mean diameter, effective mean particle diameter, volume shape factor, surface shape factor, shape coefficient, powder flow, bulk density measurements, particle bed voidage, angle of repose, shear cell measurement, angle of internal friction, flow through hoppers.

Solid Dosage Forms
tablets, tablet manufacture, tablet press, wet granulation, excipients, disintegration, hardness testing, uniformity of mass, friability, sieve analysis, microscope analysis, angle of repose, bulk density, tapped density, dissolution testing, food effects, capsules, multiple choice questions, data handling, interpretation of complex data, feedback, pharmaceutical technology scenarios, problem-solving.

Liquids 1
Effects of structure on solubility of drugs, calculation of solubility of drug, acidic, basic, amphoteric drugs, suspensions

Liquids 2
Drug structures, excipients, hydrotopy, flavours, taste-masking, sweeteners, viscosity, cyclodextrins, dielectric constant, suspending agents

Solubilisation 1
Physicochemical basis of drug solubility in aqueous systems, drug solubilisation

Solubilisation 2
Strategies for enhancing aqueous drug solubility

Solubilisation 3
Surfactants, co-solvents, complexation

Topical Products 1
Skin structure and function, stratum corneum, blood supply, appendages, skin as a drug target, formulation strategies

Topical Products 2
Ointments, pastes, ointment bases, practical formulation skills

Topical Products 3
Creams, cream bases, gels, gel bases, small and large scale production

Suppositories & Pessaries 1
Rectal and vaginal physiology, rationale of rectal and vaginal therapy

Suppositories & Pessaries 2
Types of products, formulation and production, suppository and pessary bases, displacement calculations, industrial production

Module
Radiochemistry 1
Types of radioactivity, kinetics of decay, half life, energy, spectra, disintegration, units of radioactivity and radiation, alpha particles, beta particles, gamma radiation, half life

Radiochemistry 2
Medical isotopes, methods of detection, quench correction, liquid scintillation spectroscopy, Geiger counter, channels ratio

Kinetics 1
Pseudo orders of reactions, complex reaction kinetics, calculation of the equilibrium constant, pharmaceutical examples

Kinetics 2
Specific acid and specific base catalysis, rate constants, general acid and general base catalysis, log k versus pH profiles, ionic strength, dielectric constant

Kinetics 3
Stresses placed on pharmaceutical products by storage, Arrhenius equation, stability prediction, rate constant, temperature, limitations of stability prediction

Kinetics 4 - Revision Lecture
Revision, exam questions

Legislation
Patient safety, legal categories, prescription only medicines, pharmacy medicines, general sales list medicines, prescription writing requirements, NHS prescriptions, private prescriptions, prescription books, record keeping

Extemporaneous Formulation & Dispensing
Patient safety, legal categories, prescription only medicines, pharmacy medicines, general sales list medicines, prescription writing requirements, NHS prescriptions, private prescriptions, prescription books, record keeping, formulation skills, incompatibilities, prescriber consultation, professionalism, OSCE, practical examination, creams, solutions, suspensions, suppositories, ointments, pastes, gels

Pharmaceutical Aerosols 1
Lungs, bronchi, airways, pulmonary, alveoli, aerosol, particle, aerosol delivery, drug delivery, aerosol deposition, inertial impaction, gravitational sedimentation, diffusion, electrostatic precipitation, ventilation, particle size, particle shape, particle velocity, aerodynamic diameter, Stokes diameter, mass median aerodynamic diameter, inspiration, breath-hold

Pharmaceutical Aerosols 2
Lungs, airways, pulmonary, aerosol, particle, preparation of particles, jet milling, spray drying, aerosol generators, particle size, drug targeting, drug delivery, nebulisers, pressurised metered dose inhalers, pMDI, propellants, dry powder inhalers, inhaled drugs, clearance of deposited aerosols, mucociliary clearance, deep lung delivery, asthma, chronic obstructive pulmonary disease, emphysema, cystic fibrosis

Radiopharmaceuticals 1
Radiopharmaceuticals, nuclear medicine, radioactivity, radioisotope, isotope, radioactive radiation, half-life, decay, beta decay, gamma decay, positron decay, electron capture, localisation, radionuclide generators, cyclotron, parent radionuclide, daughter radionuclide,
imaging, diagnostics, gamma scintigraphy, gamma camera, gamma emitter, SPECT, single-photon emission computed tomography, specific energy window, KeV, positron emission tomography, PET, photon, cardiac imaging, myocardial ischemia, myocardial infarction, myocardial inflammation, perfusion studies, thallous chloride, technetium, 99mTechnetium, 99mTc, Sestamibi, Cardiolite®, Tetrofosmin, Myoview, 111In-labelled antimonyosin antibody, 99mTc-labelled glucarate, 111In-labelled leukocytes, 99mTc-pertechnetate, brain imaging, blood brain barrier, static imaging, dynamic imaging, tumour, intracranial injury, epilepsy, cerebrovascular disease, 99mTc-pentetate, DTPA, 99mTc-gluceptate, 99mTc-hexamethyl propylene amine oxime, HMPAO, Ceretec®, 99mTc-ethyl cysteinate dimer, ECD, Neurolite®

**Radiopharmaceuticals 2**

Radiopharmaceuticals, nuclear medicine, radioactivity, radioisotope, isotope, radioactive, radiation, half-life, decay, imaging, diagnostics, bone imaging, bone scans, skeletal metastases, bone cancer, bone-seeking complexes, diphosphonates, 99mTechnetium, 99mTc-methylene diphosphonate, MDP, Medronate, thyroid imaging, thyroid cancer, iodine, thyroglobulin, sodium iodide, 123I-sodium iodide, 125I-sodium iodide, beta decay, gamma decay, gamma emitter, 99mTc-pertechnetate, kidney scans, renal scans, kidney, bladder, 99mTc-pentetate, DTPA, 99mTc-gluceptate, 123I-o-iodohippuric acid, Hippuran, 99mTc-mercaptacetylc triglycine, MAG-3, effective renal plasma flow, ERPF, 2-[18F]fluoro-2-deoxyglucose, FDG, PET, SPECT, myocardial ischemia, epilepsy, tissue radiosensitivity, Bergonie & Tribondeau, radiation uptake, β-emitters, beta emitters, Gray, rad, Gy/MBq, rad/mCi, 131I-sodium iodide, tumour, cancer, thyroid carcinoma, Graves Disease, hyperthyroidism, 131I-mIBG, neuroendocrine tumours, neuroblastoma, bone marrow suppression, palliative therapy, 32Phosphorous, ascites, polycythaemia, metastatic bone disease, 89Strontium chloride, Metastron, 153Samarium, 186Rhenium

**Radiopharmaceuticals 3**

Radiopharmaceuticals, nuclear medicine, radioactivity, radioisotope, isotope, radioactive, radiation, half-life, decay, radiopharmacy, contraindications, adverse reactions, adverse effects, radiation effects, 131I-sodium iodide, sialadenitis, 89Strontium chloride, 153Samarium, 32Phosphorous, bone marrow suppression, diphosphonates, 99mTc-pentetate, DTPA, type I anaphylaxis, anaphylactic shock, 99Mo/99mTc generator, 99Molybdenum, 99mTechnetium, 99mTc, daughter radionuclide, parent radionuclide, ion exchange, transient equilibrium, alumina, aluminium trioxide, elution, eluant, wet column, dry column, shielding, lead shielding, moly breakthrough, quality control, oxidation states, 99mTc-pertechnetate, cold kit, reductant, antioxidant, aseptic, sterile, tungsten shielding, radiochemical, 99mTc-methylene diphosphonate, MDP, Medronate, dosing, nuclide calibrator

**Radiopharmaceuticals 4**

Radiopharmaceuticals, nuclear medicine, radioactivity, radioisotope, isotope, radioactive, radiation, half-life, decay, radiopharmacy, radiation protection, radiation handling, radiation storage, radiation disposal, sealed source, non-sealed source, sterile, UK code of practice, European directives, The Medicines Act 1968, good manufacturing practice, GMP, licence, audit, specials licence, unlicenced product, quality control, standard operating procedures, SOP, safety, monitoring, labelling, staff training, shielding, Inverse Square Law, lead shielding, tungsten shielding, lead bricks, radionuclide purity, radiochemical purity, specific activity, sterility, apyrogenicity, nuclide calibrator, Environment Protection Agency, radioactive waste

Raj Thakur
Ocular Systems
Drug Delivery, Ocular Drug Delivery, Routes of Ocular Delivery, Allergies, Blepharitis, Cataract, Conjunctivitis, Diabetic Retinopathy, Dry Eye, Glaucoma, Uveitis, Age-Related Macular Degeneration, Cornea, Sclera, Retina, Conjunctiva, Vitreous humor, Topical administration, Periocular & intravitreal administration, Eye-drops, Eye-suspensions, Eye-ointments, Eye-gels, Passive diffusion, Lipophilic drugs, Hydrophilic drugs, solubility, charge, Molecular weight, Ophthalmics, Packing, Product Design, Contact lens, Contact Lens Solution
Vicky Kett

Pharmaceutical Drying 1
Drying, microwave, processing, manufacture, industry, drying theory, humidity, water content, water loss profile, stability, toxicity, dosing, powder, tablet, granules, transdermal, inhaler, protein, spray drying, evaporation, heat, degradation, drug, moisture, free water, bound water, hydrogen bonding, crystal, crystal lattice, hydrate, hygroscopic, hygroscopicity, equilibrium, drying rate, tray drying, critical moisture content, vaporization, diffusion, capillary action, surface, thermal conductivity, endothermic, temperature,

Pharmaceutical Drying 2
Drying, freeze-drying, microwave, process, manufacture, industry, drying theory, spray drying, freeze drying, convection, conduction, radiation, fluid bed drying, fluid bed, caking, intergranular migration, intragranular migration, dye, binder, compression, cost, stability, temperature, biopharmaceuticals, attrition, safety, processing, vacuum, pressure, containment, batch, environmental issues, eco, inhaler, excipient, protein, peptide, vaccine, tablet, capsule, sublimation, buffer, protectant, crystallisation, crystallization, drug, eutectic, amorphous, Tg, glass transition, viscosity, plasticization, reconstitution, dissolution,

Thermal analysis of pharmaceuticals 1
Thermal analysis, calorimetry, mechanical analysis, thermogravimetry, mass, energy, temperature, polymorphism, litigation, patent, IP, intellectual property, drug, glass transition, Tg, crystal, crystallisation, melt, melting, eutectic formation, water content, phase change, equilibrium, crystal, thermodynamics, standard state, stability, polymorph, bonding, solubility, hygroscopicity, bioavailability, dissolution, cream, gel, hardness, processing, tablet, shelf-life, toxicity, processing, grinding, solvent, micronisation, heat, endothermic, exothermic, excipient, enantiotropic, monotropic, Gibb’s energy, Gibb’s free energy, metastability, kinetics, pseudopolymorph, hydrate, solvate, anhydrate, amorphous, mobility, heat capacity, enthalpy, power, plasticization, water content, drug

Thermal analysis of pharmaceuticals 2
Thermal analysis, calorimetry, mass, energy, temperature, polymorphism, litigation, patent, IP, intellectual property, glass transition, Tg, crystal, crystallisation, melt, melting, eutectic formation, water content, phase change, equilibrium, crystal, thermodynamics, standard state, stability, drug, amorphous, drying, stability, Karl-Fischer, humidity, vapour sorption, skin, stratum corneum, catheter, stent, thermosetting, dental brace, viscoelastic, biomedical device, stress, strain, modulus, polymer, curing, gelation, sol, gel, interaction, drug, fluid, controlled release, wound dressing
**Endocrine**
Endocrine, pancreas, islets of langerhans, diabetes mellitus, symptoms, driving, Type 1, insulin regimes, short-acting, intermediate-acting, long-acting, rapid-acting, Type 2, biguanides, sulfonylureas, oral antidiabetics, HbA1c, monitor blood glucose concentration mmol/L, meter, hypodermic equipment, needles, syringes, test strips, lancets, hypoglycaemia, glucagon, diabetic ketoacidosis, ketones, neuropathy, nephropathy, oral glucose tolerance test, influenza vaccination, diabetic neuropathy thyroid hormones, levothyroxine, antithyroid drugs, neutropenia, agranulocytosis, carbimazole, corticosteroids, glucocorticoid, withdrawal, adrenal suppression, Addison’s disease, hypopituitarism, steroid card, mineralocorticoid side effects, glucocorticoid side effects, prednisolone dosage, bone metabolism, bisphosphonates, osteonecrosis, femoral fractures, oesophageal reactions, weekly dose, osteoporosis, corticosteroid use.

**Respiratory**
Respiratory conditions, lungs, inhaler devices, pMDI, dry powder inhaler, breath-actuated inhaler, aerosol, CFC-free inhaler, spacers, peak flow meter, peak flow, preventer, corticosteroid, oral candidiasis, BTS guidelines, beclometasone, budesonide, reliever, short-acting beta 2 agonist, salbutamol, terbutaline, long-acting beta 2 agonist, salmeterol, sodium cromoglycate, anti-muscarinic bronchodilators, ipratropium, exercise-induced asthma, sodium cromoglycate, leukotriene receptor antagonist, oral corticosteroid, theophylline, aminophylline, steroid treatment card, nebulisers, influenza vaccination, antihistamines, allergy, decongestants.

**CNS**
Epilepsy, interactions, withdrawal, driving, pregnancy, tonic-clonic, absence, myoclonic, atypical absence, atonic, tonic, carbamazepine, blood disorders, fever, rash, mouth ulcers, bruising, bleeding, hepatic disorders, skin disorders, gabapentin, pregabalin, lamotrigin, levettiracetam, phenobarbital, phenytoin, sodium valproate, status epilepticus, diazepam, Parkinson’s disease, parkinsonism, dopamine agonists, monoamine oxidase B inhibitors, catechol-O-methyltransferase inhibitors, antimuscarinics, levodopa, co-beneldopa, co-careldopa, dementia, donepezil, substance dependence, hypnotics, anxiolytics, benzodiazepines, withdrawal, non-benzodiazepine hypnotics, barbiturates, anti-psychotics, schizophrenia, first generation, second generation, extrapyramidal side effects, parkinsonian symptoms, akathisia, tardive dyskinesia, depot injections, antimanic drugs, bipolar disorder, valproate, lithium, lithium treatment card, anti-depressants, TCAs, SSRIs, MAOIs, withdrawal, interactions, ADHD, anti-obesity drugs, orlistat, nausea, vomiting, motion sickness, antihistamines, phenothiazones, domperidone & metoclopramide, 5HT3-receptor antagonists, hyoscine.

**Analgesics**
Veterinary Medicine, analgesics, analgesia, painkillers, palliative care, animal health, dog, cat, worms, flea, prescribing by cascade, controlled drugs, morphine, transdermal drug delivery, patch, lozenges, tablets, paracetamol, codeine, fentanyl, morphine, opioid, constipation, nausea, cancer, wholesale supply, schedule 2, schedule 3, CD, benzodiazepine, pain, technical error, Misuse of Drugs, NHS, private prescribing, nurse, controlled drug register, midwive, pyrexia, buprenorphine, pethidine, non-opioid analgesia, neuropathic pain, aspirin, dihydrocodeine, transdermal, modified release, tramadol, addiction, migraine.

**Cardiovascular 2**
Cardiovascular, heart, compression hosiery, warfarin, anticoagulants, thrombosis, varicose, vein, artery, hosiery, INR, International Normalised Ratio, blood, drug
interactions, antiplatelet, aspirin, clopidogrel, lipid, cholesterol, statins, simvastatin, fibrates, myopathy, exetimibe,

**Oral Contraceptives, HRT, Men’s Health**

Oral Contraceptives, HRT, Hormone Replacement Therapy, Men’s Health, erectile dysfunction, testicular cancer, self-checking, sildenafil, NHS, schedule 11, drug tariff, contraception, missed pills, hormones, combined hormonal contraceptives, progestogen-only contraceptives, emergency contraception, thromboembolism, patch, oestrogen, female sex hormones, progestogen

**Topical preparations**
eye; ear; nose; throat; eye drops; nasal; nasal sprays; ear drops; eye ointments; creams; ointments; skin; mouthwash; topical

**Drug Tariff**
drug tariff; business services organisation; payment; prescriptions; nurse; dentist; blacklisted; blacklist; contractors; allowed items; formulary; broken bulk; compression hosiery; independent nurse prescriber; controlled drugs; HS21N; HS21D

**Topical preparations**
allergy; anaphylaxis; ACBS; drug tariff; private prescription; clinical check; dosing; repeat prescription; prescription only register; records; reference number; prescriptions; HS21CS; HS21N; side-effects; cautions; advice; interactions; indications; active ingredients; legal category

**Stoma and devices**
stoma; bowel cancer; bladder cancer; colostomy; ileostomy; urostomy; one-piece appliance; two-piece appliance; stoma care; diet; medicines;

**Dressings**
Wound management; bandage; alginate; dressing; hydrocolloid; vapour-permeable; matrix; iodine; silver; absorbent; compression hosiery;

**EENT**
Eye; ear; nose; throat; pharynx; nasal; ocular; aural; eye drops; eye ointments; antibacterials; anti-inflammatories; mydriatics; glaucoma; miotics; tears; lubricants; contact lenses; corticosteroids; otitis externa; otitis media; ear wax; decongestants; allergy; sympathomimetics; antimuscarinics; oropharynx; mouth ulcers; inflammation; miconazole; nystatin; minims; chloramphenicol; dry mouth;

**Patient Medication Records**
patient medication records; PMR; records; patient safety; prescriptions; legality; counselling; compliance;

**EENT**
patient medication records; PMR; records; patient safety; prescriptions; legality; counselling; compliance; NHS; prescriptions; prescriber; optometrist; additional supply optometrist; ACBS; artificial saliva; flurbiprofen; Strefen; labelling; private prescription; lozenges

**OSCE**
Prescriptions; dispensing; accuracy; checking; labelling; legal; clinical; errors; OSCE;
Dispensing
Dispensing; prescription checking; prescriber; patient; counselling; patient safety; information; leaflet; legal; clinical; errors; overdose; undertose; controlled drugs; contraindications; cautions; side-effects; dose; warnings; strength; dosing; oral; tablets; liquids; injections; PCD1; HS21; dental; nurse; veterinary medicines; Medicines Act; safe custody; controlled drug register; prescription only register; records; code book; drug tariff; communication skills; body language; eye contact; explanatory skills; BNF; patches; GSL; Pharmacy medicines; POMs; labelling; owing; coding; pricing; storage; expiry dates; advice; indications; ACBS; S11; SLS; Latin; repeat dispensing; Stockley; MHRA; PSNI; RPS; signed orders; optometrists; podiatrists; chiropodists; midwives; doctors; independent; supplementary; formulary; blacklist; generics; EEA; substitute prescribing; stock orders; minor ailments service; borderline substances; law; professionalism;

Gastrointestinal tract
Dyspepsia, gastro-oesophageal reflux disease, antacid, alginate, rafting agent, colic, simeticone, antimuscarinic, antispasmodic, peptic ulcer, proton-pump inhibitor, histamine h2-receptor antagonist, prostaglandin analogues, diarrhoea, inflammatory bowel disease, ulcerative colitis, crohn’s disease, irritable bowel syndrome, aminosalicylate, corticosteroid, laxative, bulk-forming, stimulant, faecal softener, osmotic, anal fissure, rectal, haemorrhoidal, haemorrhoid, rectal sclerosants, pancreatin, dicycloverine, merbenyl, ranitidine, cimetidine, omeprazole, ispaghula, lactulose, oral rehydration therapy, Imodium, nexium, esomeprazole, norgalax, sodium picosulfate, sodium bicarbonate, magnesium containing antacids, electrolade

Cardiovascular 1
Cardiac glycoside, digoxin, diuretic, thiazide, loop, potassium-sparing, bendroflumethiazide, indapamide, bumetanide, furosemide, amiloride, aldosterone antagonists, spironolactone, eplerenone, co-amilorfruse, co-amiloizde, triamterine, amiodarone, disopyramide, flecaainide, propafenone, arrhythmia, lidocaine, ventricular, beta-adrenoceptor blocking drug, beta-blocker, propranolol, angina, acebutolol, atenolol, bisoprolol, carvedilol, celiprolol, labetalol, metoprolol, nadolol, nebivolol, oxprenolol, pindolol, sotalol, alpha-adrenoceptor blocking drugs, doxazosin, prazosin, angiotensin-converting enzyme inhibitor, heart failure, hypertension, Joint British Hypertensive Society, National institute for Health and clinical excellence, guideline, systolic, diastolic, blood pressure measurement, lifestyle, exercise, diet, captoril, enalapril, lisinopril, perindopril, quinapril, ramipril,trandolapril, candesarten, angiotensin-II receptor antagonist, irbesarten, losartan, telmisartan, valsartan, glyceryl trinitrate, isosorbide mononitrate, calcium-channel blocker, amlodipine, diltiazem, felodipine, lacidipine, lercanidipine, nicardipine, nifedipine, verapamil, nicorandil, peripheral vasodilators, naftidrofuryl, oxerutin, cardiovascular risk prediction charts, familial hypercholesterolaemia, methyldopa

Infections (antibacterial, antiviral, antifungal drugs)
Antibacterial, penicillins, hypersensitivity, allergy, phenoxymethylpenicillin, penicillin v, flucloxacillin, amoxicillin, ampicillin, co-amoxiclav, co-fluampicil, cephalosporin, cefaclor, cefalexin, cefixime, tetracycline, doxycycline, lymecycline, minocycline, oxytetracycline, aminoglycoside, gentimicin, macrolide, azithromycin, clarithromycin, erythromycin, clindamycin, chloramphenicol, sodium fusidate, fuscidic acid, trimethoprim, metronidazole, alcohol, quinolone, ciprofloxacin, norfloxacin, nitrofurantoin, antifungal, fluconazole, itraconazole, miconazole, terbinafine, clotrimazole, aciclovir, antiviral, famciclovir, valaciclovir, antimalaria, mefloquine, chloroquine, proguanil, summary of product characteristics
Interactions
Stockley, British National Formulary (BNF), cytochrome p450, isoenzyme, enzyme inducing, enzyme inducer, enzyme induction, enzyme inhibitor, enzyme inhibiting, enzyme inhibition, drug-drug, drug-food, absorption, metabolism, plasma concentration.
Module

Controlled Drugs
Controlled drug, schedule 2, schedule 3, schedule 4, schedule 5, CD, CD No Register POM, CDPOM, CD Inv POM, CD Anab POM, register, amendment, legal, prescription, prescription requirements, storage, CD cupboard, record, evidence, patient, Misuse of Drugs Act 1971, running balance, pharmacist, prescriber, requisition
Introduction to pharmaceutical legislation
Primary legislation, secondary legislation, civil law, criminal law, northern Ireland assembly, statutory instruments, orders in council, statutory rules, negligence, regulation, Pharmaceutical Society of Northern Ireland, PSNI, General Pharmaceutical Council, GPhC, Statutory Committee, Pharmacy Order NI, professional indemnity, examination skills, revision skills, writing skills

Medicines Act 1968 – Overview and administration

Medicines Act 1968 – Part II licensing
system of licensing, medicinal product, medicinal purpose, marketing authorisation, manufacturer’s licence, clinical trial authorisations, wholesale dealer’s licence, exemptions from licensing, parallel imports, homeopathic products, herbal remedies

Medicines Act 1968 - Part III – Sale or supply of medicinal products
Dosage definitions, legal classifications of medicines, general sales list, GSL, Pharmacy only medicines, Pharmacy medicines, P medicines, Prescription only medicines, POMs, retail pack size limitations, POM status exemptions, emergency administration of parenteral medicines

Medicines Act 1968 - Part III – Sale or supply of medicinal products
Prescription requirements, Prescription only register, emergency supply, appropriate practitioners, prescribers, supplementary prescriber, independent prescriber, Community Practitioner nurse prescriber, clinical management plan, dental prescriptions, faxed prescriptions, controlled drugs register, exemptions for control on retail sale, midwives, chiropodists, optometrists, additional supply optometrists, drug treatment services, patient group directions, PGD, HS21, HS21D, PCD1, private prescription, supply order

Medicines Act 1968 Part IV - pharmacies
Retail pharmacy business, titles and descriptions, registration of pharmacies, premises, change of ownership, new pharmacy

Medicines Act 1968 Part V – containers, packages and identification of medicinal products
Labelling requirements, dispensed medicinal products, chemists’ nostrums, assembled medicines, relevant medicinal products, warnings and special labelling requirements, fluted bottles, child resistant containers, patient information leaflets

Medicines Act 1968 Part VI – Promotion of sales of medicinal products
Part VII – Pharmacopoeias and other publications, Advertising restrictions, promotion of sales, advertisements to health professionals, public advertisements, advertising of pharmaceutical services, British Pharmacopoeia

Health Act 2006 – Responsible pharmacist Regulations
Health Act 2006, Responsible pharmacist, personal control, supervision, Pharmaceutical Society of Northern Ireland, PSNI, General Pharmaceutical Council, GPhC, mandatory professional standards, good practice, safe and effective running of a pharmacy,
temporary absence, display a notice, pharmacy record, pharmacy procedures, standard operating procedures, SOPs, Code of Ethics

**Veterinary Regulations**
Veterinary Medicines Regulations 2011, veterinary medicinal products, classifications of veterinary medicines, prescriptions for veterinary medicines, labelling of veterinary medicines, prescribing cascade, records, marketing authorisations, restrictions on supply, withdrawal periods, annual audit, veterinary product committee

**The control of non-medical poisons in northern Ireland**

**Misuse of Drugs Regulations**
Controlled drugs, CDs, The Controlled Drugs (Supervision of Management and Use) Regulations (Northern Ireland) 2009, designated Bodies, Responsible Bodies, accountable officers, Shipman Inquiry, Health Act 2006, controlled drug schedules, standard operating procedures, SOPs, Misuse of Drugs Act 1971, Advisory Council on the Misuse of Drugs, prescription requirements, handwriting requirements, requisition requirements, invoices, possession and supply, repeats, Schedule 1 (CD Lic), Schedule 2 (CD), Schedule 3 (CD No Reg), Schedule 4 (CD Benz), Schedule 4 (CD Anab), Schedule 5 (CD Inv), CD register, controlled drugs register, CD cabinet, controlled drugs cabinet, Controlled drug licence, emergency supply, safe custody, Patient group directions, midwives, midwives supply orders, independent prescribers, supplementary prescribers, private prescriptions, PCD1 form, 30 day supply, technical errors, running balance, instalments, EEA prescriptions, Swiss prescriptions, destruction of controlled drugs, authorised witness, notification and supply to addicts, substitution treatment, SP1, SP2, paraphernalia, inspection and enforcement, CDs in hospital

**Code of Ethics**
Professional decision making model, Code of Ethics, PSNI, GPhC, Code of Conduct, Principles, good practice guidance, ethical dilemmas, Deontological Theories, Consequentialist theories, hybrid approach, autonomy, non-maleficence, beneficence, justice, bioethical principles, vicarious liability, criminal law, civil law, administrative law, professional negligence, negligence, gross negligence, duty of care

**European Law**
EEA, Swiss, prescriptions, EU law, EU directives, European directives, EU legislative machinery, EU legislative process, European control on medicines, European Convention on Human Rights
PMY3072
Pharmaceutical Biotechnology
Amino acid chemistry and protein structure
amino acids, side chain chemistry, structure, catalysis, pH, pKa, planar peptide bond,
rotation, alpha carbon, aliphatic amino acids, hydroxyl, amino, acidic, amids, sulphur,
proline, histidine, aromatic residues, alpha helix, beta sheet, parallel beta sheet, anti-
parallel beta sheet, beta bend, protein folding, entropy, post-translational modifications

Therapeutic antibodies
antibody, light chain, heavy chain, variable region, constant region, immunoglobulin, active
site, binding, glycoprotein, immune response, antigen, epitope, hapten, complimentarity-
determining regions (CDR), neutralisation, neutralization, IgG, IgM, IgA, IgE, IgD, clonal
expansion, B cell, plasma cell, B cell memory expansion, VDJ rearrangement,

Therapeutic Antibodies
gleevec, glivac, diagnostic, detection reagent, polyclonal, monoclonal, recombinant, host
recognition, foreign, self, nonself, titre, hybridoma, immortalisation, immortalization,
myeloma cells, cell fusion, hypoxanthine-guanine phosphoribosyl transferase, purines,
thymidine, affinity purification, size exclusion, ion exchange, affinity, avidity, humanisation,
humanization, human anti-mouse antibodies, HAMA, contraindication, chimeric, chimaeric,
antigen display, major histocompatibility complex, MHC type I, MHC type II, endogenous
antigens, exogenous antigens, CD4, CD8, self, non-self, T cell receptor, TCR, recombinant
antibody, single chain antibody, scFv, Fab fragment, bacteriophage display, phage display,
cancer, rheumatoid arthritis, organ transplant, genomics, proteomics, biomarker, receptor,
herceptin, mylotarg, remicade, ultimab technology, contraindications, human anti-human
antibodies, HAHA

Therapeutic enzymes
Proteases, inhibitors, enzymes, respiratory disease, innate immunity, mucociliary
clearance, neutrophils, inflammation, cystic fibrosis, CF, neutrophil elastase, alpha1
antitrypsin, protein, chronic obstructive pulmonary disease, COPD, emphysema,
recombinant proteins, transgenic proteins, Pittsburgh Variant, amino acid, mutation,
thrombin, cathepsin G, active site, primary specificity, binding pocket, antithrombin III,
alpha1 antichymotrypsin, protein engineering

Antithrombotics 1
Antithrombotics, blood clot, blood, bleeding, clotting cascade, coagulation cascade, arterial
thrombosis, atherosclerosis, venous thrombosis, deep vein thrombosis, platelets,
fibrinogen, fibrin, prothrombinase complex, factor Xa, FXa, thrombin, factor IIa, FIIa,
protein C, thrombomodulin, plasmin, intrinsic pathway, extrinsic pathway, vitamin K,
antiplatelet drugs, anticoagulant drugs, fibrinolytic drugs, aspirin, platelet cyclooxygenase
1, Clopidogrel, Prasugrel, protease-activated receptor, PAR, G-protein coupled receptors,
PAR-1, PAR-1 antagonists

Antithrombotics 1
Antithrombotics, blood clot, blood, bleeding, clotting cascade, coagulation cascade, anticoagulant
drugs, fibrinolytic drugs, fibrinolysis, heparin, low molecular weight heparin,
LMWH, Fondaparinux, warfarin, vitamin K, vitamin K antagonist, arterial
thromboembolism, venous thromboembolism, VTE, tissue factor, TF, Factor VIIa, FVIIa,
TF-FVIIa complex, NAPc2, prothrombinase complex, factor Xa, FXa, Apixaban,
Rivaroxaban, thrombin, factor IIa, FIIa, indirect factor Xa inhibitors, direct factor Xa
inhibitors, direct thrombin inhibitors, indirect thrombin inhibitors, Dabigatran etrexilate,
Pradaxa, plasminogen activator, tissue plasminogen activator, Retepalase, Tenecteplase
Bioinformatics
bioinformatics, computing methods, biological data, medicine, biotechnology, microbiology, environmental science, NCBI, data base, PubMed, literature, 'Limits', search builder, full text, PubMed Central, MeSH term, gene data base, Genbank, gene symbol, chromosomal location, map view, exons, introns, protein, amino acid, sequences, accession number, 3D structure, protein BLAST, sequence alignment, algorithm, conserved domains, homology, colour key, E value, query sequence, subject sequence, similarity, positive, identity, gap, Entrez

Follicle Stimulating Hormone
FSH, anterior pituitary, stimulate, follicle, sertoli cells, infertility, medicine, IVF, urinary preparation, recombinant preparation, Folitropin α & β, α-unit, β-unit, carbohydrate side chains, recombinant DNA technology, gene, expression vector, CHO cells, transfection, chromosome, translation, Golgi apparatus, secretion, selection, master cell bank, working cell bank, medium, purification, purity, sterility, bulk production, batch-to-batch consistence, Corifollitropin alfa

Functional Genomics – Peptide Discovery
amino acids, peptides, therapeutic, natural source, high biological activity, low toxicity, high specificity, integrated, strategy, peptidomics, approach, sample, HPLC, mass spectrometry, Edman degradation, genomics, mRNA, cDNA, reverse transcription, PCR, DNA polymerase, cloning, restriction endonuclease, vector, ligation, T4 DNA ligase, transformation, DNA sequences, physiomics, fractionation, bioactivity screening, drug discovery

Genomic Technologies
genomic technologies, genome, chromosomes, genes, bases, genome sequencing, human genome project, gene map, genetic linkage map, physical map, map-based sequencing, chain-termination method, sequencing reaction, fluorescent, dideoxy bases, termination, electrophoresis, laser detection, “shotgun” sequencing, whole genome, digest, computing analysis, “Next-generation” sequencing, DNA microarray, genes, express, expression pattern, mRNA, cDNA, expression profiling, disease, solid support, probes, array, hybridisation, complementary sequences, normal tissue, disease tissue, Gene Expression Microarray, reverse transcription, fluorescent labelling, scanning, location and density of colour, computing analysis, Comparative Genome Hybridisation Microarray, genome-wide screening, copy number variation, genomic DNA, known chromosomal location, Mutation Microarray, mutations, SNPs, gene discovery, disease diagnosis, therapy development, prognosis prediction, drug response, pharmacogenomics, toxicogenomics

Molecular Biotechnology
Definition of Pharmaceutical Biotechnology; Central Dogma of Molecular Biology; DNA-RNA-Protein; DNA Replication; Enzymes; Topoisomerase; DNA helicase; SSB's; RNA primase; DNA polymerase, DNA ligase; Origin of Replication; Nucleotides; RNA's; process of transcription; Initiation; RNA capping and polyadenylation; Splicing; Genetic code; Ribosomes; Ribosomal binding sites; Translation; tRNA; anti-codon; charging of tRNA; initiation; elongation; termination; structure of tRNA; aminoacyl tRNA synthetase; initiation codon (AUG); stop codons, UAA, UAG, or UGA; Polysomes;

Recombinant Proteins – the basics
Recombinant DNA; Recombinant Proteins; Recombinant Organisms; Recombinant DNA Vector; gDNA v cDNA; production of complementary DNA; reverse transcriptase and DNA
polymerase; dNTP's; ligation and restriction digests; transformation; heat shock of bacterial cells; identification of recombinants; fusion proteins; expression of recombinant proteins; purification of recombinant proteins; his-tag;

**Molecular Methods**
Gel electrophoresis; DNA, RNA, separation on the basis of size; restriction digest; SDS-Page; Polymerase Chain Reaction; Denaturation; annealing; extension; exponential amplification; real-time PCR; quantitative measurements using a probe; DNA sequencing; Dideoxynucleotides cause termination of chain synthesis; applications of techniques.

**Genetically Engineered Animals**
Definition of Genetically Engineered Animals; Why do we want them; 2 main methods: 1.DNA Microinjection, transgene is injected into the pronucleus of a reproductive cell, 3 pairs of mice needed, founder pair, recipient pair, foster pair; 2.Embryonic stem cell - mediated gene transfer, Isolation of totipotent stem cells from embryos, The desired gene is inserted into these cells, DNA are incorporated into the host embryo, resulting in a chimeric animal. Transgenic selection using a homologous sequence and a PCR method; design of target sequence is critical. Contribution to human welfare.

**Nucleic Acid Technology**
Gene Delivery Considerations; production of recombinant viral vectors; suitability of a range of viral vectors; stable and transient vectors; production of a recombinant viral vector; considerations; retro adeno and adeno associated viruses; advantages and disadvantages; production and processing for large scale use; Antisense technologies; antisense oligonucleotides; antigene sequences; ribozymes; pharmaceutical and clinical relevance.

**Gene Therapy**
Cancer Gene Therapy; Definition of Cancer; explanation of mutations in proto-oncogenes and tumour suppressor genes; immunotherapy; oncolytic virotherapy; gene transfer; PROSTVac; Oncovex; Gendicine; Transcriptional targeting; promoters structure and function; tissue specific promoters e.g. PSA; radiation inducible promoters e.g. WAF-1; tumour specific promoters e.g. hOC; Gene therapy and AIDS; HIV infection; 9 key genes; target cells; first AIDS gene therapy clinical trial;

**Therapeutic Hormones**
Insulin; structure and function; release and action on cells; production of recombinant insulin; recombinant short and fast acting insulin; modifications in base pairs will change amino acids and insulin type; examples include Lantus and Humalog.
Human Growth Hormone; Structure and function; action on cells; associated diseases; hGH excess pegvisomant; production of recombinant proteins; hGH deficiency; norditropin; humatrope; idiopathic short stature; ethical questions.

**Recombinant Growth Factors**
Haemopoietic Growth Factors; definition and synthesis of HSCs; CFU-GEMM; Haematopoiesis; G-CSF; M-CSF; GM-CSF; Recombinant production; clinical example filgrastim; Erythropoietin and rhEPO. Wound Healing; function and action at a cellular level; Insulin-Like Growth Factors; Epidermal Growth Factor; Platelet Derived Growth Factor; Fibroblast Growth Factor; Transforming Growth Factors; Tyrosine Kinase Receptors; Increlex; Regranex; Fiblast; TGF-Beta-1.

**Recombinant DNA Technology**
Problem solving; report writing; presentation skills; gel electrophoresis; restriction digests; visualising DNA; alkaline lysis.

**Recombinant Vaccines**
Traditional Vaccines; subunit; peptide; recombinant vaccines; pathogen; antigen; adaptive immune system; live attenuated bacteria or viruses; toxoids; MMR; Hep B recombinant vaccine; Cervarix; VLPs; DNA vaccines; dendritic cells; humoral response; cell-mediated response; delivery; adjuvant; Oncept
Introduction to Clinical Pharmacokinetics

Plasma concentration, Cp, intravenous dose, clearance, rate of elimination, rate of excretion, urine concentration, constant rate infusion, steady state, rate of infusion, area under the curve, trapezoidal rule, concentration profile, time, oral dose, first order kinetics, half-life, elimination rate constant, K, t1/2, instantaneous distribution, slope, natural logarithm, log scale, linear scale, volume of distribution, apparent volume of distribution, Vd, extrapolation, AUC, AUC0-inf, terminal slope, amount eliminated, cumulative amount eliminated, steady state concentration, Cpss, loading dose, total clearance, fraction of steady state, fss.

First order absorption with first order elimination

Intravascular absorption, extravascular absorption, oral absorption, buccal absorption, pulmonary absorption, barriers of absorption, amount remaining to be absorbed, absorption rate constant, elimination rate constant, volume of distribution, semi-log scale, normal scale, plasma concentration after oral absorption, method of residuals, feathering, terminal slope, residual slope, Ka, K, Vd.

Bioavailability and Extraction Ratios

Bioavailability, absolute bioavailability, relative bioavailability, area under the curve, F, blood clearance, physiological clearance, extraction ratio, eliminating organ, elimination, metabolism, excretion, phase I metabolism, Phase II metabolism, rate of elimination, blood concentration, rate of drug entry, rate of drug exit, rate of drug extraction, blood flow, maximum bioavailability, high extraction ratio, low extraction ratio, hepatic extraction ratio, renal extraction ratio, intermediate extraction ratio, liver blood flow, physiological factors, pathological factors, exercise, food intake.

Hepatic and Renal Extraction Ratios

Estimation of extraction ratio, red blood cells, plasma, whole blood, haemoglobin, blood to plasma ratio, liver blood flow, renal clearance, extra-renal clearance, extra-hepatic clearance, nephron, glomerulus, proximal tubule, distal tubule, loop of Henle, collecting duct, arterial supply, venous return, glomerular filtration rate, GFR, unbound concentration, tubular reabsorption, tubular secretion.

Multiple dosing and dosage regimen design

Drug accumulation, maximum plasma concentration, minimum plasma concentration, steady state, dosage interval, therapeutic range, accumulation factor, fluctuations in drug level, target plasma concentration, average concentration at steady state, clearance, half-life, taw, loading dose, dosage regimen, Cpmax,ss, Cpmin,ss, Intravenous Dose, oral dose.

Serum enzymes and liver function tests

Serum enzymes, interpretation, patient care, medical decision, clinical lab tests, body fluid, physiological parameter, international units, katas, AST, ALT, alanine transaminase, aspartate transaminase, lactate dehydrogenase, tissue specific, organ damage, myocardial infarction, creatinine kinase, troponin, acute hepatitis, chronic hepatitis, bilirubin, hyperbilirubinaemia, jaundice, albumin, prothrombin.

Basic Mathematics Revision Class

Exponents, logarithms, power function, units, linear graph paper, semi-log graph paper, slope calculation.

Introduction to Clinical Pharmacokinetics
Linear graph paper, semi-log graph paper, plasma concentration, elimination rate constant, K, time, concentration versus time profile, urine collection, urine volume, excreted amount in urine, rate of excretion, half-life, delta Ae, delta t.

**Introduction to Clinical Pharmacokinetics**
Renal clearance, CLR, area under the curve, AUC, AUC0-t, AUC0-inf, volume of distribution, Vd, apparent volume of distribution, fraction of drug excreted unchanged, excretion rate constant, Ke, constant rate infusion, infusion rate, elimination rate constant, K, plateau level, steady state, new plateau level.

**Introduction to Clinical Pharmacokinetics**
Oral dose, absorption rate constant, first order kinetics, flip-flop kinetics, elimination rate constant, K, residual plot, residual method, terminal slope, residual slope, clearance, bioavailability, absolute bioavailability, relative bioavailability, equivalent dose, molecular weight, loading dose, multiple intravenous dose, peak plasma level, trough plasma level, Cmax,ss, Cmin, ss.

**Nutrition 1**
Malnutrition, BAPEN, nutrition, weight loss, wound healing, causes, intake of food, utilisation of food, medication causing malnutrition, nutritional status, anthropometry, nutritional scoring system, MUST, Malnutrition universal screening tool, nutritional history, BMI, Body mass index, percentage weight loss, acute disease affect score, dietitian, Harris-Benedict, Schofield, stress factor, activity factor, weight gain, additive factor, nitrogen, protein, daily, BMR, basal metabolic rate, population average, obesity, reducing obesity, NICE guidelines, causes of obesity, waist circumference, complications of obesity, diabetes, risk factor of obesity, management of obesity, overweight, medication, surgery, diet, activity, orlistat.

**Nutrition 2**
Nutritional support, BMI, weight loss, enteral, parenteral, oral, nasogastic, NG, jejunostomy, JF, percutaneous endoscopic gastrostomy, PEG, PEJ, NJ, nasojejunal, route, peripheral parenteral nutrition, stomach, feeding tube, fistula, aspiration, button, sip feed, ACBS, Advisory council on borderline substances, complication of enteral feeding, intolerance, discomfort, inadequate delivery of feed, PN, TPN, tailor nutrition, electrolyte, nutrient, replete, indications of parenteral nutrition, refeeding syndrome, hyperglycaemia, cholestatis, fluid balance, infection, mechanical, complication of parenteral nutrition, lipid, fat, carbohydrate, protein, cycling, LFT, liver function test, central venous catheter, CVC, PICC, peripheral inserted central catheter, subclavian, jugular, tunnelled.

**Nutrition 3**
Nutrition, energy carriers, carbohydrate, fat, protein, fluid, electrolytes, trace elements, mineral, vitamin, amino acids, consequences of protein depletion, nitrogen, chemical, osmotic, mechanical, energy requirements, dextrose, glucose, glucose overload, hyperglycaemia, combined glucose and lipid, liver dysfunction, sodium, potassium, chloride, calcium, magnesium, phosphate, phosphorus, refeeding syndrome, compartmental shift, calorie, risk of refeeding, BMI, weight loss, NICE guidelines, fluid requirement, biochemical monitoring, gastrointestinal secretion, patient monitoring, stopping PN, conversion to oral, home PN, neonates, paediatric, intestinal failure, NST, nutrition support team, pharmacist, preparation, aseptic, glutamine, arginine.

**Nutrition 4**
Medicine, medication, role, pharmacist, feed, feeding, tube, blockage, dietician, dietitian, doctor, patient, monitor, nurse, administration, drug, multidisciplinary, advice, advising, enteral, parenteral, law, product, license, formulation, flush, flushing, interaction, unblocking, pancreatic, enzyme, narrow, therapeutic, alternative, route, crush, water, syringe, sodium bicarbonate, absorption, liquid, solution, capsule, osmolality, pH, viscosity, sorbitol, empty stomach, feed interaction, phenytoin, bore, mechanical, obstruction, TPN, PN, composition, light, temperature, multilumen, y-site, dietary, nutraceutical, folic, deficiency, source

**Nutrition workshop**
BMI, body mass index, weight loss, percentage, harris-benedict, schofield, BMR, basal metabolic rate, activity, stress, protein, nitrogen, fluid, kcal, male, female, additive, iv, intravenous, electrolyte, serum, water, refeeding syndrome, compartmental, sodium, potassium, magnesium, phosphate, chloride, calcium, borderline substance, enteral, sip, indication, diabetes, nutrition, interaction, phenytoin, blockage, unblock, parenteral, requirement, drug, therapy, medication, route, alternative, BNF, incompatibility

**Acid-base balance**
Major cell dysfunction, Blood pH, carbohydrate metabolism, fat metabolism, amino acid metabolism, renal function, buffers, carbonic acid, partial pressure, organic acids, lactic acid, acidosis, urea, anion gap, metabolic acidosis, bicarbonate ion, hyperchloraemic acidosis, high anion gap metabolic acidosis, normal gap acidosis, uraemia, ketoacidosis, lactic acidosis, poisoning, salicylate, methanol, ethylene glycol, respiratory acidosis, respiratory alkalosis, metabolic alkalosis, bicarbonate loss, H+ gain, CO2 gain, renal tubular acidosis, aldosterone deficiency, renal failure, Reyes syndrome, iodine based contrast media, metformin, hyperventilation, Kussmaul’s, circulatory insufficiency, arrhythmias, arrest, hypoventilation, seizures, tetany, hypokalaemia, ventilation, sodium bicarbonate infusion, isotonic, hypertonic, central line, THAM, organic buffer

**Serum proteins**
Proteins, homeostasis, simple, complex, transport, metal ions, vitamins, hormones, drugs, immunoglobulins, infection, albumin, liver, carrier, binding protein, acidic drugs, serious illness, post-chemotherapy, burns, haemorrhage, liver dysfunction, malnutrition, malabsorption, calcium levels, osmotic pressure, diuretics, liver failure, alpha fetoprotein, foetal liver, amniotic fluid, maternal, pregnancy, tumour, hepatoma, teratoblastoma, alcoholic cirrhosis, gamma globulins, immune system, B-lymphocytes, infection, immunisation, antigen, IgG, IgM, IgA, IgE, IgD, antitoxin, antiviral, opsonisation, opsonization, bacterial agglutination, helminth infection, markers, allergies, immunosuppression

**Drug displacement interactions**
Protein binding, drug displacement, pharmacokinetic, distribution, binding sites, competitive, non-competitive, tissue binding, ionisation, equilibrium, metabolism, absorption, albumin, glycoprotein, warfarin, digoxin, sodium valproate, phenytoin, toxicity, aspirin, methotrexate, association constant, adverse effects, volume of distribution, plasma concentration, therapeutic drug monitoring, TDM, extraction ratio, renal function, amiodarone

**Drug elimination interactions**
Drug elimination interactions, renal excretory mechanisms, pharmacokinetic, kidney; absorption, distribution, metabolism, fluid and electrolyte regulation, waste products, filtration, glomerular filtration, tubular secretion, tubular reabsorption,
metabolites, plasma proteins, renal tubules, drug clearance, urinary pH, non-steroidal anti-inflammatory drugs, NSAIDS, prostaglandins, PGE2, lithium, diuretics, aspirin, methotrexate, amiodarone, digoxin

**Biochemistry of Lipids**

Biochemistry, lipids, triglycerides, physiology, dietary fats, fatty acids, saturated, unsaturated, cis, trans, diet, essential fatty acids, omega-3, omega-6, oily fish, phospholipids, steroids, cholesterol, hydrocarbon, atherosclerosis, liver, lipoproteins, LDL, Low density lipoproteins, HDL, High density lipoproteins, Vitamins, Cardiovascular disease, lipid profile, point-of-care testing, pharmacy services, population screening, enzymes, cholesterol assay, absorbance, photometry, NICE guidelines, cholesterol testing

**Management of Hyperlipidaemia**

Hyperlipidaemia, lipid, cardiovascular risk, primary prevention, secondary prevention, cardiovascular disease, mode of action, risk assessment, ethnicity, risk prediction chart, obesity, diabetes, smoking, gender, lipid profile, lifestyle changes, lifestyle modifications, oily fish, saturated fats, unsaturated fats, alcohol, exercise, acute coronary syndrome, statin, fibrates, simvastatin, NICE guidelines, simvastatin, ezetimibe, liver, contra-indications, liver function tests, side effects, myositis, safety, MHRA, myopathy, drug interactions, omega-3

**Pharmacokinetics**

Excretion rate, clearance, plasma concentration, steady state plasma concentration, non-steady state, bolus dose, area under curve, integration, IV infusion, IV bolus, rate constant, elimination rate constant, half-life, apparent volume of distribution, renal clearance

**Mathematics Workshops**

logarithms (base 10, base e), inverse logarithms, algebra, plotting graphs, using semi-log graph paper, calculating rate constants, calculating area under the curve using trapezoidal rule

**Drug Interactions**

Drug interactions, drug interaction, therapeutic consequences, classified, how pharmacodynamics interactions occur, their clinical consequences, appropriate management, examples, drug interaction definition, drug-drug, drug-herbal medicine, drug-food, drug-drink, drug-environmental chemical agent, potential therapeutic consequences, harmful, increased toxicity, theophylline and ciprofloxacin, decreased efficacy, warfarin and rifampicin, clinically significant, unexpected change or complication, lamotrigine and combined oral contraceptives, beneficial, Targinact®, no clinical significance, isphaghula husk and Asacol®, cause adverse drug reactions, epidemiology, susceptible patients, polypharmacy, elderly, seriously ill eg. renal disease, hepatic disease, transplant recipient, genetic polymorphism, high-risk medicines, concentration-dependent toxicity: digoxin, aminoglycosides, warfarin, lithium, patient dependant on therapeutic effect: oral contraceptives, glucocorticoids, immunosuppressants, steep dose/response curve: verapamil, levodopa, saturable hepatic metabolism: phenytoin, theophylline, useful information resources: BNF appendix 1, black dot interactions, computer warning systems, medicines information centre, summary of product characteristics, stockley’s drug interactions, alcohol and metronidazole interaction, important to check for drug interactions when selling OTC, dispensing medicines, prescribing medicines, reviewing medicines on a ward/clinic, advise on appropriate management, avoid the combination, simvastatin and clarithromycin, recommend and alternative treatment, “controversial” PPI/clopidogrel
interaction, make a dose adjustment, reduce theophylline dose when ciprofloxacin prescribed, monitor patient closely, INR on Tamiflu®, separate times of administration, ciprofloxacin and iron, no action required if not clinically significant, two antihypertensives, drug interaction classification, pharmacokinetic, pharmacodynamics, other, pharmaceutical incompatibilities, drug-biochemical test reactions, pharmacokinetic absorption, distribution, metabolism, elimination, pharmacodynamic, pharmacological action, not mutually exclusive, overlap, pharmacokinetic, absorption, distribution, metabolism, elimination, pharmacodynamic, antagonistic/opposing, additive/synergistic, drug or neurotransmitter uptake, increased toxicity, decreased therapeutic effect, pharmacodynamics interactions, effect of one drug on pharmacological action of another drug, competition for receptor sites, indirect and involve interference with physiological systems, classification difficult, antagonistic interactions, direct competition, same receptor site, reduced pharmacological effect, agonist action will interact with antagonists at that receptor site, some interactions therapeutic advantage, antidote administration, reduce side-effects, Targinact®, beta blockers and beta 2 agonists, warfarin and vitamin K, naloxone and opioids, flumazenil and benzodiazepines, insulin and glucocorticoids, ACE-inhibitors and NSAIDS, warfarin and vitamin K, inhibits vitamin K epoxide reductase, therapeutic effect, international normalised ration (INR), most indications target INR 2.5, range 2-3, vitamin K intake increased, INR will decrease, untentional, dietary change, intentional, vitamin K antidote, monitor INR, adjust warfarin dose, naloxone and opioids, opiate toxicity, naloxone an opioid antagonist, reverses effects of opioids, shorter duration of action than opioids, close monitoring of patient, additive synergistic, similar pharmacological effect, two or more antihypertensives, intended, adverse drug reactions, QT interval prolongation, methotrexate and trimethoprim, bone marrow depression, avoid trimethoprim, aspirin and clopidogrel, increased risk of bleeding, monitor Hb, PLT, signs of bleeding, ramipril and spironolactone, increased risk of hyperkalaemia, monitor potassium and renal function, alter dose of spironolactone, drug or neurotransmitter uptake interactions, monoamine oxidase inhibitor, phenelzine, isocarboxacid, tranylcypromine, dangerous dietary and drug interactions, tranylcypromine most hazardous MAOI, mechanism of interaction, accumulation of neurotransmitters, noradrenaline, blood vessel constriction, excessive blood pressure rise, avoid tyramine containing foods, OXO, Bovril, Marmite, red wine, fresh food, avoid stale food, avoid sympathomimetics, pseudoephedrine, case studies.

Pharmacokinetic Drug Interactions - drug metabolism
Pharmacokinetic drug interactions; metabolism; purpose of drug metabolism; mechanisms by which drug metabolism interactions occur; examples; practical solutions for effective management; drug interactions classification; pharmacokinetic; pharmacodynamics; other; pharmaceutical incompatibilities; drug-biochemical test interactions; pharmacokinetic; absorption; distribution; metabolism; elimination; metabolism; biotransformation; drugs biochemically modified; degradation and removal from body; drug rendered more hydrophilic; renal excretion; less lipid soluble metabolite not absorbed; metabolites less active than parent drug; pro-drugs; levodopa; liver; principle site of drug metabolism; first-pass metabolism; gut; kidneys; skin; lung; placenta; metabolism; phase 1 reactions; polar; oxidation; reductions; hydrolysis; phase 2 reactions; more hydrophilic; glucuronic; sulphuric acid; cytochrome P450 system; haemoproteins; inner mitochondrial membrane; endoplasmic reticulum; metabolism of endogenous molecules; metabolism of exogenous molecules; CYP450 enzyme system; isoenzymes; isoforms; gene; drug substrates; nomenclature system; number; family; letter; subfamily; number; individual isoform; isoenzymes and drug substrates; CYP1A2; theophylline; R-warfarin; amitriptyline; CYP2C9; diazepam; diclofenac; S-warfarin; CYP2CA9; citalopram; omeprazole; CYP3A4; amiodarone; ciclosporin; tacrolimus; CYP2D6; amitriptyline; codeine; risperidone; drug
metabolism interactions mechanisms; genetic factors; change in blood flow through liver; enzyme inhibition; enzyme induction; change in blood flow through liver; portal circulation; first-pass metabolism; enzyme inhibition; inhibit activity CYP450 enzymes; competition; reduced rate of metabolism; accumulation; clinical effect; narrow therapeutic range drugs susceptible; enzyme inhibitor examples; ciprofloxacin; clarithromycin; metronidazole; erythromycin; fluconazole; ketoconazole; itraconazole; miconazole; amiodarone; verapamil; diltiazem; quinidine; cimetidine; omeprazole; allopurinol; azapropazone; ciprofloxacin & theophylline interaction; clinical effect; toxicity; mechanism; management; check theophylline level; clarithromycin & simvastatin interaction; clinical effect; rhabdomyolysis; mechanism; management; temporarily discontinue simvastatin; cranberry juice & warfarin interaction; raised INR; bleeding; avoid use; Grapefruit juice; numerous drugs; ivabradine; ranolazine; dronaderone; simvastatin; felodipine; mechanism of action; naringenin; enzyme induction; stimulate activity of CYP450 enzymes; increase rate of metabolism; reducing plasma concentration; clinical effects; patient variable effects; age; genetic factors; disease; concurrent drug therapy; enzyme inducer drugs examples; rifampicin; rifabutin; griseofulvin; carbamazepine; phenytoin; phenobarbital; primidone; St. John’s wort; chronic alcohol; cigarette smoking; rimapicin & oral contraceptives; breakthrough bleeding; pregnancies; mechanism; potent enzyme induction; management; additional method during antibiotic course; 4-8 weeks after withdrawal; St Johns wort & warfarin; reduced anticoagulant effect; mechanism of action; management; avoid use; if warranted monitor INR; increase warfarin dose; difference in herbal preparations; cigarette smoking & theophylline; higher doses theophylline in cigarette smokers; mechanism; management whilst smoking; when stop smoking; management options for drug metabolism interactions; avoid the combination; adjust dose of object drug; monitor for early side-effect detection.

Pharmacokinetic drug interactions – drug absorption
Pharmacokinetic; absorption; mechanisms; examples; practical solutions for management; drug interactions; pharmacodynamic; pharmacokinetic; definition of pharmacokinetic; drug absorption revision; oral; stomach; small intestine; rate and extent of absorption; drug interactions at the absorption site; mechanisms; drug-binding; GI motility; GI pH; Malabsorption; Induction or inhibition of drug transport proteins; drug binding in GI tract; poorly absorbable complexes; tetracycline antibiotics & iron; tetracycline; demeclocycline; doxycycline; lyme cycline; minocycline; oxytetracycline; chelate with iron; poorly soluble complexes; lower serum levels; management; separation of administration times; quinolone & iron; bisphosphonates & food; changes in GI motility; decrease in motility; slow rate absorption; increased extent absorption; anticholinergics; levodopa; mechanism of action; management; tricyclic antidepressants; diamorphine & paracetamol; increase in motility; increase rate of absorption; decrease extent of absorption; paracetamol & metoclopramide; mechanism of action; interaction exploited; Paramax; digoxin & metoclopramide; ciclosporin & metoclopramide; changes in pH; ionozation; pH. pKa; ketoconazole & PPI’s; H2 antagonists; mechanism of action; management; Asacol & lactulose; mechanism of action; management; induction or inhibition of drug transport proteins; P-glycoprotein; efflux pump; drug transport; digoxin; inducers & inhibitors of drug transport protein; rifampicin; St Johns Wort; atorvastatin; clarithromycin; ketoconazole; itraconazole; verapamil; propafenone; elimination interactions; digoxin & rifampicin; mechanism of interaction; management; monitor digoxin levels/response when on rifampicin; when rifampicin stopped.

Drug Interactions
Pharmacokinetic; Pharmacodynamic; mechanism of action; drug-drug; drug-food; drug-disease; clinically significant; advice on management; Case 1; UTI; ciprofloxacin;
paracetamol; PMR; co-codamol; ferrous fumarate; pharmacokinetic; interaction; absorption; ciprofloxacin; iron; complex; management; separate administration times; therapeutic duplication; paracetamol; co-codamol; counselling; Case 2; anticoagulant; warfarin; AF; rifampicin; sodium fusidate; INR decrease; non compliance; diet; pharmacokinetic interaction; AF & stroke; increase warfarin dose; monitor INR; sodium fusidate; warfarin; bisoprolol; paracetamol; Case 3: Nurofen; methotrexate; folic acid; pharmacokinetic; interaction; excretion; renal excretory mechanisms; toxicity; paracetamol; celecoxib; meloxicam; Case 4; flumazenil; midazolam; antidote; sedation; imidazobenzodiazepin pharmacodynamic; antagonism; receptor; reverses sedative effect; short half life; Case 5; warfarin; enteral feed; reduced INR; physio-chemical; binding to protein; vitamin k; antagonism; separate administration times; raise warfarin dose; Case 6; ramipril; amlodipine; enhanced hypotensive effect; no clinically significant interaction; expected; monitor BP; renal function; potassium; LFTs; side effects eg. oedema.

Practical Application of Laboratory Tests
Clinical laboratory tests; hospital pharmacist; factors which alter; apply laboratory tests; patient; important; confirm diagnosis; raised troponin; STEMI; assess severity; eGFR; renal impairment; Monitor response; cholesterol; simvastatin; monitor appropriate dosing; INR; warfarin; help prevent toxic side-effects; gentamicin levels; digoxin levels; Monitor response to therapy; WCC; CRP; Temperature; Clinical signs; antibiotic; pharmaceutical care; wards; dispensary; clinics; aseptics; quantitatively; qualitatively; reference range; do not interpret in isolation; consider other results; factors which influence laboratory tests; pharmacological; toxicological; chemical interference; method of collection; diurnal variation; age; nutrition; case studies; haematological tests; iron deficiency anaemia; decreased Hb; Decreased MCV; Decreased MCH; Decreased ferritin; Increased TIBC; blood loss; diet; treat; oral iron; dose; duration; counselling; Urea & electrolytes; Hyperkalaemia; ECG changes; potassium citrate mixture; hyperkalaemia treatment; hyperkalaemia kit; calcium gluconate; insulin actrapid; salbutamol nebules; calcium resonium; haemodialysis; GAIN guidelines for the treatment of hyperkalaemia; counselling; drugs which can raise potassium; ACE-inhibitors; Angiotensin 2 antagonists; potassium sparing diuretics; potassium supplements; Movicol; Fybogel; Klean-Prep; NSAIDS; Digoxin toxicity; Trimethoprim; Heparin; Low-salt; sodium content of medicines; solpadol effervescent; peptic liquid; metronidazole IV; sodium chloride 0.9%; kidney function tests; gentamicin 5mg/Kg; contraindications to regime; Cockcroft & Gault; eGFR; Liver function tests; co-amoxiclav; cholestatic jaundice; adverse drug reaction; yellow card; MHRA.

Serum electrolytes
Sodium; osmotic; osmolality; salt; hypernatraemia; hyponatraemia; kidneys; water balance; proximal tubule; loop of Henle; distal tubule; collecting duct; anti-diuretic hormone; ADH; angiotensin; atrial natriuretic hormone; aldosterone; normonatraemia; isotonic; saline; extracellular fluid; ECF; diabetes insipidus; Conn’s syndrome; Cushing’s syndrome; potassium; intracellular; extracellular; homeostasis; cation; diuretics; alkalosis; ECG; hyperaldosteronism; nephrotoxics; thiazide; loop; renal; catabolism; insulin; magnesium; hypomagnesaemia; hypermagnesaemia; symptoms; aetiology; treatment; calcium; albumin; acidosis; hypocalcaemia; hypoparathyroidism; hypercalcaemia; phosphate; hypophosphataemia; hyperphosphataemia; orthopnea; ketoacidosis; serum; patient safety

Haematological Laboratory Test
red blood cells; haemoglobin; blood; haematocrit; count; RBC; anaemia; MCV; MCH; MCHC; mean; corpuscular haemoglobin; concentration; volume; microcytic; hypochromic; reticulocyte; myelosupression; serum iron; total iron binding capacity; classification; iron;
iron deficiency; aetiology; drugs; ferritin; side-effects; folate deficiency; macrocytic; folic acid; Vitamin B12; Schillings test; radioactive; cyanocobalamin; hydroxycyanocobalamin; haemorrhage; haemolytic; chronic disease; aplastic; platelets; thrombocytopenia; erythrocyte sedimentation rate; ESR; bone marrow; aspiration; white blood cells; leukocytes; leucocytes; granulocytes; monocytes; neutrophils; basophils; eosinophils; infection; allergy; hayfever; asthma; lymphocytosis; leucopenia; normochromic;

**Kidney function tests**
glomerular filtration rate; GFR; creatinine; urea; creatinine clearance; serum creatinine; blood urea nitrogen; BUN; age; kidney function; renal impairment; nomograms; Cockcroft and Gault; estimation; eGFR; MDRD; modification of diet in renal disease; cystatin C; drug clearance
Drug-induced haematological diseases and lung diseases
Drug-induced, haematological diseases, lung diseases, adverse drug reactions, ADRs, drug experts, mechanisms, pharmacist role, prevention, advice, type A reaction, dose dependent, type B reaction, unpredictable, morbidity, mortality, blood components, Haematopoiesis, pluripotent stem cells, Erythroid, Granulocyte, monocytic, Megakaryocytic, Aplastic anaemia, Agranulocytosis, Thrombocytopenia, Haemolytic anaemia, Megaloblastic anaemia, Hypoplastic bone marrow, chloramphenicol, Phenylbutazone, NSAIDS, DMARDs, ALG, ciclosporin, steroids, rhG-CSF, blood products, antibiotics Antithyroid drugs, beta lactam antibiotics, Phenothiazines, Sulphonamides, Tricyclic antidepressants, Haemorrhage, petechiae, cerebral haemorrhage, Penicillamine, Furosemide, Digoxin, Sulphonamides, Heparin, Glucose-6-phosphate deficiency jaundice, haemoglobinuria, renal impairment, Methotrexate, Folate reductase inhibitors, Nasal congestion, Airway obstruction, Interstitial pneumonitis, Pulmonary fibrosis, Pulmonary oedema, xylometazoline, Radiocontrast media/general anaesthetics Pharmaceutical excipients, Aspirin, colchicine, dextropropoxyphene, dihydrocodeine, tricyclic antidepressants, Oral contraceptive pill, pleuritic chest pain, breathlessness, haemoptysis, cyanosis

Liver Infections
Function; liver; hepatic; causes; liver diseases; signs; symptoms; clinical features; viral hepatitis; prevention; treatment; Largest organ in the body; blood supply; re-generate; hepatic vein; portal vein; bile duct; anabolic; catabolic; acute; chronic; viral; hepatitis; alcohol; immune disorders; toxins; cirrhosis; jaundice; gynaecomastia; cutaneous; hepatitis; hepatomegaly; ascites; hyperbilirubinaemia; yellow; pruritis; hepatitis A (HAV); hepatitis B (HBV); hepatitis C (HCV); hepatitis D (HDV); hepatitis E (HEV); hepatocytes; fulminant; carrier; prodromal; anicteric; icteric; recovery; prognosis; infectious; spread; faecal-oral; childhood; sporadic; epidemics; explosive; incubation; cholestasis; IgM; treatment; analgesics; colestyramine; alcohol; recovery; hygiene; vaccination; travellers; high risk; hepatavirus; antigens; transmission; blood; occupational; vertical infection; horizontal infection; age; genetics; injection; interferon alpha; antivirals; prognosis; blood-borne; progressive;

Primary prevention of cardiovascular disease
Cardiovascular disease; coronary artery disease; cerebrovascular disease, peripheral vascular disease; risk factors; modifiable, non-modifiable; age; gender; smoking; high cholesterol; family history; strategies; primary prevention; assessment; triglyceride; renal dysfunction; atherosclerotic; guidelines; coronary heart disease; stroke; risk; diabetes; ethnicity; smoking habit history; family history; weight; waist measurement; blood pressure; lipids; glucose; high risk; risk calculator; clinical judgement; framingham; JBS2; BNF; graph; QRISK; arthritis; chronic kidney disease; atrial fibrillation; risk estimation; population characteristics; lifestyle modification; advice; pharmacotherapy; smoking cessation; intensive support; weight measurement; central obesity; BMI; exercise; cardioprotective diet; fat; oily fish; salt intake; fruit and vegetables; alcohol intake; alcohol units; binge drinking; moderate intensity; physical activity; optimal BP; target BP; high cholesterol; high density lipoprotein; low density lipoprotein; statin; baseline; monitoring; clinical indication; aspirin; current evidence; secondary prevention; vascular mortality; extracranial bleed; GI bleed; polypill; combination; challenges; symptoms; progressive; change; compliance; pharmacist; health promotion; measurement; vascular; clinics.

Medication history taking
medication history; medicines management; procurement; selection; prescribing; medicines optimisation; length of stay; patient; NHS; morbidity; independence; cost;
Peripheral Vascular Disease
Peripheral vascular disease; pathophysiology; risk factors; intermittent claudication; ischaemia; atherosclerosis; DVT; Buerger's disease; Raynaud's; nocturnal leg cramps; ilioaortic; femoropopliteal; Framingham; Acute Coronary Syndrome; smoking; smoking cessation; diabetes mellitus; dyslipidaemia; hypertension; hypercoagulable states; obesity; male; female; menopause; family history; occlusive; lactic acid; muscle; artery; mortality; necrosis; gangrene; cold extremities; treadmill; ultrasonography; ankle brachial index; vascular assessment; lifestyle; glycosylated haemoglobin, cholesterol; LDL; HDL; exercise; footcare; naftidrofuryl oxalate; oxypentifylline; inositol; cinnarizine; cilostazol; antiplatelet; vasodilator; heart failure; aspirin, clopidogrel; statin; fibrate; simvastatin; atorvastatin; walking distance; bezafibrate; nicotinic acid; homocysteine; prostataglandin; gingko biloba; surgical management; balloon angioplasty; amputation; ulceration; nailfold capillaries; vasoconstriction; vasospasm; nifedipine; iloprost; quinine; verapamil; NICE; SIGN; guidelines; technology appraisal

Upper Respiratory Tract Infections
Upper Respiratory Tract, Infection, mucociliary, air passage, pharynx, larynx, trachea, cough, organisms, normal flora, Staphylococci, Strepococci, pathogens, incidence, common cold, viruses, rhinovirus, transmission, Cochrane, evidence, non-pharmacological, analgesics, sympathomimetic, decongestants, pseudoephedrine, MHRA, crystal meth, methylamphetamine, antibiotics, sinusitis, diagnosis, amoxicillin, penicillin, doxycycline, macrolides, sore throat, cough, children, safety, smoking, expectorants, cough suppressants, antihistamines, antitussives, codeine, croup, corticosteroids, otitis media, acute otitis media, otitis media with effusion, glue ear, NICE, clinical guidelines, centor criteria, prescribing guidelines

Hypertension 1
Hypertension; diagnose; pathology; risk factor; evidence based therapy; blood pressure; perfusion; organ damage; cardiac output; peripheral vascular resistance; ventricle; aorta; arteries; vasodilators; stroke volume; blood; noradrenaline; sympathetic nervous system; acetylcholine; parasympathetic nervous system; adrenaline; renin, angiotensin; aldosterone; vasoconstriction; salt; lifestyle; non-pharmacological; co-morbidity; antihypertensives; stroke; renovascular disease; retina; kidney; brain; heart; systolic; diastolic; NICE; pulse pressure; morbidity; mortality; elderly; essential hypertension;
secondary hypertension; heart rate; catecholamines; antidiuretic hormone; ethnicity; gender; age; smoking; stress; weight; cerebrovascular accident; dementia; transient ischaemic attack; myocardial infarction; heart failure; clinical examination; physical activity; ambulatory

**Hypertension 2**
Pharmacotherapy; NICE guidelines; beta-antagonists; calcium channel blockers; angiotensin converting enzyme inhibitor; cardiovascular risk; drug interactions; diuretics; alpha blockers; Hypertension; risk factor; evidence based therapy; blood pressure; organ damage; cardiac output; peripheral vascular resistance; arteries; vasodilators; stroke volume; blood; noradrenaline; sympathetic nervous system; acetylcholine; parasympathetic nervous system; adrenaline; renin, angiotensin; aldosterone; vasoconstriction; salt; co-morbidity; antihypertensives; stroke; renovascular disease; retinopathy; kidney; brain; heart; systolic; diastolic; morbidity; mortality; elderly; essential hypertension; secondary hypertension; heart rate; catecholamines; antidiuretic hormone; ethnicity; gender; age; cerebrovascular accident; dementia; transient ischaemic attack; myocardial infarction; heart failure; clinical examination; physical activity; ambulatory; direct renin inhibitors; adrenal gland; sodium; diabetes; cough; hyperkalaemia; glomerular filtration rate; lipids; glucose; respiratory disease; aspirin; primary prevention; secondary prevention

**Tuberculosis**
Tuberculosis; TB; infection; world health organisation; mycobacterium tuberculosis; AIDS; HIV; pulmonary; extrapulmonary; parasite; latent TB; active TB; immunosupressed; airbourne; transmission; interferon gamma; x-ray; fatigue; appetite; weight loss; haemoptosis; mantoux; drug resistance; isoniazid; rifampicin; pyrazinamide; ethambutol; pharmacotherapy; streptomycin; pyridoxine; monitoring; liver function tests; renal function; visual acuity; vaccination; preventative therapy; Bacille Calmette-Guèrin; BCG

**Renal**
Acute renal failure; medication history; past medical history; case summary; monitoring; nephotoxic drugs; infection; dehydration; NSAIDS; angiotension converting enzyme inhibitor; creatinine clearance; chronic renal failure; dietary advice; phosphates; iron; ferritin; potassium; appetite; calcitriol; vitamin D; calcium; absorption; symptoms; erythropoisis stimulating agents; blood pressure; full blood count; reticulocytes; parathyroid hormone; sevelamer; lanthanum; cinacalcet; PTH; Cockcroft and Gault

**Acute Coronary Syndromes 1**
acute coronary syndromes; ACS; coronary heart disease; CHD; classification; atherosclerosis; chest pain; mortality; morbidity; unstable angina; UA; non ST-segment myocardial infarction; NSTEMI; ST-segment myocardial infarction; NSTEMI; MI; aetiology; fatty streaks; foam cells; atheroma; plaque; cholesterol; thrombus; clot; pathology; platelet; thrombosis; rupture; embolism; interruption to blood flow; coronary artery; blocked; cardiac; muscle; symptoms; ischaemia; exertion; exercise tolerance; ANS activation; tachycardia; dyspnoea; diagnosis; ambulance; A&E; hospital; history; physical examination; ECG; biochemistry; biochemical markers; troponin; CK-MB; glucose; lipid; renal; kidney; hepatic; liver; TFT; FBC; coagulation; management; pain relief; sympathetic activation; vasoconstriction; glyceryl trinitrate; GTN; diamorphine; opioid; anti-emetic; metoclopramide; cyclizine; nausea; oxygen; aspirin; COX-1; thromboxane A2; loading dose; atrium; ventricle; exercise stress testing; coronary angiography; risk; cardiovascular events; CV events; stenosis; NICE; National Institute for Health and Clinical Excellence; clinical guideline; pharmacotherapy; nitrate; venodilator; anticoagulant; beta-blocker;
Acute coronary syndromes 2

clopidogrel; adenosine diphosphate; ADP; P2Y12 receptor; unlicensed; thienopyridine; prasugrel; cangrelor; trials; glycoprotein IIb/IIIa inhibitor; GPI; fibrinogen; abciximab; eptifibatide; tirofiban; heparin; UFH; low molecular weight heparin; LMWH; fondaparinux; factor-Xa; bivalirudin; direct thrombin inhibitor; beta-1 receptor; side-effects; limitations; calcium channel blocker; CCB; nicorandil; ivabradine; ACE inhibitor; angiotensin converting enzyme; ACEI

Acute coronary syndromes 3

clopidogrel; adenosine diphosphate; ADP; P2Y12 receptor; unlicensed; thienopyridine; prasugrel; cangrelor; trials; glycoprotein IIb/IIIa inhibitor; GPI; fibrinogen; abciximab; eptifibatide; tirofiban; heparin; UFH; low molecular weight heparin; LMWH; fondaparinux; factor-Xa; bivalirudin; direct thrombin inhibitor; beta-1 receptor; side-effects; limitations; calcium channel blocker; CCB; nicorandil; ivabradine; ACE inhibitor; angiotensin converting enzyme; ACEI

Lower respiratory tract infection

Aetiology; Prevention; Treatment; acute bronchitis; chronic bronchitis; Pneumonia; Bronchiolitis; Secondary bacterial infection; viral respiratory infection; Rhinovirus; Coronavirus; Adenovirus; Influenza virus; Bordetella pertussis; Mycoplasma pneumonia; Streptococcus pneumonia; Haemophilus influenzae; cough; rhonchi; antimicrobial guidelines; amoxicillin, doxycycline, clarithromycin, erythromycin; co-amoxiclav; alveoli; Dyspnoea; Fever; Pleural pain; Consolidation; Chest X-ray; Bronchopneumonia; Lobar pneumonia; Primary atypical pneumonia; mycoplasma infection; Q fever; Legionnaires’ disease; Legionella pneumophila; CAP; Community-acquired pneumonia; Hospital-acquired pneumonia; HAP; Nosocomial pneumonia; CURB severity score; severity assessment; Confusion; Urea; Respiratory rate; Blood pressure; CRB-65; British thoracic society guidelines; Analgesia; fluids; Oxygen; Nutritional support; Antibiotics; benzylpenicillin; levofloxacin; Cefuroxime; cefotaxime; rifampicin; Duration of treatment; Influenza vaccination; Pneumococcal vaccination; pneumococcal polysaccharide conjugate vaccine; PCV; Pneumococcal polysaccharide vaccine; childhood immunization

Nosocomial infection

Aetiology; Prevention; Treatment; Nosocomial infection; MRSA; methicillin resistant Staphylococcus aureus; meticillin resistant Staphylococcus aureus; prevalence; mortality; Respiratory tract infection, urinary tract infection, central line infection, wound infection,
host defences; Colonisation; underlying health status, Surgery, Trauma, Burns, ET or nasal intubation, Central venous catheterisation, Surgical drains, Urinary catheters, antimicrobial therapy, Immunosuppressive treatment, Blood transfusion, infection control, Education, hygiene, Handwashing, Gloves, patient segregation, patient cohorting, Glycopeptides, vancomycin, teicoplanin, linezolid, Oxazolidinone, Streptogramins Quinupristin & Dalfopristin, Synercid®, Tigecycline, Daptomycin, Rifampicin, Gentamicin, Fusidic acid, Mupirocin nasal ointment, Eradication, Chlorhexidine, skin disinfectant, Clostridium difficile, C. difficile, intestinal overgrowth, Clindamycin, penicillins, fluoroquinolones, Metronidazole, Rehydration, Surgery

Cystic Fibrosis
Cystic Fibrosis, CF, Aetiology; Clinical pathology; Diagnosis; Treatment, Respiratory disease, Gl disease, Liver impairment, autosomal recessive, genetic mutation, CF transmembrane conductance regulator, CFTR, thickened mucus, Genetic testing, neonatal screening, Pancreatic dysfunction, diabetes, Distal intestinal obstructive syndrome, DIOS, liver cirrhosis, Acute infective exacerbations, Neutrophil elastase, secretagogue, host defences, Staphylococcus aureus, S.aureus, Haemophilus influenzae, H. Influenzae, Pseudomonas aeruginosa, P. aeruginosa, Burholderia cepacia complex, Stenotrophomonas maltophilia, MRSA; methicillin resistant Staphylococcus aureus; meticillin resistant Staphylococcus aureus, intermittent colonisation, chronic infection, mucoid, biofilm, pulmonary function, genomovar, cepacia syndrome, Patient segregation, anaerobes, Prevotella, Veilonella, quality of life, nutrition, vitamins, fat soluble, Salt supplementation, pancreatic enzyme replacement, Pancreatin, protease, amylase, lipase, laxatives, Bowel cleansing solutions, Gastrograftin, Ursodeoxycholic acid, Sulphophytreas, Insulin, Physiotherapy, Dornase alfa, Antibiotics, Bronchodilators, fluocoxacillin, cefradine, Fusidic acid, Azithromycin, Erythromycin, Clindamycin, Amoxicillin, Cefaclor, Co-amoxiclav, colistin, ciprofloxacin, Aminoglycoside, Tobramycin, gentamicin, cephalosporin, Ceftazidime, Carbenapenem, Meropenem, Ureidopenicilllin, Azlocillin, piperacillin, nebulised, aztreonam, trimethoprim/sulfamethoxazole, salbutamol, terbutaline,

Asthma
asthma; british thoracic society; BTS; guidelines; inflammation; reversible; symptoms; epidemiology; mortality; hyper-reactivity; lungs; bronchoconstriction; bronchi; oedema; mucus; triggers; allergens; infections; pollution; NSAIDs; beta-blockers; exercise; pathology; IgE; early; late; response; episodic; chronic; breathing; exercise-induced; childhood; status asthmaticus; extrinsic; intrinsic; brittle; diagnosis; wheeze; cough; intermittent; variable; FEV1; FVC; peak expiratory flow; acute severe asthma; hypercapnia; cyanosis; non-pharmacological; house dust mites; smoking cessation; immunotherapy; bronchodilators; relievers; preventers; corticosteroids; inhaled; anti-inflammatory; beta-2 agonists; salbutamol; salmeterol; side-effects; methylxanthines; theophylline; aminophylline; anti-muscarinics; ipratropium; oxtropium; beclometasone; fluticasone; prednisolone; anti-allergic; sodium cromoglicate; nedocromil sodium; leukotrienes; histamine; leukotriene receptor antagonistists; cysteinyl leukotrienes; steroid-sparing; methotrexate; gold; ciclosporin; omalizumab; patient counselling; counselling; spacers; metered-dose inhalers; MDI; peak flow meter; compliance; diary cards; records; pulmonary function; diskhalers; breath-actuated; dry powder inhalers; step-wise; management; treatment;

COPD
chronic obstructive pulmonary disease; COPD; COLD; COAD; chronic bronchitis; emphysema; cough; expectoration; bronchioles; alveoli; epidemiology; mortality; aetiology; smoking; pollution; irritation; risk factors; Fletcher-Peto diagram; hypersecretion;
obstruction; mucus; infection; histology; hypoxaemia; polycythaemia; cor pulmonale; blue bloater; wheeze; dyspnoea; bronchospasm; hypercapnia; respiratory tract infection; sputum; alpha-1 antitrypsin; alpha-1 antiprotease; genetics; elastase; elastic recall; lung capacity; residual volume; alveolar destruction; pink puffer; pathophysiology; clinical features; sleep apnoea; acute respiratory failure; smoking cessation; NRT; symptoms; pulmonary rehabilitation; non-invasive ventilation; NIV; NICE guidelines; beta-2 agonist; long acting; muscarinic antagonist; inhaled; corticosteroids; breathlessness; muciliary clearance; theophylline; oxygen; concentrator; treatment; lungs; breathing;

**Urinary tract infection**

urinary tract infection; pyelonephritis; cystitis; prostatitis; urethritis; women; pathogenesis; host defences; glomerulonephritis; virulence factors; flagellum; fimbriae; bacteria; aerobactin; haemolysin; uroepithelium; urine osmolality; neutrophils; micturition; commensals; uncomplicated; complicated; infection; sexual intercourse; trauma; resistance; prostatic hypertrophy; catheter; recurrent; relapse; reinfection; risk factors; symptoms; bacteriuria; diagnosis; dipsticks; mid-stream; microorganisms; Escherichia coli; E. coli; pregnancy; treatment; antibiotics; trimethoprim; prophylaxis;

**CV workshop**

Pharmaceutical care, hypertension, ischaemic heart disease, cardiovascular risk, pitfalls, hypertension clinic, stroke, ibuprofen, OTC, lifestyle, smoking, implications, therapeutic plan, NICE, BP measurement, seated and standing, end organ damage, muscle hypertrophy, GFR, afterload, stroke volume, exercise, low fat, increased fibre, reduce salt, reduce alcohol, J curve, reduce caffeine, weight loss, waist circumference, BMI, QRISK2, Framingham, BP, HR, ECG, U&E, FBC, fasting lipids, LFTs, blood glucose, atenolol, aspirin, family history, ACE inhibitor, statin, diabetes, PVD, asthma, CHD, CKD, beta-blocker, peripheral dilatation, cardioselective agents, Acute coronary syndromes (ACS), signs, symptoms, STEMI, monitoring, benefits, counselling, secondary prevention, chest pain, SOB, troponin T, cardiac ambulance, non-pharmacological management, contraindications, thrombolysis, discharge planning, cardiac rehabilitation, erectile dysfunction, patient choice, concordance, alternative medication, calcium channel blockers, rate limiting, analgesia, diamorphine, oxygen, hypoxic, metoclopramide, nausea, antiplatelet, thromboxane A2, clopidogrel, tenecteplase, enoxaparin, haemorrhagic stroke, intracranial neoplasm, active bleeding, aortic dissection, major surgery, head injury, anticoagulation, INR, pancreatitis, oesophageal varices, infectious endocarditis, IV GTN, IV beta-blocker, radiating chest pain, increased respiratory rate, clammy, atypical presentation, elderly, NRT, smoking cessation, OTC medication, pseudoephedrine, herbal, homeopathic, ivabradine.

**Renal lecture**

renal anatomy, renal pelvis, medulla, cortex, ureter, glomerulus, efferent arteriole, afferent arteriole, proximal convoluted tubule, descending loop of Henle, ascending loop of Henle, distal convoluted tubule, collecting duct, bowman’s capsule, excretion of waste, fluid balance, regulation of electrolytes, acid-base balance, endocrine, erythropoietin, activated vitamin D, renin-angiotensin-aldosterone-system, chronic kidney disease, acute renal failure, albuminuria, reduced GFR, prevalence, dialysis, transplantation, classification - stage 1 - 5, NICE guidelines, patient monitoring, causes, risk factors, diabetes, hypertension, cardiovascular disease, structural disease, multisystem disease e.g. systemic lupus erythematosus, family history, malignancies, nephrotic medication, diagnosis, signs and symptoms, laboratory tests, investigations, proteinuria, morbidity and mortality, itching, nausea, pruritis, vomiting, night cramps, restless leg syndrome, gout, fatigue, weight loss, hyperkalaemia, hyperphosphataemia, hyperparathyroidism,
hypocalcaemia, metabolic acidosis, lethargy, oedema, shortness of breath, renal anaemia, cockcroft and gaunt, eGFR, body surface area, exceptions to eGFR, limitations to cockcroft and gault, ideal body weight, UK renal pharmacy group, renal drug handbook, urine albumin:creatinine ration (UCAR), pharmacokinetics, pharmacodynamics, bioavailability, uraemia, GI absorption, distribution of drug, ascites, volume of distribution, hydrophilic, protein-bound, plasma concentration, proteinuria, parathyroid hormone, first pass metabolism, oedema, ascites, water soluble drugs, protein bound drugs, decreased plasma concentration, dehydration, muscle wasting, metabolism of drugs, altered reduction, altered hydrolysis, increased ADRs, increased CV risk, CKD mineral and bone disorder, renal anaemia, metabolic acidosis, fluid balance, reduced ability to filter phosphate, active form of vitamin D, skeletal decalcification, bone pain, deformity, fractures, reduced QOL, vascular or soft tissue calcification, hypocalcaemic, hyperparathyroidism, action of sunlight, dietary intake, GI bleed, nausea and vomiting, erythropoietin, reduced production by kidney, bone marrow response, hyperkalaemia, bicarbonate, pruritis, palliative, end stage renal disease, mortality, blood pressure control, ACE inhibitors, ARBs, more than 3 antihypertensives, dyslipidaemias, lifestyle changes, glycaemia control, reduce dietary phosphate, dialysis, phosphate binders, sevelamer, high pill burden, vitamin D, calcitriol, alfacalcidol, mineral metabolism, cinalcet, action on parathyroid glands, parathyroidectomy, target haemoglobin, Erythropoiesis-stimulating agents, increased production of RBCs, darbapoeitin alfa, epoetin beta, SC, IV administration, Cost-effectiveness, seizures, ADRs, iron supplementation, monitor serum ferritin, restless legs, clonazepam, antiemetics, nausea, antihistamines, haemodialysis, peritoneal dialysis, transplantation, diffusion, semi-permeable membrane, electrochemical concentration gradient, synthetic membrane, endogenous membrane, immunosuppressants, acute renal failure, abrupt rise in urea, rapid decline in GFR, acutely unwell, reversible, hospital admission, nitrogenous waste products, salt, water, potassium, itching, pleural effusion, pericarditis, depression of consciousness, oliguria, convulsions, pre-renal, intrinsic, post-renal, hypovolaemia, calyces, renal artery, renal vein, ureter, renal pelvis, medulla, cortex, hypotension, decreased cardiac output, heart failure, thrombus, damage to vasculature, drug induced, bladder outflow, benign prostatic hypertrophy, obstruction of ureter, NSAIDs, kidney tubular damage, prostaglandin synthesis impaired, aminoglycosides, dose adjustment, alternative therapy, complementary therapy, liquorice,

Medication history taking
Importance of accurate medication history. Demonstration of how to take a medication history. Discussion of sources used and reliability. Develop appreciation of medicines reconciliation. Practice taking medication histories from peers through OSCEs. Medicines reconciliation activity. Assessed by 20 MCQs.
Roisin McNulty

Cerebrovascular Stroke
Differentiate between Transient Ischaemic Attack (TIA) and Stroke. Differentiate between Ischaemic and Haemorrhage Stroke. Recognise the signs, symptoms and clinical presentation. Development of pharmaceutical care issues for patients. Epidemiology, causes, prognosis, risk factors and complications of Stroke & TIA. Medical management of acute, ischaemic stroke, sub arachnoid haemorrhage and intracerebral haemorrhage and secondary prevention. NICE guidelines for the management of Stroke. Use of antiplatelet, antithrombotic agents, recanalising therapy and thrombolysis. Discuss the role of aspirin, clopidogrel and dipyridamole.
The pharmacist’s role in the multidisciplinary team including pharmacy technicians, doctors, nurses, social workers, physiotherapists, occupational therapists, dieticians etc. especially in a Stroke Unit.
**Surgical Antibiotic Prophylaxis**

Surgical antibiotic prophylaxis, Surgical site infection, patient, operation, goals, benefits, risk, surgical antibiotic prophylaxis administration, pathogens, operations, optimal prophylactic antibiotic regimens, heathcare associated infection, MRSA, Clostridium difficile, post-op UTI/RTI, surgical site infection, National mandatory surveillance, surgical site infection definition, surgical wound, incisional, organ, space, body cavity, bones, joints, meninges, tissues, implant or prosthetic device infection, SIGN guidelines, surgical site infection implications, morbidity, mortality, length of stay, costs, development of surgical infections, endogenous sources, exogenous sources, bacterial virulence, host defences, risk factors for SSI, patient related, operation related, patient-related risk factors, age, smoking, malnutrition, obesity, immunosuppressed, concomitant disease state, prolonged post-operative hospital stay, operation-related risk factors, operation classification, clean, clean-contaminated, contaminated, dirty, National Academy of Sciences national research council, operation classification and infection risk, skin preparation, duration of surgery, foreign material, implants, surgical drains, surgical technique, theatre cleanliness, instrument cleanliness, prophylaxis, adjunct to surgical technique, contaminating flora, goals of antibiotic prophylaxis, evidence, adverse effects, normal flora, reduce surgical site infection, benefits and risk of SAP, reduce risk of SSI, inappropriate antibiotic use, penicillin allergy, clostridium difficile diarrhoea, SAP considerations, choice, dose, route, timing, duration, record, expected pathogens, resistance, penicillin allergy, MRSA positive, treatment doses, route, IV, less than or equal to 30 minutes before incision, reduced efficacy, single dose, legal requirement to record, procedures, microorganisms, S. aureus, S. epidermidis, E. coli, Bacteroides, anaerobes, upper GI surgery, Biliary tract surgery, Appendicetomy, Colorectal surgery, SIGN guideline 104 “Surgical Antibiotic Prophylaxis”, 2008, evidence-based, local Trust Guidelines, SHSCT guidelines, minimise risk of C. difficile, minimise cephalosporins, quinolones, clindamycin, DH “Clostridium difficile infection: How to deal with the problem”, audit, drugs and organisms they cover, Examples of prophylactic regimes from SHSCT, tonsillectomy & adenoidectomy, Upper GI surgery, laparoscopic cholecystectomy, lower GI surgery, pharmacist role in preventing SSI, pre-assessment clinic, during admission, discharge.

**Stable Angina**

Stable Angina, aetiology, signs, symptoms, diagnosed, risk stratification, evidence-based management. Angina pectoris, syndrome, strangling, anxiety, pathological, aetiology, ossification of the coronaries, Angina, Stable, Unstable, variant, syndrome X, nocturnal, decubitis, management, epidemiology, risk factors, age, gender, smoking, hypertension, diabetes, obesity, positive family history, raised cholesterol, anaemia, hyperthyroidism, peripheral vascular disease, aetiology, pain, myocardial ischaemia, inadequate coronary artery blood supply, oxygen demand greater than supply, atherosclerosis, coronary artery spasm, tachycardia, hypertension, anaemia, atherosclerosis, atheromatous plaque, obstruction of arterial lumen, impeded blood flow during exertion, angina symptoms, ACS, pain, adenosine, location, retrosternal, left side of chest, left arm, neck, jaw, teeth, back, shoulder, epigastria area, character, tight, dull, pressure, heavy, burning, strangling, constricting, squeezing, silent, duration, exertion, emotional stress, heavy meal, exposure to cold, first thing, rest, glyceryl trinitrate, fatigue, faintness, SOB, nausea, burping, restlessness, GI discomfort, differential diagnosis, oesophagitis, peptic ulcer disease, pneumonia, pulmonary embolism, stable angina versus unstable angina, stable angina severity, Canadian cardiovascular society angina classification, prognosis, risk stratification, diagnosis, NICE guideline 2010 “Chest pain of recent onset. Assessment and diagnosis of recent chest onset pain or discomfort of suspected cardiac origin”, clinical assessment alone, clinical assessment plus diagnostic testing, NICE defines angina pain,
constricting discomfort, precipitated by physical exertion, relieved by rest/GTN, physical examination, laboratory tests, specific cardiac investigations, laboratory tests, fasting lipid profile, fasting glucose, full blood count, renal function, myocardial damage, troponin, TFT’s, cardiac investigations, chest X-ray, Resting ECG, EST treadmill, routine observations, myocardial perfusion scintigraphy, CT calcium scoring, coronary angiography, risk stratification, diagnosis, treatment options, low-risk, intermediate-risk, high-risk, minimize or abolish symptoms, improve prognosis, improve quality of life, NICE guideline 2011, “stable angina”, explaining, professional help if there is a sudden worsening in severity/frequency of angina, discuss the risk and benefits of treatment, exploring and addressing issues according to persons needs, self-management, stress/anxiety/depression, physical exertion, lifestyle advice, drug treatment, revascularisation, not exclude from treatment based on age, not be investigated or treated differently based on gender or ethnicity, lifestyle advice, smoking cessation, alcohol intake, diet, exercise, weight control, psychological support, drug treatment, short term relief, GTN spray, secondary prevention of CVD, aspirin, if allergic clopidogrel, statin, ACE inhibitor, hypertension, anti-anginal medication, beta-blocker, calcium channel blocker, long-acting nitrate, nicorandil, ivabradine, ranolazine, optimal drug treatment, 1-2 antianginal drugs plus drugs for secondary prevention of CVD, if symptoms persist, revascularisation, triple anti-anginal therapy, GTN spray or SL tablets, coronary vasodilator, decreases oxygen demand, administer, side-effects, sit or hold onto something if feeling light-headed, expiry date, do not inhale, help if angina severity/frequency worsens, nifedipine sublingual, treating and preventing an acute angina attack, rest, administer, repeat administration, call ambulance, preventing acute attack, 2-3 minutes immediately before planned exercise, beta-blockers, first-line, prognosis, cardioprotective function, post MI trials, mechanism of action, decrease contractility, decrease cardiac workload, coronary perfusion, anti-arrhythmic, anti-hypertensive, calcium channel blockers, also first-line therapy, dihydropyridines, amlodipine, felodipine, nifedipine, nicardipine, nisoldipine, non-dihydropyridines, phenylalkylamine, verapamil, benzothiapine, diltiazem, brand prescribe, mechanism of action, dilating coronary arteries, reduce heart rate (verapamil and diltiazem), place in stable angina, avoid verapamil and diltiazem in heart failure, data extrapolated from post MI studies, long acting nitrates, isosorbide mononitrate, isosorbide dinitrate, prophylaxis of angina, mechanism of action, vasodilation, dose, contraindications, interactions, side-effects, tolerance, evidence limited, nicorandil, mechanism of action, dose, contraindications, interactions, side-effects, tolerance, IONA trial, ivabradine, indication, INITIATIVE study, ASSOCIATE study, pure heart rate reduction, cardiac pacemaker if, I current, visual function, evidence, dose, contraindications, side-effects, interactions, ranolazine, metabolic modulator, evidence, MARISA, CARISA, ERICA, mechanism of action, dose, contraindications, side-effects, interactions, If optimal medical management fails?, revascularisation, triple-therapy, pain interventions, Transcutaneous electrical nerve stimulation, enhance external counterpulsation, acupuncture, secondary prevention, aspirin, antithrombotic, evidence-based, Antiplatelet Triallists Collaboration, mechanism of action, dose, contraindications, enteric coated no therapeutic advantage, proton pump inhibitor, GI protection, higher risk, aspirin resistance, clopidogrel, thienopyridine, aspirin-intolerant patients, CAPRIE study, mechanism of action, dose, contraindications, side-effects, interactions, clopidogrel resistance, statins, Heart Protection Study, ACE inhibitors, diabetes, HOPE, EUROPA, PEACE, QUIET study, hypertension, NICE guideline 2011 on hypertension, dietary supplements, vitamin, fish oil supplements, no evidence to support efficacy, references
Cancers of the blood
Lymphoma, Leukaemia, Myeloma, Bone marrow, Lymphocytes, T cell, B cell, Granulocytes, neutrophils, eosinophils, basophils, Platelets, stromal cells, stem cells, Malignant Lymphoma, lymph nodes, Hodgkin's disease, Non-Hodgkin's lymphoma, Reed Sternberg cell, staging, ABVD (doxorubicin / bleomycin / vinblastine / dacarbazine), CHLVPP (chlorambucil / vinblastine / procarbazine /prednisolone), CHOP (cyclophosphamide / doxorubicin / vincristine / prednisolone), ESHAP (Etoposide / methyprednisolone / cytarabine/ cisplatin, Fludarabine, Rituximab, monoclonal antibody, radiotherapy, chemotherapy. Acute Lymphoblastic leukaemia, ALL, Acute Myeloid leukaemia, AML, Chronic Lymphocytic leukaemia, CLL, Chronic Myeloid Leukaemia, CML, lymphoblasts, myeloblasts, Lymphadenopathy, Bulsulphan, Hydroxyurea, Alpha-interferon, Tyrosine Kinase Inhibitors, Imatinib, Dasatinib, CHOP, monoclonal protein, M-protein, paraprotein, Bence Jones protein, Bone Marrow Transplants, BMT, Peripheral Stem Cell Transplants, PSCT, Cord Transplants, Haemopoietic Stem cells, Syngeneic stem cells, Allogeneic stem cells, Autologous stem cells, Bone Marrow Aspiration, Peripheral Stem Cell Mobilisation, Graft vs host disease, Acute GvHD, Chronic GvHD,

Medication errors
Prescribing; dispensing; administration; knowledge; skills; judgement; decision-making; prescription writing; dose; route; drug; selection; omission; illegible; abbreviations; patient safety; harm; hospital admission; economic burden; morbidity; mortality; legality; media; accountability; multi-disciplinary; reporting systems; avoidable; preventable; detection; safety procedures; Human error theory; causes; individual; system; latent; environment; personal; slip; lapse; mistake; violation; intentional action; unintentional action; severity; NCCMERP; national patients’ safety agency; general medical council; education; prevention; medicines reconciliation; prescribing hygiene; checking procedures; tall-man; electronic; packaging;

Adverse Drug Reactions
ADR; adverse drug event; Definition; risk; benefit; classification; type A; type B; type C; type D; type E; incidence; economic burden; morbidity; mortality; hospital admissions; pharmaceutical; pharmacokinetic; pharmacodynamic; dose; risk factors; polypharmacy; age; gender; co-morbidities; race; renal function; hepatic function; genetics; detection; predictable; unpredictable; idiosyncrasy; allergies; high risk drug classes; NSAIDs; anticoagulants; diuretics; digoxin; over-the-counter; herbal; prevention; primary care; secondary care; mortality; morbidity; management; alternative drug therapy; pharmacovigilance; clinical trials; case reports; cohort-studies; reporting systems; yellow card; Medicines and Healthcare products Regulatory Agency (MHRA); European Medicines Agency (EMA); Commission on Human Medicines; public; professionals; WHO; pharmacoepidemiology; Drug Safety Update; National Prescribing Centres; BNF;

Inflammatory Bowel Disease
Inflammatory bowel disease; ulcerative colitis; Crohn’s disease; lower GI tract; rectum; sigmoid colon; descending colon; transcending colon; ascending colon; caecum; appendix; unknown aetiology; chronic; relapsing; condition; inflammatory; epidemiology; population; incidence; peak; indeterminate colitis; response; environmental triggers; genetically susceptible; autoimmune; dietary allergy; infectious; psychological; medications; GI tract; location; distribution; mucosal; continuous; transmural; segmental; bowel wall; haustral markings; fibrotic; oedematous; rectal bleeding; abcess; fissure; sinus; stricture; abdominal mass; abdominal pain; carcinoma; proctitis; proctosigmoiditis; left-sided; extensive; pancolitis; toxic megacolon; refractory; surgery; malignancy; extraintestinal; diarrhoea, urgency; tenesmus; weight loss; malaise; mild; moderate;
severe; stools; toxicity; ileum; small intestine; large intestine; colonic; classic triad; lethargy; anorexia; growth; fulminant; alimentation; manifestations; response to treatment; CD activity index; clinical evaluation; travel; medication; diet; family history; bowel history; colonscopy; biopsy; stool examination; physical examination; laboratory; diagnosis; FBC; Hb; platelets; LFTs; albumin; CRP; ESR; U&E; vitamin deficiency; stool culture; complications; perforation; haemorrhage; systemic; arthritis; liver; metabolic bone disease; anaemia; thromboembolic; erythema nodosum; pyoderma gangrenosum; clinical course; life-threatening; intermittent; chronic; continuous; colectomy; cure; palliative; recurrence; work; control; medical management; nutritional deficiencies; oral; topical; suppositories; foam; enema; corticosteroids; inhibit; immune system; prostaglandin; leucotriene; hydrocortisone; exacerbation; response; step-down; prednisolone; duration; dose; adverse effects; maintaining remission; budesonide; side-effects; weight gain; fluid retention; adrenal suppression; Cushing’s syndrome; acne; mood disorders; diabetes; osteoporosis; cataracts; glaucoma; topical; indication; choice; aminosalicylates, inflammatory cascade; GI mucosa; role; remission; sulfasalazine; azobound; mesalazine; carrier; sulfapyrine; dose-related; sensitivity; side-effects; monitoring; unexplained bleeding; sore throat; fever; thiopurine; azathiopurine; mercaptopurine; modulation; active; steroid sparing; onset of action; effectiveness; unlicensed; intolerant; pancreatitis; flu-like; bone marrow suppression; reversible; contraception; vaccines; lymphoma; TPMT test; interactions; methotrexate; folic acid; inhibitor; unresponsive; toxicity; hepatotoxicity; myelosuppression; ciclosporin; IV; divided doses; narrow therapeutic index; seizures; side-effects; baseline; fasting lipids; anti-TNF; tumour necrosis factor; infliximab; adalimumab; antibody; ACT; ACCENT; CLASSIC; GAIN; CHARM; guidelines; NICE; induction; maintenance; infusion; BP; pulse; temperature; acute; infusion reactions; prefilled; subcutaneously; anaphylaxis; delayed; reactivation; TB; cardiac failure; chest X-ray; pregnancy; concomitant; nutrition; weight; elemental supplementation; rest; reintroduction; pain; antibiotics; antidiarrhoeals; reconstructive surgery; smoking.

**Palliative care**
Symptom management, syringe drivers, cancer, route of administration, Therapeutic drug monitoring, Syringe driver compatibility, pain, pain management, analgesics, analgesics ladder, analgesic adjuvants, breakthrough pain, Breakthrough analgesia, anti-emetics, constipation, continuous subcutaneous infusion, CSC, NMG

**Intensive care**
Intensive care, critical care, sepsis, sedatives, inotropes, delirium, ventilatory support, renal dysfunction, liver dysfunction, Nil by mouth, NBM, organ failure, HDU, High Dependency Unit, endotracheal tube, mask, Fluid and electrolyte management, Sedation, DVT Prophylaxis, deep vein thrombosis, Stress ulcer prophylaxis, Analgesia, Antibiotics, Uraemia, hypoalbuminaemia, Continuing renal replacement therapy, CRRT, anti-coagulation, heparin infusion, SIRS, systemic inflammatory response syndrome, burns, pancreatitis, trauma, Severe Sepsis, septic shock, hypnosis, anxiolysis, amnesia, Hypertension, hypotension, Tachycardia, Immunosuppression, cardiac output, arterial pressure, dobutamine, noradrenaline RMN

**Diarrhoea and constipation**
Diarrhoea; causes; acute gastroenteritis; food poisoning; Campylobacter, Norovirus, Salmonella, Giardia, Cryptosporidium, E.Coli and Shigella; travellers’ diarrhoea; viruses, protozoa; symptoms; nausea, vomiting, abdominal discomfort, fever; antibiotics; drug induced diarrhoea; osmotic diarrhoea; general malabsorption; steatorrhoea; glucose malabsorption; secretory; impaired fluid absorption; disturbed intestinal motility; ulceration;
inflammation; antineoplastics; NSAIDs; clostridiyum-difficile-associated diarrhoea; antibiotic use; fluoroquinolones; cephalosporins; pseudomembranous colitis; management; stop antibiotics; review acid suppressants; hold iron; metronidazole; vancomycin; IV immunoglobulin; rifampicin/rifaxamin; faecal replacement therapy; prevention; treatment; oral rehydration therapy; serious complications; referral; history of a change in bowel habit; presence of blood or mucus in stools; suspected adverse drug reaction; alternating constipation and diarrhoea in elderly patients; diarrhoea associated with severe vomiting and fever; management; opioids; morphine; diphenoxyllate; loperamide; adsorbants; kaolin; bismuth subsalicyclate; 48 hours symptom free; Constipation; primary, idiopathic; secondary; medicine related; soft faeces; hard faeces; severe impaction; inadequate fluid intake; inadequate dietary fibre; lifestyle changes; suppressing the urge to defaecate; depression; coeliac disease; diabetes; GI obstruction, carcinoma; hypothyroidism; hypokalaemia; IBS; antacids; anticonvulsants; antimuscarinic drugs; antidepressants; antipsychotics; opioids; diuretics; difficulty passing stools; abdominal discomfort and distension; faecal impaction; faecal and urinary incontinence; UTI; rectal bleeding; anal fissures; alternating with diarrhoea; unintentional weight loss; tenesmus; therapy; restore the normal frequency of defaecation; laxatives; bulk forming; stimulant; faecal softeners; osmotic; bran; isphagula; methylcellullose; sterculia; stimulant; bisacodyl; senna; danthron; sodium picosulphate; arachis oil; docusate sodium; magnesium salts; lactulose; macrogols; phosphate; suppositories and enemas; bisacodyl; glycerol; Roisin O’Hare

Clinical skills
Clinical pharmacy, skills, techniques, pharmacy practice, hospital setting, community setting, therapeutics, pre-registration, hospital environment, teacher practitioner, student responsibilities, code of conduct, fitness to practice, pathophysiology, patient, clinical pharmacist, professional behaviour, communication skills, body language, open questions, closed questions, multiprofessional team, interactive, participation, commitment, dress code, work etiquette, infection control, attendance, confidentiality, AccessNI, NHS plan, role of pharmacists, NHS, medicines safety, cost-effective, pre-admission clinics, medication history, OTC, herbal, allergy status, NICE guidelines, GAIN guidelines, SIGN guidelines, community pharmacist, GP, seamless care, patient support groups, patients own drugs, compliance, medicines reconciliation, inpatient, appropriate medications, monitoring response, TDM, side-effects, interactions, ADRs, yellow card scheme, discharge, patient counselling, discharge prescription, PSNI, problem solving, self-governance, self-directed learning, laboratory testing, patient notes, clinical record, medication kardex, pharmaceutical care issues, OSCE, clinical interventions, Pharmaceutical care plan, pharmaceutical care, powerpoint presentation, medicines concordance, compliance aids, non-adherence, assessment, effective listening skills, good eye contact, non-verbal communication, timeliness, appearance, initiative, SIADH, carbamazepine, rhabdomyolysis, acute renal failure, creatinine clearance, Cockcroft and Gault, methotrexate, mouth ulcers, pancytopenia, patient interview, acute coronary syndrome, simvastatin, aspirin, clopidogrel, tachycardic, blood pressure, heart rate, ECG, aspirin, ramipril, bisoprolol, NKDA, salbutamol, seretide, theophylline, montelukast, trimethoprim, oxygen

Clinical skills
Clinical pharmacy, skills, techniques, pharmacy practice, hospital setting, community setting, therapeutics, pre-registration, hospital environment, teacher practitioner, student responsibilities, code of conduct, fitness to practice, pathophysiology, patient, clinical pharmacist, professional behaviour, communication skills, body language, open questions, closed questions, multiprofessional team, interactive, participation, commitment, dress code, work etiquette, infection control, attendance, confidentiality, AccessNI, NHS plan, role of pharmacists, NHS, medicines safety, cost-effective, pre-admission clinics, medication history, OTC, herbal, allergy status, NICE guidelines, GAIN guidelines, SIGN guidelines, community pharmacist, GP, seamless care, patient support groups, patients own drugs, compliance, medicines reconciliation, inpatient, appropriate medications, monitoring response, TDM, side-effects, interactions, ADRs, yellow card scheme, discharge, patient counselling, discharge prescription, PSNI, problem solving, self-governance, self-directed learning, laboratory testing, patient notes, clinical record, medication kardex, pharmaceutical care issues, OSCE, clinical interventions, Pharmaceutical care plan, pharmaceutical care, powerpoint presentation, medicines concordance, compliance aids, non-adherence, assessment, effective listening skills, good eye contact, non-verbal communication, timeliness, appearance, initiative, SIADH, carbamazepine, rhabdomyolysis, acute renal failure, creatinine clearance, Cockcroft and Gault, methotrexate, mouth ulcers, pancytopenia, patient interview, acute coronary syndrome, simvastatin, aspirin, clopidogrel, tachycardic, blood pressure, heart rate, ECG, aspirin, ramipril, bisoprolol, NKDA, salbutamol, seretide, theophylline, montelukast, trimethoprim, oxygen
code, work etiquette, infection control, attendance, confidentiality, AccessNI, NHS plan, role of pharmacists, NHS, medicines safety, cost-effective, pre-admission clinics, medication history, OTC, herbal, allergy status, NICE guidelines, GAIN guidelines, SIGN guidelines, community pharmacist, GP, seamless care, patient support groups, patients own drugs, compliance, medicines reconciliation, inpatient, appropriate medications, monitoring response, TDM, side-effects, interactions, ADRs, yellow card scheme, discharge, patient counselling, discharge prescription, PSNI, problem solving, self-governance, self-directed learning, laboratory testing, patient notes, clinical record, medication kardex, pharmaceutical care issues, OSCE, clinical interventions, Pharmaceutical care plan, pharmaceutical care, powerpoint presentation, medicines concordance, compliance aids, non-adherence, assessment, effective listening skills, good eye contact, non-verbal communication, timeliness, appearance, initiative, SIADH, carbamazepine, rhabdomyolysis, acute renal failure, creatinine clearance, Cockcroft and Gault, methotrexate, mouth ulcers, pancytopenia, patient interview, acute coronary syndrome, simvastatin, aspirin, clopidogrel, tachycardic, blood pressure, heart rate, ECG, aspirin, ramipril, bisoprolol, NKDA, salbutamol, seretide, theophylline, montelukast, trimethoprim, oxygen, U&E, FEV, sputum sample, MRC dyspnoea scale, chest infection, purulent sputum, prednisolone, doxycycline, contraindications, concurrent disease, presenting complaint, evidence base, P medicines, GSL medicines, complementary medicines, General Practitioner, Community Pharmacist, Body mass index (BMI), reference range, social, compliance, inappropriate medications, interaction, ADR, allergy status, adverse device related events, warfarin, St John's Wort, cranberry juice, drug-drug interactions, drug-disease interactions, drug-nutrient interactions, drug-laboratory test interactions, cost-effectiveness, pharmaceutical services improvement policy, therapeutic duplication, immunisation regimen, compliance aid, braille labels, haleraid, easy-open lids, medidose, large writing, drug levels, narrow therapeutic index, lifestyle, quality of life, ethical issues, initiating communication, jargon.

Roisin O'Hare

**Diabetes mellitus**

Diabetes mellitus, Aetiology, Clinical pathology, Diagnosis, monitoring, treatment, complications, insulin, glucose, oxidation, Glycogen, synthesis, carbohydrate, lipid, metabolism, proteolysis, diurnal variation, Type I diabetes mellitus, Type II diabetes mellitus, Malnutrition related diabetes mellitus, MRDM, Gestational diabetes, glucose regulation, deficiency, Autoimmune destruction, pancreatic beta cells, polynia, polydipsia, Hunger, Weight loss, Fatigue, Ketaocidosis, risk factors, Random venous plasma glucose, Fasting venous plasma glucose, Venous Plasma glucose, OGTT, oral glucose tolerance test, Microvascular, Retinopathy, Nephropathy, Neuropathy, Macrovascular, Diabetic nephropathy, Microalbuminuria, hyperglycaemia, neuropathic pain, Erectile dysfunction, MI, myocardial infarction, stroke, heart failure, Hypertension, Dyslipidaemia, Glycated haemoglobin, HbA1c, glycosylated haemoglobin, Ketones, Urine glucose, Blood glucose, HbA1c target levels, hypoglycaemia, Diabetes Control and Complications Trial, Epidemiology of Diabetes Interventions and Complications trial, subcutaneous injection, Rapid-acting insulin analogues, Short-acting insulin, Intermediate acting insulin, long-acting insulin, Prolonged action analogue, Insulin mixes, Insulin Lispro, Insulin Aspart, Insulin Glulisine, Actrapid, Humulin S, Insuman Rapid, Insulatard, Humulin I, Insulin glargine, Insulin detemir, Human Mixtard, Basal-Bolus, Twice daily using insulin mixes, Twice daily using intermediate acting insulin, United Kingdom Prospective Diabetes Study, UKPDS, oral therapy, Biguanides, Sulphonylureas, Postprandial glucose regulators, Thiazolidinediones, glitazones, Alpha glucosidase inhibitors, Incretin mimetics, DPP-4 inhibitors, metformin, tolbutamide, chlorpropamide, glibenclamide, gliclazide, repaglinide,
nateglinide, rosiglitazone, pioglitazone, acarbose, Exenatide, liraglutide, body mass index, BMI, vildagliptin, Sitagliptin, combination therapy

**Thyroid disorders**
Diagnosis, Symptoms, Treatment, hypothyroidism, hyperthyroidism, Thyroxine, T4, Triiodothyronine, T3, TRH, thyrotrophin releasing hormone, TSH, thyroid stimulating hormone, negative feedback, thyroid gland, Protein binding, Thyroid-binding globulin, TBG, albumin, thyroid-binding prealbumin, TBPA, Primary hypothyroidism, Hashimoto’s thyroiditis, Congenital hypothyroidism, cretinism, Iatrogenic, Antithyroid drugs, Amiodarone, lithium, Postoperative hypothyroidism, Hypopituitarism Hypothalamic disease, Levothyroxine Na, thyroxine Na, Liothyronine Na, Graves’ Disease, toxic diffuse goitre, Toxic nodular goitre, Subacute thyroiditis, adenoma, Surgery, partial thyroidectomy, Radioactive iodine, Carbimazole, Propylthiouracil, β-blockers

**Pituitary disorders**
Diagnosis, Symptoms, Treatment, pituitary gland, Posterior pituitary, Anterior pituitary, Growth hormone, GH, Thyroid-stimulating hormone, TSH, Adrenocorticotropic hormone, ACTH, Prolactin, Luteinizing hormone, LH, Follicle-stimulating hormone, FSH, somatotrophin, Insulin-like growth factor-1, IGF-1, hypersecretion, Acromegaly, pituitary adenoma, Surgery, Irradiation, Dopamine agonists, Somatostatin analogue, Bromocriptine, Quinagolide, Cabergoline, Somatostatin, Octreotide, Lanreotide, Somatropin, prolactinomas, Amenorrhoea, Oligomenorrhoea, Galactorrhoea, gynecomastia, Antidiuretic hormone, ADH, vasopresxin, Oxytocin, Cranial diabetes insipidus, Nephrogenic diabetes insipidus, Vasopressin, Desmopressin

**Adrenal disorders**
Diagnosis, Symptoms, Treatment, Adrenal medulla, Adrenaline, noradrenaline, Adrenal cortex, Aldosterone, Cortisol, hydrocortisone, Corticosterone, Mineralocorticoids, Glucocorticoids, glucose, gluconeogenesis, Cushing’s Syndrome, adrenal tumour, diurnal rhythm, Dexamethasone suppression test, Metyrapone, Trilostane, Addison’s disease, Autoimmune adrenalitis, Tuberculosis, synacthen, Hyponatraemia, hyperkalaemia, hydrocortisone, glucose, Steroid treatment card

**Bone metabolism/Paget’s disease (Parathyroid gland)**
Diagnosis, Symptoms, Treatment, hyperparathyroidism, hypoparathyroidism, Paget’s disease, parathyroid hormone, PTH, Osteoclasts, osteoblasts, 1, 25-dihydroxycholecalciferol, calcitriol, Calcitonin, Phosphate, Primary hyperparathyroidism, Parathyroid adenoma, Secondary hyperparathyroidism, Chronic renal failure, hypercalcaemia, Rehydration, Furosemide, Bisphosphonates, Disodium pamidronate, Post-operative hypoparathyroidism, Idiopathic autoimmune disorder, Multiple endocrine deficiency, hypocalcaemia, hyperphosphataemia, Hypocalcaemic tetany, Ca supplements, Vitamin D, Ergocalciferol, Calcitriol, alfalcacidol, osteitis deformans, Disodium etidronate

**Pain**
Aetiology, acute pain, chronic pain, Analgesic ladder, NSAIDs, non-steroidal anti-inflammatory drugs, nociceptors, opiates, transmission, Paracetamol, Antipyretic, Analgesic effect, Anti-inflammatory, COX, cyclooxygenase, prostaglandins, NSAID side-effects, gastrointestinal complications, reversible renal failure, platelet dysfunction, bronchospasm, COX-2 Specific Inhibitors, Celecoxib, Etoricoxib, Parecoxib, Cardiovascular toxicity, Nonselective NSAIDs, Naproxen, meloxicam, diclofenac, ibuprofen, peptic ulceration, aspirin, opioid analgesics, Weak opioids, Strong opioids, Opioid Receptor sites, Endogenous opioids, Exogenous opioids, Respiratory depression,
Psychological dependence, potency, Codeine, Dihydrocodeine, Compound analgesics, Low-dose Compound analgesics, Full-dose Compound analgesics, Morphine, Diamorphine, Pethidine, Fentanyl, transdermal delivery, Hydromorphone, Oxycodone, Tramadol, Naloxone, Analgesic Adjuvants

Osteoarthritis
Aetiology, clinical pathology, treatment, osteoarthritis, OA, degeneration of cartilage, reparation of bone, synovial joint, chondrocytes, Matrix Metalloproteinases, MMPs, fissures, cysts, joint space, osteoblasts, lipping, osteophytes, Fibrosis, Heberden’s nodes, Bouchard’s nodes, Primary osteoarthritis, secondary osteoarthritis, Congenital dysplasia, Radiographic changes, Mono-articular pain, polyarticular pain, gelling, analgesics, oral NSAIDs, topical NSAIDs, paracetamol, Codeine, Dihydrocodeine, NSAIDs, non-steroidal anti-inflammatory drugs, Capsaicin cream, Intra-articular, Hyaluronic acid, Surgery, hip, knee

Rheumatoid Arthritis
Aetiology, clinical pathology, treatment, rheumatoid arthritis, RA, synovium, Infiltration, lymphoid cells, Synovial proliferation, Joint destruction, Joint laxity, erosion, Deformity, dislocation, Heat, swelling, Early morning stiffness, Non-articular manifestations, Anaemia, Rheumatoid nodules, Sjogren’s syndrome, Radiological change, X-ray change, Analgesics, paracetamol, Codeine, Dihydrocodeine, NSAIDs, non-steroidal anti-inflammatory drugs, oral Corticosteroids, cytokines, Prednisolone, Rheumatoid vasculitis, Methylprednisolone, Intra-articular corticosteroids, triamcinolone, methylprednisolone, hydrocortisone, DMARDs, disease modifying anti-rheumatic drugs, Methotrexate, folic acid, Sulfasalazine, Anti-malarials, Hydroxychloroquine, chloroquine, Gold, Sodium aurothiomolate, intramuscular Gold, Auranofin, Oral gold, Penicillamine, Ciclosporin, Azathioprine, Cyclophosphamide, Leflunomide, Biologic therapies, Tumour necrosis factor alpha inhibitors, TNF alpha inhibitors, Infliximab, Etanercept, Adalimumab, Certolizumab pegol, Anakinra, Rituximab, Abatacept, TNF alpha, cytokines, human anti-chimeric antibodies

Gout
Aetiology, clinical pathology, treatment, prophylaxis, gout, acute gout, chronic gout, acute inflammatory arthritis, deposition of uric acid crystals, xanthine oxidase, Increased uric acid production, Decrease in uric acid output, Hyperuricaemia, Primary Gout, idiopathic, Secondary Gout, podagra, Crystals in synovial fluid, serum urate, Bone and cartilage destruction, Deformity, Tophi, joint erosion, acute treatment, chronic treatment, NSAIDs, Colchicine, Opioid Intraarticular corticosteroids, Oral Corticosteroids, non-steroidal anti-inflammatory drugs, Indometacin, Paracetamol, simple analgesics, Prednisolone, infective arthritis, Xanthine oxidase inhibitors, Allopurinol, febuxostat, Uricosuric agents, Sulfinpyrazone, Probencid

Musculoskeletal disease
Osteoarthritis, Celecoxib, pain and stiffness, knees, risk of heart attack, cycloxygenase 2 inhibitor, COX-2 inhibitor, gastroprotective agent, Rheumatoid Arthritis. shared care card, shared care guidelines, methotrexate, upper respiratory tract infection, laboratory markers, gout, acute attach, comorbid illness, risk factors, hypertension, congestive heart failure, acute treatment of gout, chronic treatment of gout, non-drug treatment of osteoarthritis, glucosamine sulphate

EENT
Ear, nose, throat, pathophysiology, diagnosis, management, pharmaceutical care issues, tinnitus, vertigo, menieres disease, otitis media, ototoxic drugs, allergic rhinitis, nasal polyposis, oral candidiasis, mouth ulcers, cold sores, external ear, helix, scapha, concha, external auditory meatus, antitragus, lobe, tragus, anthelix, root of helix, navicular fossa, balance disorders, benign paroxysmal positional vertigo, symptoms, ringing, buzzing, whistling, external stimuli, prevalence, risk factors, age, gender, cuase, cochlea, hair cells, bilateral, unilateral, severity, local causes, presbycusis, noise-induced deafness, aneurysm, arteriovenous malformation, peformation of tympanic membrane, otitis externa, general causes, fever, CVD, hypertension, heart failure, anaemia, hyperviscosity, multiple sclerosis, aspirin, quinine, alcohol abuse, counseling, hearing aids, sound therapy, relaxation techniques, radio-masker, support groups, sedatives, antidepressants, agitation, depression, gabapentin, placebo-effect, intratypmanic lidocaine, rotary movement, balance, gait, navigation, fluid abnormalities, vestibular apparatus, incidence, differential diagnosis, light-headedness, unsteadiness, motion intolerance, imbalance, floating, duration of symptoms, body position, benign, allopurinol, aminoglycosides, NSAIDs, central vertigo, brainstem, cerebellum, peripheral vertigo, inner ear, 8th cranial nerve, transient ischaemic attack, vestibular rehabilitation, cinnarzine, prochlorperazine, prophylaxis, reduce salt, reduce fluid, smoking cessation, non-pharmacological, reduce alcohol, betahistine, triad of symptoms, disordered fluid homeostasis, over-accumulation, endolymph, cochlear duct, post-trauma, post-infection, otosyphilis, cogan syndrome, headache, epidemic, spontaneous resolution, erratic, reduced quality of life, morbidity, syncope, diazepam, prednisolone, intratympanic methylprednisolone, scopoline patch, diuretics, sound therapy, middle ear inflammation, common in childhood, cleft palate, breast-feeding, smoking parent, self-limiting, viral infection, bacterial infection, rhinovirus, strep pneumonae, haemophilus influenza, secretions, occlusion, Eustachian tubes, perforated eardrum, glue ear, speech delay, asymptomatic, upper respiratory tract infection, irritability, malaise, fever, tugging at ear, ear pain, bulging eardrum, red eardrum, analgesia, ibuprofen, paracetamol, wait and see Rx, antibiotics, amoxicillin, azithromycin, clarithromycin, penicillin allergy, ototoxic, damage to cochlea, hearing loss, disequilibrium, drug concentration, inner ear, renal disease, hepatic disease, cisplatin, prevention, smallest effective dose, patient weight, shortest time, check symptoms, hydration, comorbid, sensorineural damage, nose, frontal sinus, superior turbinate, middle turbinate, inferior turbinate, vestibule, anterior naris, hard palate, soft palate, uvula, Eustachian tube, pharyngeal tonsil, choana, sella turcica, sphenoid sinus, cribiform plate, IgE mediated, prevalence, intermittent, persistent, societal impact, co-existance, asthma, sleep disturbance, learning impairment, anxiety, social interaction, allergens, perennial, house-dust mite, animal dander, seasonal, pollen, fungal spores, environmental pollutants, smog, tobacco smoke, common cold, rhinorrhea, nasal congestion, watery and itchy eyes, rhinovirus, flu, RSV, intranasal corticosteroids, antihistamines, decongestants, sodium cromogycate, ipratropium, leukotriene receptor antagonist, immunotherapy, HPA axis suppression, beclomethasone, budesonide, side-effects, effect, mechanism of action, H1 receptor antagonist, competitive inhibition, histamine, sedative, lipophilic, chlorpheniramine, promethazine, non-sedative, long half-life, loratidine, personal preference, azelastine, cautions, contraindications, first line therapy, second line therapy, rapid onset of action, synergy, rhinitis medicamentosa, xylometozoline, pseudoephedrine, triamcinolone, gluteal muscle, mast cell stabilizer, pre-treatment, anti-muscarinic, oedematous tissue, aspirin hypersensitivity, cystic fibrosis, blocked nose, runny nose, sneezing, olfactory ability, taste, catarrh, hyposmia, anosmia, intrapolyp corticosteroid, macrolides, surgery, topical diuretics, nasal drop administration, evacuate nose, instill liquid, spread over nasal surface, bend head forward, do not tilt head back, candida albicans, white coating, pseudomembrane, epithelial cells, bacteria, necrotic tissue, tongue, cheeks, lips, ulceration, neonates, vertical transmission, diarrhea,
hepatosplenomegaly, failure to thrive, immunodeficiency, HIV, leukaemia, antifungal, nystatin, contact stomatitis, intense pain, aetiology, autoimmune, malabsorption, GI disease, alendronate, nicorandil, oral cancer, triggers, iron deficiency, vitamin deficiency, pain relief, chlorhexidine mouthwash, benzydamine mouthwash, hydrocortisone pellets, traumatic ulcers, spicy food, zealous toothbrushing, broken teeth, dentures, diabetes, iatrogenic cause, herpes simplex labialis, HSV1, lesions, fluid filled, oropharynx, kissing, close contact, primary attack, dormant, fever, ocular involvement, confusion, triggers, ill health, physical abrasions, UV radiation, pyrexia, stress, hormonal changes, drugs, 5 fluorouracil, prodromal phase, acyclovir, valaciclovir, penciclovir, famciclovir, oral manifestations of drug reactions, osteonecrosis of the jaw, bisphosphonate, calcium channel blockers, minocycline.

Management of Upper Gastrointestinal Disease (stomach and duodenum)

Pathophysiology, upper gastrointestinal (GI) disease, stomach, duodenum, diagnosed, management, pharmaceutical care issues, upper GI disease prevalence, Upper GI disease, oesophagus, stomach, duodenum, oesophagus, GORD, oesophagitis, oesophageal tumour, stomach, gastric ulcer, gastritis, gastric cancer, duodenum, duodenal ulcer, duodenitis, Dyspepsia, symptoms, Rome II definition, symptoms, heartburn, acid regurgitation, excessive burping, increased abdominal bloating, nausea, retching, vomiting, abnormal/slow digestion, early satiety, epigastric pain, GI bleeding, alarm features, new symptoms >55, weight loss, unexplained vomiting, bleeding/anaemia, dysphagia, upper abdominal mass, urgent endoscopic investigation, conditions causing dyspepsia, GORD, gastritis, duodenitis, peptic ulcer disease, Helicobacter pylori, Zollinger-Ellison syndrome, Cancer, conditions causing, functional dyspepsia, ulcer-like, dysmotility-like, diet, medication, NSAIDS, Bisphosphonates, corticosteroids, nitrates, calcium channel blockers, theophylline, cardiac disorders, myocardial infarction, gall bladder disease, uninvestigated dyspepsia, functional dyspepsia, GORD, peptic ulcer disease, Zollinger-Ellison Syndrome, pharmacy management, GP referral criteria, NICE guidelines 2004, Lifestyle advice, weight, fatty foods, large meals, late at night, smoking cessation, avoid tight clothing, raise head of bed, avoid stooping, antacids, H2 receptor antagonists, proton pump inhibitor, uninvestigated dyspepsia, does not meet referral criteria, endoscopic investigation not necessary, lifestyle advice, proton pump inhibitor, test and treat Helicobacter pylori, H2 antagonist, prokinetic agent, review, acid secretion, hydrochloric acid, pepsinogen, intrinsic factor, bicarbonate, mucus, parietal cell receptors, proton pump, caniculus, gastrin, muscarinic, histamin, prostaglandin, proton pump inhibitors, omeprazole, esomeprazole, lanstaprazole, pantoprazole, rabeprazole, pro-drugs, inhibit gastric secretion, mechanism of action, dose, contraindications, cautions, side-effects, fracture risk, interactions, H2 receptor antagonists, cimetidine, raniditine, famotidine, nizatidine, mechanism of action, dose, contraindications, cautions, side-effects, interactions, antacids, aluminium hydroxide, magnesium hydroxide, calcium, sodium bicarbonate, bismuth, mechanism of action, dose, contraindications, caution, side-effects, interactions, PPIs and uninvestigated dyspepsia, NICE guidelines, Helicobacter pylori, spiral, gram negative, microaerophilic, rod shaped, multiple flagella, gastric antrum, proximal stomach, oral-oral, oral-faecal, route, gastric ulcer, duodenal ulcer, MALT lymphoma, carbon 13 urea breath test, stool antigen test, rapid urease test, blood test, CLO test, treatment, triple therapy regimes, PPI, amoxicillin, clarithromycin, metronidazole, adherence, NICE guidelines, metoclopramide, domperidone, functional dyspepsia, ulcer-like, dysmotility-like, endoscopy, NICE guidelines, gastro-oesophageal reflux disease (GORD), Peptic Ulcer Disease, gastric ulceration, duodenal ulceration, oesophageal ulceration classified under GORD, Helicobacter pylori, aetiology, epithelial lining, prostaglandins, epidemiology, risk factors, age, positive family history, stress?, medication, NSAIDS, aspirin, SSRI’s, warfarin, corticosteroids, blood group 0, disease states,
Helicobacter pylori, lower socioeconomic status, smoking, alcohol, hyperacidity, PUD symptoms, epigastric discomfort, weight changes, fatigue, nausea, vomiting, heartburn, melena, abdominal bloating/flatulence, silent symptoms, PUD differential diagnosis, biliary colic, pancreatitis, functional dyspepsia, Malignancy, Chron’s disease, Abdominal migraine, PUD causes, Helicobacter pylori, medication, malignancy, diagnosis, endoscopy, radiology, PUD complications, bleeding, perforation, pyloric obstruction, penetration, gastric adenocarcinoma, PUD treatment, acute upper Gi haemorrhage, fluid loss, blood pressure, blood transfusion, endoscopy, adrenaline, thermal coagulation, ligation, proton pump inhibitor, intravenous, somatostatin, tranexamic acid, stop NSAIDs, hold aspirin or clopidogrel, hold warfarin, vitamin K, NICE guidelines, Helicobacter eradication, benefits, PAC500, PMC250, 1 week, quadruple regime, PPI bd, tripotassium dicitratobismuthate, tetracycline, metronidazole, 14 days, tripotassium dicotratobismuthate, mechanism of action, dose, contraindications, side-effects, interactions, PUD NSAID induced, simple analgesia, paracetamol, COX 2 agent, gastric protection, CINODS, NSAID G1 protection, H2 receptor antagonists, misoprostol, proton pump inhibitors, PUD, NSAIDS & H pylori, Zollinger-Ellison syndrome, gastrin producing tumour, high dose PPIS.

**Eye conditions**

Eye conditions, pathophysiology, diagnosed, management, identify pharmaceutical care issues, Subconjunctival haemorrhage, bright red patch of blood, whole of eye, one sector, unilateral, symptoms, causes, idiopathic, local congestion, trauma, hypertension, blood dyscrasia, head injury, post-partum, drugs, warfarin, clopidogrel, aspirin, prasugrel, treatment, self-limiting, BP check, INR check, FBC check, sty. Hordeolum, infection, glands of eyelids, staphylococcus aureus, external, internal, glands of Zeis/Moll, pain, redness, swelling, pus-filled lesion, treatment, self-limiting, baby shampoo, warm compress, topical antibiotics, chloramphenicol, fusidic acid, systemic antibiotics if infection widespread, fluocoxacillin, hygiene, internal syte, chalazion/meibomian cyst, tarsal plate, inflammation of meibomian glands, pain, redness, self-limiting, topical antibiotics, chloramphenicol, fusidic acid, fluocoxacillin, surgery, Blepharitis, inflammation of eyelid margin, chronic, fetaures, scales in eyelashes, eyelids deformed, eyelashes lost, distorted, itchy, gritty, dry, uncomfortable eye, eyelashes waxed, bacterial, seborrhoeic, allergic, acne rosacea, treatment, bacterial, lid hygiene, topical antibiotics, fluocoxacillin, artificial tears, dry eye, seborrhoeic, cleansing of scalp, allergic, avoid allergen, mild steroid cream, other, acne rosacea, oxytetracycline, Xanthelasmata, yellow plaque, lipids, causes, hypercholesterolaemia, renal disease, liver disease, cholestasis, myxoedema, hereditary, treatment, cosmetic surgery, cholesterol levels checked, conjunctivitis, bacterial, viral, chlamydial, allergic, foreign body, pathophysiology, streptococcus pneumonia, Moraxella catarrhalis, Haemophilus influenzae, Pseudomonas aeruginosa, Staphylococcus aureus, bacterial conjunctivitis, symptoms, red eye, yellow discharge, discomfort, vision unaffected, photophobia absent, differential diagnosis, treatment, self-limiting, topical ocular antibiotics, chloramphenicol, pharmacy medicine, dose, eye drops, eye ointment, mechanism of action, contraindications, side-effects, fusidic acid, propamidine, dibromopropamidine, Pharmacy medicines, RPSGB Practice Guidance OTC Chloramphenicol Eye Drops, mentioned that now RPS, eye drop counselling, remove contact lenses, measures to minimise spread, viral, adenovirus, herpes simplex, symptoms, treatment, self-limiting, artificial tears, chloramphenicol, Glaucoma, not single disease, group of diseases, optic nerve damage, loss of visual function, definition, blindness, epidemiology, aqueous humour formation and flow, junction of iris and cornea, ciliary body, posterior chamber, anterior chamber, trabecular meshwork, schlemms canal, episcleral veins, flow can become obstructed, glaucoma classification, cause, primary, secondary, mechanics, open angle, closed angle, secondary glaucoma, primary open angle glaucoma, primary closed angle glaucoma, congenital glaucoma, primary open
angle glaucoma, pathophysiology, open angle of anterior chamber, raised intraocular pressure, loss of retinal nerve fibre layer, optic disc cupping, splinter haemorrhages, optic disc pallor, deterioration of visual field, loss of colour sensitivity, spatial resolution, motion detection, contrast sensitivity, optic disc changes, normal optic disc, optic disc cupping, pallor, atrophy, optic nerve tissue, risk factors, raised IOP >21mmHg, race, positive family history, myopia, increasing age, corneal thickness, vascular, diabetes, diagnosis, tonometry, ophthalmoscopy, perimetry, regular eye tests, hospital, ophthalmoscope, tonometry, gonioscopy, slit-lamp, central corneal thickness, perimetry, treatment, damage occurred irreversible, reduce the IOP, follow-up, pharmacological, laser, surgery, NICE clinical guideline 85. Glaucoma, diagnosis and management of chronic open angle glaucoma and ocular hypertension, 2009, reduce IOP, minimal adverse effects, follow up, person-centred care, first line, prostaglandin analogues, beta blockers, second line, carbonic anhydrase inhibitors, sympathomimetics, miotics, not recommended, alternative therapy ??, first line, prostaglandin analogue, latanoprost, travoprost, prosamide, bimatoprost, beta blocker, betaxolol, timolol, levobunolol, carteolol, second-line, sympathomimetics, brimonidine, apraclonidine, carbonic anhydrase inhibitors, brinzolamide, dorzolamide, acetazolamide, mechanism of action, side-effects, other, miotics, pilocarpine, not recommended by NICE, complimentary and alternative, ginkgo, acupuncture, NICE do not support or reject due to poor evidence base, mechanism of action, side effects, interactions, dose and frequency, combination therapies, Xalacom, advantages, disadvantages, surgery, Mitomycin C, 5-fluoracil, laser, pharmaceutical care issues, health promotion, medication adherence, attending eye clinics, counsel on eye drop usage, signpost support organisations, primary angle closure glaucoma, pathophysiology, closure of angle, raised IOP, symptoms, risk factors, age, race, gender, hypermetropia, dilated pupil, positive family history, treatment, medical emergency, acetazolamide IV, then PO, pilocarpine, analgesia, antiemetic, peripheral iridotomy, iridectomy, medicines to avoid, anticholinergics, sympathomimetics, antihistamines, lifestyle issues, drinks, smoking, exercise.

Heart failure
Heart failure, acute, chronic, pathophysiology, high risk groups, diagnosis, signs and symptoms, shortness of breath, oedema, structural abnormalities, pulmonary oedema, cardiac output, Frank Starling mechanism, left heart failure, right heart failure, biventricular failure, reduced gaseous exchange, preload, afterload, renin-angiotensin-aldosterone system (RAAS), sympathetic nervous system, arginine-vasopressin, neurohormonal activation, stroke volume, compensatory mechanisms, left ventricular remodelling, angiotensin II, renin, aldosterone, epinephrine, contractility, systemic vascular resistance, perfusion, ejection fraction, anasarca, heart rate, blood pressure, dysrhythmia, sudden death, anterior infarction, hypertension, hypotension, prognosis, epidemiology, ischaemic heart disease, cardiomyopathy, alcohol misuse, viral infection (endocarditis), congenital, risk factors, smoking, anaemia, thyroid dysfunction, cholesterol, obesity, NYHA classification, physical activity, ECG, NT-pro-BNP, chest X-ray, FBC, echocardiogram, lipid profile, angiogram, drug induced fluid retention, wheeze, tachycardia, gallop rhythm, Jugular venous pressure (JVP), ascites, cardiomegaly, murmurs, tachypnoea, hepatomegaly, cachexia, anorexia, rhonchi, GTN, diuretics; loop, thiazide, aldosterone antagonists, bumetamide, furosemide, spironolactone, eplerenone, dopamine, dobutamine, diamorphine, vasodilator, ototoxicity, myokymic dysrhythmia, myocardial oxygen demand, catecholamine, respiratory depression, beta receptor downregulation, beta 1, beta 2 and alpha adrenoceptors, ACE inhibitor, angiotensin receptor blocker, beta blocker, survival, quality of life, ramipril, perindopril, carvedilol, bisoprolol, metoprolol, hydralazine, bradycardia, hypotension, severe asthma, bronchospasm, cardioselective, hypoglycaemia, lipid metabolism, dyspnoea, diuretic resistance, gout, self-management,
Arrhythmias
Electrical impulses, mechanical functions, pathogenesis, arrhythmias, anti-arrhythmic agents, atrial fibrillation (AF), conduction, cardiac muscle, cardiac contraction, sinoatrial (SA) node, atrioventricular (AV) node, bundle of His, Purkinje fibres, right bundle branch, left bundle branch, atrium, ventricle, action potential, depolarisation, repolarisation, fast Na channels, sodium, outflow, inflow, potassium, plateau, calcium channels, pacemaker potential, phase 0 – 4, autorhythmicity, refractory period, sinus rhythm, pacemaker, autonomic nervous system, parasympathetic nervous system, bradycardia, tachycardia, epidemiology, sudden death, syncope, dizziness, palpitations, clinical classification, heart rate, heart rhythm, broad complex, narrow complex, regular and irregular heart rate, ECG, supraventricular, ventricular, re-entry, slow calcium current, heart block, ischaemic heart disease, suppression of rhythm, vagotonic methods, DC cardioversion, surgery, ablation, alleviate symptoms, survival, prophylaxis, Cardiac Arrhythmia Suppression Trial (CAST), class Ia-1d, II, III, IV, electrical devices, implantable defibrillator, myocardial infarction, Vaughan Williams Classification, primary mechanism, amiodarone, active metabolite, procainamide, lidocaine, flecaainide, sotalol, pro-arrhythmic, mortality, wolf-parkinson-white, mexilitine, phenytoin, ventricular tachycardia (VT), peri-MI, potassium, asystole, Super ventricular tachycardiac (SVT), propafenone, amiodarone, beta-blockers, heart failure, catecholamines, Ionic funny (If) channel, QT interval, morbidity, clinical uses, drug interactions, dose reductions, pulmonary fibrosis, thyroid function tests, hypokalaemia, hypomagnesaemia, corneal deposits, dronedarone, lipophilic, volume of distribution, contraindications, digoxin, complete heart block, cardiac glycoside, NaKATPase pump, narrow therapeutic index, steady state, loading, digibind, overdose, atrial pressure, thyrotoxicosis, alcohol abuse, palpitations, paroxysmal AF, persistent AF, permanent AF, rate versus rhythm, thromboprophylaxis, warfarin, anticoagulation, vagal manoeuvres, NICE guidelines.

Clinical skills
Clinical pharmacy, skills, techniques, pharmacy practice, hospital setting, community setting, therapeutics, pre-registration, hospital environment, teacher practitioner, student responsibilities, code of conduct, fitness to practice, pathophysiology, patient, clinical pharmacist, professional behaviour, communication skills, body language, open questions, closed questions, multiprofessional team, interactive, participation, commitment, dress code, work etiquette, infection control, attendance, confidentiality, AccessNI, NHS plan, role of pharmacists, NHS, medicines safety, cost-effective, pre-admission clinics, medication history, OTC, herbal, allergy status, NICE guidelines, GAIN guidelines, SIGN guidelines, community pharmacist, GP, seamless care, patient support groups, patients own drugs, compliance, medicines reconciliation, inpatient, appropriate medications, monitoring response, TDM, side-effects, interactions, ADRs, yellow card scheme, discharge, patient counselling, discharge prescription, PSNI, problem solving, self-governance, self-directed learning, laboratory testing, patient notes, clinical record, medication kardex, pharmaceutical care issues, OSCE, clinical interventions, Pharmaceutical care plan, pharmaceutical care, powerpoint presentation, medicines concordance, compliance aids, non-adherence, assessment, effective listening skills, good eye contact, non-verbal communication, timeliness, appearance, initiative, SIADH, carbamazepine, rhabdomyolysis, acute renal failure, creatinine clearance, Cockcroft and Gault, methotrexate, mouth ulcers, pancytopenia, patient interview, acute coronary
syndrome, simvastatin, aspirin, clopidogrel, tachycardic, blood pressure, heart rate, ECG, aspirin, ramipril, bisoprolol, NKDA, U&E, FEV, sputum sample, MRC dyspnoea scale, chest infection, purulent sputum, prednisolone, doxycycline, contraindications, concurrent disease, presenting complaint, evidence base, P medicines, GSL, complementary medicines, GP, BMI, reference range, social, compliance, inappropriate medications, interactions, ADR, allergy status, adverse device related events, warfarin, st johns wort, cranberry juice, drug-drug interactions, drug-disease interactions, drug-nutrient interactions, drug-laboratory interactions, pharmaceutical services improvement policy (PSIP), therapeutic duplication, compliance aids, immunisation regimen, haleraid, braille labels, easy-open lids, medidose, large writing labels, drug levels, narrow therapeutic index, lifestyle, quality of life (QOL), ethical issues, community pharmacist, prescribing issues, patient counselling, jargon, body language.

Cancer
Effects of systemic anti cancer therapy, chemotherapy, on normal tissues.
Cancer, incidence, UK, diagnosis, causes, characteristics of cancer cells, metastasis, lifestyle, environmental and genetic factors, prevention primary and secondary, symptoms of concern, bone marrow suppression, neutropenia, management and treatment, nausea and vomiting, mucositis, side effects, alopecia, fertility – male and female, breast, colorectal, lung, clinical assessment, staging, risk factors, surgical management, sentinel node biopsy, hormonal therapy, adjuvant, tamoxifen, anastrazole, 5-fluorouracil, palmer-plantar syndrome, epirubicin, cardiotoxicity, cyclophosphamide, haemorragic cystitis, docetaxel, hypersensitivity reactions, fluid retention, nail changes, trastuzumab, capecitabine, non-small cell, small cell, signs and symptoms, smoking cessation, cisplatin, renal toxicity, magnesium, symptom management, screening, investigations, diarrhoea, oxaliplatin, peripheral neuropathy, irinotecan, delayed diarrhoea, acute cholinergic syndrome

Contraception
Hypothalamus, pituitary, ovaries, progesterone, oestrogen, menstrual cycle, ovulation, follicle stimulating hormone, luteinizing home, combined oral contraception, progestogen-only contraception, ethinyloestradiol, first, second and third generation progestogen, gestodene, desogestrel, side-effects, venous thromboembolism, myocardial infarction, cerebrovascular accidents, cervical cancer, breast cancer, enzyme inhibitors and inducers, parenteral administration, implants, intra-uterine devices, patches, ring device, Levonelle

Menopause
Menopause, climacteric, follicle stimulating hormone, luteinizing home, ovulation, symptoms, vasomotor, genito-urinary, cardiovascular disease, osteoporosis, hormone replacement therapy, oestrogen, progestogen, synthetic and natural oestrogen, ethinyloestradiol, conjugated oestrogens, endometrial hyperplasia, withdrawal bleed, opposed therapy, unopposed therapy, continuous combined therapy, routes of administration, HDL and LDL cholesterol, breast cancer

Hepatic disorders
Liver, portal vein, hepatic artery, biliary system, metabolism, hepatocytes, acute and chronic disease, cutaneous, hepatomegaly, splenomegaly, jaundice, ascites, oedema, portal hypertension, varices, pruritis, acute hepatitis, fulminant liver failure, paracetamol, fatty liver of pregnancy, hepatic encephalopathy, cirrhosis, sphincter, vasopressin, octreotide, omeprazole, lactulose, neomycin, metronidazole, cholestyramine, cholestipol, antihistamines, drug-induced liver disease, age, gender, genetics, enzyme induction and inhibition, acute hepatic necrosis, cholestasis, hepatic blood flow, clearance, hepatic
reduced cell mass, portal systemic shunting, protein binding, hepatic extraction, high and low extraction
PMY3081
Drug Delivery
**Triggered drug delivery**

Drug delivery, triggered delivery, on demand, therapeutic concentration, burst release, toxicity, pain relief, diabetes, insulin, infection, medical device, device-related infection, dose dumping, ideal drug delivery, responsive polymers, polymer, smart polymer, heat, magnetism, ultrasound, pressure, pH, glucose, light, thermal, poly(N-isopropyl acrylamide), lower critical solution temperature, mechanical change, stimulus, modulated release rate, swelling, deswelling, gel, hydrogel, PLGA, microparticles, EVA, cavitation, poly(lactic acid), poly(glycol acid), protein release, peptide delivery, liposome, lymphatic absorption, analgesia, self-administered, enzymes, ionic strength, drug-polymer conjugate, GI tract, urinary tract, urinary catheter, catheter, lubricity, biocompatibility, enteric coating, repulsion, crosslinking, localisation, cleavage, drug cleavage, photosensitiser, intraocular lens, energy transfer, singlet oxygen, reactive oxygen, cytotoxic, antibacterial, bacteria

**Modelling drug release data**

Diffusion, release order, zero order, diffusion coefficient, Higuchi's equations, swelling controlled release, degradation controlled release

**Parenteral Systems: Controlled Release Parenterals**

Solutions, diffusion, viscosity, suspensions, particle size, sedimentation, Hixson-Crowell equation, Noyes-Whitney equation, oily solution, oily suspension, steroids, insulin

**Parenteral Systems: Particulate Systems**

Particle manufacture (coacervation, solvent evaporation, quench cooling), liposomes, niosomes, polymeric micelles, surface modification, stealth liposomes, reticulo-endothelial system, particle clearance, drug targeting

**Oral Drug Delivery**

Patient compliance, routes of administration, therapeutic range, structure and physiology of GI tract, gastrointestinal motility, pH changes in GIT, metabolism, P-glycoprotein efflux, food effects, immediate release, modified release, sustained drug blood levels, diffusion controlled release, dissolution controlled release, oral extended release hydrophilic matrices, mechanisms of release, Korsmeyer-Peppas equation, multilayer matrix tablets, polymer blends, microenvironmental pH control, minimitracles, osmotically controlled oral tablets, hydrodynamics, zero-order release, first-order release, IVIVC, pH-dependent release, tablet manufacture, film coating, enteric coating, delayed release, gastric irritation, gastric drug degradation, enteric polymers, multiple unit dosage forms, pharmacokinetics, colon targeting, colon cancer, inflammatory bowel disease, ulcerative colitis, Crohn's disease, pH-triggered systems, time-dependent release, microflora activated platforms, pressure-triggered systems, in vitro dissolution testing, Pentasa, Salofalk, sulphasalazine, Olsalazine, prodrugs.

**Hot Melt Extruded Solid Dispersions**

Melt extrusion, plastics processing, granulation, particle size, particle shape, thermoplastic polymers, glass transition temperature, melting points, plasticisers, drug release testing, processing conditions, hydrophilic matrices, PXRD, modulated DSC, BCS system, poorly soluble drugs, amorphous drugs, metastability, bioavailability, recrystallization, crystalline dispersions, amorphous dispersions, glass solutions, Gordon-Taylor equation, storage stability, supersaturated drug concentrations, DMTA.

**Powders**

Tablets, capsules, particle size analysis, sieve analysis, microscope methods, coulter counter, particle size distribution, mode, median, arithmetic mean diameter, logarithmic
mean diameter, harmonic mean diameter, effective mean particle diameter, volume shape factor, surface shape factor, shape coefficient, powder flow, bulk density measurements, particle bed voidage, angle of repose, shear cell measurement, angle of internal friction, flow through hoppers.

**Practical component (Project & Critique)**
Communication, scientific discussion, tutorial, written word, critical evaluation of scientific published work, information and communications technology, searching and obtaining information, entering and processing scientific data, presentation of research data, numerical processing and interpretation, statistical analysis, organisational skills, PowerPoint, Excel, Word, plan and execute research ideas, group work, feedback, independent work, agreeing deadlines, reviewing progress.

Helen McCarthy

**Delivery of Genetic Material 1**
structure of genetic material; central dogma to molecular biology; Gene Therapy; biological barriers; vector design; Double helix; Purines and Pyrimidines; Nucleus; Chromosomes; Genes; Base Pairs; DNA-RNA-Protein; Corrective and Therapeutic Gene Therapy; Clinical Trials; Vectors; Somatic and Germline Gene Therapy; In vitro; In situ; In vivo; Entry into Cells; Escape to cytoplasm; Entry to Nucleus; stability; efficacy; safety of vectors.

**Delivery of Genetic Material 2**
Viral Replication; viruses possess either DNA or RNA; Virus binds to a receptor; Reverse Transcriptase; Viral Integrase; Characteristics suitable for Gene Therapy; Basic Viral Genome; Production of Recombinant viruses; Packaging Cell Line; Retrovirus; Adeno-virus; Adeno Associated Virus;
Gene Therapy Clinical Trial using a viral vector; Leber’s Congenital Amaurosis; Genetic Eye Disease with a mutation in the RPE65 gene (retinal pigment epithelium); AAV-hRPE65 delivered via a subretinal injection; 12 patients treated and half are no longer classified as blind.

**Delivery of Genetic Material 3**
Methods of non-viral delivery; 1. Physical - Needle Injection, Ultrasound and Hydrodynamic Therapy; 2. Chemical - Cationic liposomes, Stealth liposomes, 3. Polycations – Polymer and Biological vectors; Non - Viral vectors allow the delivery of larger genes; Non - Viral vectors can be repeatedly administered; Non - Viral vectors are easier and less expensive to manufacture; Lipoplexes and polyplexes. Electrostatic interactions; Pegylation; nanoparticles; Targeted PEI; Bio-Inspired vectors; Importance of Nuclear Localisation Signal.

**Principles of Modified Release - Drug Delivery Systems 1**
modified release, drug, delivery, physicochemical, absorption, modified release, pathway, dosage form, plasma, target, excipients, disintegration, dissolution, distribution, metabolism, excretion, binding, receptor, interaction, controlled release, dose, pharmaceutics, biopharmaceutics, pharmacokinetics, pharmacodynamics, clinical pharmacology, onset, intensity, duration, activity, administration, preformulation, state, molecular weight, solubility, logP, log P, partition coefficient, pH, ionisation, ionization, peptide, protein, stability, assay, prodrug, liquid, suspension, cream, gel, emulsion, tablet, patch, aerosol, powder, capsule, particle, medical device, route, parenteral, oral, mucosal transdermal, topical, epithelium, nasal, pulmonary, ocular, buccal, sublingual, gingival, rectal, vaginal, skin, liver, first pass, GI, gastrointestinal, epidermis, dermis, subcutaneous, vein, intramuscular, intravenous, subcutaneous, intradermal, immediate, extended,
sustained, pulsatile, delayed, zero-order, kinetics, first order, targeted, monographs, USP, EP, BP, pharmacopeia, rotating basket, paddle, rapidly dissolving, in vitro release testing, Franz cell, diffusion cell, cell membrane, passive, connective, active facilitated, ion pair, endocytosis, phospholipid, electrolyte, aqueous pore, Lipinski, pH partition theory, equation, penetration

**Principles of Modified Release - Drug Delivery Systems 2**
modified release, mechanisms, kinetics, compliance, pharmacokinetics, site, coated pellets, eroding, osmotic, pH, time of onset of action, minimum therapeutic level, therapeutic range, window, toxic levels, plasma profiles, coating, dissolution, compliance, antiretroviral, contraception, contraceptive

**Principles of Modified Release - Drug Delivery Systems 3**
mechanisms, kinetics, diffusion, controlled, matrix, reservoir, zero order, root time, first order, Fick’s law, Alzet, osmotic, bulk erosion, surface erosion, activation modulated, constant activity source, monolithic, rate controlling membrane, swelling, cumulative release, fractional release, Higuchi equation, Peppas, Korsmeyer,

**Principles of Modified Release - Drug Delivery Systems 4**
controlled release, origins, evolution, drug delivery systems, history, macro, micro, nano, Judah Folkman, zero order, implant, anesthetic, Alejandro Zaffaroni, ALZA, Ocusert, Progestasert, PEVA, Mirena, Paragard, Norplant, Population Council, subcutaneous, steroid, Jadelle, contraception, pharmacokinetics, failure rates, Implanon, etonogestrel, vaginal ring, WHO, medroxyprogesterone acetate, Estring, Nuvaring, Femring, transdermal patch, patents, Transderm Scop, scopolamine, ethinylestradiol, osmotic, Duros, Viadur, Alzet, macromolecule, protein, immunisation, immunization, PLGA, Decapeptyl, Lupron, depot, microparticle, PEG, pegylation, polymer drug conjugates, EPR effect, antibody, paclitaxel, camptothecin, asparaginase, enhanced permeation and retention effect, SMANCS, Rinsdorf, Maeda, Langer, Kopec, HPMA, spacer, doxorubicin, PK1, PK2, micelles, liposomes, DNA, ODN, antisense, PEI, Doxil, dendraimin, personalised medicine

**Vaginal Drug Delivery**
vaginal, drug delivery, history, anatomy, histology, physiology, dosage forms, Ebers medical papyrus, Macht, penicilllin, steroids, vaginal rings, cervix, rectum, posterior, anterior, mucosa, submucosa, muscularis, stratified, non-keratinised, epithelial, vascularised, glands, mucle, squamous, estrogen, vaginal fluid, pH, enzymes, routes of transport, glycogen, estrogen, age, menstrual cycle, transcellular, intercellular, paracellular, tight junctions, vesicular, receptor-mediated, cyclic changes, Henderson Hasselbalch, ketoconazole, local, systemic, hormone replacement therapy, cultural, tolerance, retention, compliance, pharmacokinetics, tablets, creams, ointments, gels, pastes, suppositories, foams, films, spermicide, cervical ripening, labour induction, infection, bacterial vaginosis, vaccination, cancer, microbicides, HIV

**Nasal Drug Delivery**
Nose, drug delivery, nasal, nasal anatomy, nasal physiology, nasal mucosa, mucosa, transmucosal drug delivery, nasal cavity, turbinates, respiratory epithelium, olfaction, olfactory region, smell, resonance, filtration of particles, mucociliary clearance, host defence, nasal secretions, inhaled drugs, transnasal, systemic drug delivery, aqueous solubility, macromolecule drug delivery, peptides, proteins, hypothalmic hormones, buserelin, nafarelin, desmopressin, lypressin, vaccines, Flumist, drug absorption, particle size, molecular weight, particle charge, paracellular pathway, transcellular pathway,
transcytosis, receptor-mediated transport, physicochemical factors, pH, osmolarity, viscosity, density, concentration, dose, volume, formulation, device, drug delivery system, deposition, aerosol deposition, inertial impaction, solution, suspension, emulsion, drops, spray, dry powder inhalers, pressurised metered dose inhalers, pMDI, viscosity enhancer, hydrogel, bioadhesive, polyelectrolyte polymer, Optinose, brain, central nervous system, CNS

**Pulmonary Drug Delivery**
Lungs, bronchi, airways, pulmonary, alveoli, aerosol, particle, aerosol delivery, drug delivery, transmucosal drug delivery, mucosa, inhaled drugs, respiratory disease, systemic drug delivery, asthma, chronic obstructive pulmonary disease, COPD, inhalation market, deposition, inertial impaction, gravitational sedimentation, diffusion, dry powder inhalers, pressurised metered dose inhalers, pMDI, deep lung delivery, inhaled insulin, insulin, Exubera, Afrezza, technosphere, particle size, formulation, device, macromolecule drug delivery, peptides, proteins, Powderhale, force control agent, AERx platform, smoking cessation therapy, gene therapy, anticancer agents, vaccines

**Drug Delivery to the CNS**
Neurotherapeutics, drug delivery, central nervous system, CNS, brain, spinal cord, blood brain barrier, BBB, blood cerebral spinal fluid barrier, BCSFB, choroid plexus, cerebral spinal fluid, CSF, blood brain barrier physiology, tight junctions, zonulae occludentes, ion regulation, neurotransmitters, neurotoxins, molecular weight, paracellular pathway, transcellular pathway, carrier-mediated transport, receptor-mediated transport, active transport, passive diffusion, systemic drug delivery, transnasal, olfactory region, intravenous, intra-arterial, direct CNS delivery, intracerebral, transcranial, intrathecal, blood brain barrier disruption, chimeric peptides, cationic proteins, prodrugs, liposomes, nanoparticles, nano drug delivery, autonomic nervous system

**Delivery of peptides and proteins 1**
Peptides, proteins, drug delivery, macromolecules, amino acids, peptide bond, recombinant DNA, protein engineering, molecular weight, hydrophilic, enzymes, proteases, proteolytic enzymes, parenteral administration, mucosa, transmucosal drug delivery, endopeptidases, exopeptidases, enkephalins, non-cleavable peptide bond isosteres, protease inhibitors, bombesin, nasal mucosa, buccal mucosa, membrane permeability, paracellular pathway, transcellular pathway, transcytosis, active transport, absorption enhancers, gonadotropin-releasing hormone, leuprolide, buserelin, nafarelin, bioavailability

**Delivery of peptides and proteins 2**
Peptides, proteins, drug, drug delivery, macromolecules, iontophoresis, mucosa, molecular weight, hydrophilic, transmucosal drug delivery, transdermal, skin, stratum corneum, drug charge, ionised molecules, electrode, systemic drug delivery, iontophoretic drug delivery system, IDDS, oxidation, reduction, anionic, cationic, negative electrode, positive electrode, counter ions, diffusion, migration, electroosmosis, fluid movement, reverse iontophoresis, therapeutic drug monitoring, GlucoWatch, pH, mA/cm², vasopressin, desmopressin, thyrotropin releasing hormone, TRH, leuprolide, enkephalins, LHRH, insulin, angiotensin

**Buccal drug delivery**
Epithelium, mucus, mucosa, saliva, blood supply, tablet, compact, gel, patch, mucoadhesion
Transdermal drug delivery 1
Skin, stratum corneum, blood supply, intercellular lipids, shunt route, bricks and mortar model, diffusion cell, patches,

Transdermal drug delivery 2
Enhancement strategies, pro-drugs, eutectics, penetration enhancers, iontophoresis, electroporation, jet injection, sonoporation, phonophoresis, tape-stripping

Vaccine delivery 1
Immunity, innate immunity, adaptive immunity, antibodies, immunoglobulins, virus-like particles, cervical cancer HPV vaccination

Vaccine delivery 2
Controlled release, polio vaccine, mucosal vaccination, vaginal vaccination, microneedles, emerging strategies

Ocular Drug Delivery
Drug Delivery, Ocular Drug Delivery, Allergies, Blepharitis, Cataract, Conjunctivitis, Diabetic Retinopathy, Dry Eye, Glaucoma, Uveitis, Age-Related Macular Degeneration, Cornea, Sclera, Retina, Conjunctiva, Vitreous humor, Topical administration, Periocular & intravitreal administration, Anterior Segment, Posterior Segment, Non-Biodegradable, Biodegradable, Constant therapeutic levels, Intravitreal, Suprachoroidal, Intrascleral, Ocusert, Vitrasert, Iontophoresis.

In-situ Gelling Polymers

Pharmaceutical materials 1
crystal, salt, manipulation, processing, polymorph, pseudopolymorph, solvate, hydrate, co-crystal, spray freeze drying, molecule, ion, drug, lattice, nucleation, impurity, anion, cation, acid, base, solvent, temperature, volume, stoichiometry, solubility, hygroscopicity, shelf-life, patent, IP, intellectual property, structure, chemical structure, bonding, pH, stability, crystal engineering, regulatory approval, lattice energy, dissolution rate, bioavailability, cream, gel, tablet, hardness, receptor, FDA, hydrophobic, hydrophobicity, XRD, thermal analysis, DSC, calorimetry, X-ray diffractometry, granulation, toxicology, amorphous, glass transition, Tg, kinetics, thermodynamics, hydrogen bonding, covalent bonding, ionic bonding, molecular complex, counter ion, solvent,

Pharmaceutical materials 2
crystal, salt, manipulation, processing, polymorph, pseudopolymorph, solvate, hydrate, co-crystal, spray freeze drying, molecule, ion, drug, lattice, nucleation, impurity, anion, cation, acid, base, solvent, temperature, volume, stoichiometry, solubility, hygroscopicity, shelf-life, patent, IP, intellectual property, structure, chemical structure, bonding, pH, stability, crystal engineering, regulatory approval, lattice energy, dissolution rate, bioavailability, cream, gel, tablet, hardness, receptor, FDA, hydrophobic, hydrophobicity, XRD, thermal analysis, DSC, calorimetry, X-ray diffractometry, granulation, toxicology, amorphous, glass transition, Tg, kinetics, thermodynamics, hydrogen bonding, covalent bonding, ionic bonding, molecular complex, counter ion, solvent, environmental issues, supersaturation, green, microscopy, Raman microscopy,
hot stage microscopy, desolvation, functional group, particle, solution, emulsion, size, degradation, protein, peptide, vaccine, density, aerodynamic properties
Analysis of Ibuprofen Tablets by Fluorescence Spectroscopy

- analysis, fluorescence, spectroscopy, ibuprofen, Nurofen, tablets, molecular weight, wavelength, excitation, emission, calibration curve, stock solution, dilution, Buchner filtration, tablet strength, percentage error, precision, accuracy, linearity, coefficient of variation

Molecular Modelling

- Molecular modelling, molecular dynamics, chemoinformatics, QSAR, quantitative-structure activity relationships, chemogenomics, ligand binding site, mutagenesis, x-ray crystallography, homology modelling, chemical libraries, lead search, intermolecular interactions, protein motion, dynamics, single molecule spectroscopy, thermodynamics, conformational changes, molecular recognition, protein folding, bioinformatics, molecular descriptor, 2D-representation, graph theory, graph isomorphism, subgraph isomorphism, chemical structure, Markush structure, pharmacophore, similarity search, drug design, linear regression, cross-validation, Hansch model, lead optimization, QSAR, quantitative structure-property relationships, drug transport, biological activity, hydrophobicity, Hammett parameter, 1-octanol, Hammett equation, multiple linear regression, F-statistic, t-statistic, training set, test set, chemical scaffold, machine learning, network pharmacology, privileged structures, selective optimization of side activities, side effects.

Infrared spectroscopy

- Infrared spectroscopy, vibrational spectroscopy, analysis, pharmaceutical analysis, quantitative analysis, qualitative analysis, spectroscopy, spectra, problem solving, experimental design, British Pharmacopoeia, Pharmacopoeial standards, identification test, potassium bromide disc, data analysis, hypothesis testing, data evaluation, accuracy, precision, standard solution, Beer-Lambert law, calibration curve, report writing, statistical analysis, group work, time management, aspirin, paracetamol, ibuprofen

Biopharmaceutical protein analysis

- protein analysis, gel electrophoresis, protein concentration assay, protein integrity, protein size determination

Applied pharmaceutical analysis

- Phytochemicals, alkaloids, non-alkaloid plant products, biochemical, neurohormones, peptide hormones, prostaglandins, vitamins, drugs from microorganisms, fungi, synthetic drugs, screening, serendipitous discovery, drug identification, physicochemical properties, chemical reactions, pharmaotherapeutic group, chemical drug assays, identification, quantitation, quantification, volumetric methods, acid-basse-titrations, oxido-reduction titration, precipitation titration, spectrophotometry, characterisation, polarometry, electroanlytes, chromatography, electrophoresis, british pharmacopoeia, stability, decomposition, drug monitoring, morphine-like alkaloids, morphine, noscapine, thebaine, naloxone, naltrexone, identity, quantify, relative quantities, tablet formulation, pure material, active ingredient, API, active pharmaceutical ingredient, formulations, drug monitoring, HPLC, NMR, ultraviolet and visible spectroscopy, UV, GC, gas chromatography, fluorescence, colourimetry, raman spectroscopy, mass spectroscopy, protein binding assays, enzyme immunoassays, TLC, thin layer chromatography, densitometry, spray reagents, detection methods, detection level, detector, wavelengths, auxochromes, sample derivatisation, fluorophore, silylation, vapour pressure, frequencies, functional groups, chemical shift, integration, coupling pattern, splitting pattern, phosphorus NMR, proton NMR, carbon NMR, Flouor NMR, plant extract, mole ratio, sample preparation, chemical handling, purification, solid/liquid phase extraction, liquid/liquid phase extraction, chemical analysis, standards, automated analysis, counterfeit drugs.
data finger print analysis, mixture of compounds, activation energy, temperature effect, specifications, shelf life, efficacy, safety, quality, quality control, physical properties, drug decomposition, toxicity, stability assessment, regulatory agencies, environmental conditions, packaging, formulation, storage, monitoring metabolism, metabolism, phase 1, phase 2, biotransformation screening, metabolite identification, quinidine, tests, impurity, formulated drug product, ephedrine hydrochloride tablets, chemical assays.

**Drug Stereochemistry**
Drug stereochemistry, stereochemistry, racemic, diastereoisomers, enantiomers, organic compounds, eutomers, distomers, stereoselectivity, pharmacodynamics, metabolism, racemic switches, chirality, chiral drug, Lipitor, Zocor, drug action, biological molecules, chiral molecules, constitutional isomers, functional group, isomers, positional isomers, geometric isomers, meso compounds, conformational isomers, eclipsed, gauche, staggered, chair, boat, mepiridine, 3,4-MDA, phenacetin, trans-DEC, vitamin A, tripolidine, atropism, rotating bonds, bond rotation, mirror image, tetrahedral, chiral centers, projection, lactic acid, dichroism, alpha-D, enzymes, receptors, ephedrine, enzyme stereoselectivity, eudismic affinity plots, cholinesterases, DMPK, side effects, citalopram, promethazine, warfarin, ketamine, thalidomide, chemical synthesis, active agents, asymmetry, thioridazine, cytochrome P450. Ibuprofen,

**Hypertension: ACE Inhibitors**
Snake venom-derived bradykinin-potentiating peptides, angiotensin-converting enzyme (ACE), bioavailability issues with peptides, evolution of orally-available ACE inhibitors, relationship between inhibitor structures and rate of onset of action.

**Atherosclerosis 1**
Definition of atherosclerosis and discussion of the role of low and high-density lipoproteins in cholesterol transport. Brief overview of treatment methodologies/regimes. Biosynthesis of cholesterol and identification of HMG-CoA reductase as key therapeutic target.

**Atherosclerosis 2**
Mechanism of action of HMG-CoA reductase, mevalonic acid, bi-substrate inhibitors, the discovery of statins, their mode of inhibition of HMG-CoA reductase, pharmacophore, relationship between inhibitor structures and rate of onset of action.

**Drug Analysis in biological matrices 1**
Scope of analysis methods for drug testing, profiling and detection. Composition of biological matrices, the challenges posed by differing matrices.

**Drug Analysis in biological matrices 2**
Sample preparation, extraction methods, interfering/confounding factors. Analytical techniques (UV spectroscopy, Mass spectrometry, LC & HPLC, NMR)

**Hypertension: molecular mediators**
Definition of hypertensive stages, key molecules involved in blood pressure regulation, vasoactive mediators, identification of Angiotensin-bradykinin axis as a therapeutic target.

**Assay Development and Validation**
Precision, Accuracy, Selectivity, Linearity, Specificity, Analytical Methods, Stability, Limit of Detection, Limit of Quantification, Analytical method, Assay Validation, validation, Ruggedness, Robustness, Calibration curve, Internal standard, Regression equation,
International Conference on Harmonisation (ICH), Qualitative analysis, Quantitative analysis, Method Validation, Peak Area, Peak Height.

**Analytical Methods for Stability Testing**

**Sample Preparation Methods**
Sample Preparation, Liquid-liquid Extraction, Protein precipitation, Solid-Phase Extraction, Normal-Phase Chromatography, Reverse-Phase Chromatography, Ion-exchange Chromatography, Cartridge, Solid Phase Micro-extraction, Head-space extraction, Derivatisation, Stir-Bar Sorptive Extraction.

**Analysis of Simvastatin Tablets by Derivative spectroscopy**

**The Role of LHRH in Cancer**
Luteinising hormone releasing hormone, LHRH, gonadotropin releasing hormone, GnRH, neuroendocrinology, prostate cancer, breast cancer, ovarian cancer, endometrial cancer, peptide therapeutic, testes, ovaries, lutenising hormone, androgen, adrenal gland, Hypothalamus, pituitary, adrenocorticotropic hormone, androstenedione, dehydroepiandrosterone, Testosterone, androgen receptor, LHRH agonist, LHRH antagonists, Goserelin (Zoladex), Leuprorelin (Prostap), Triptorelin (Decapeptyl), Buserelin (Suprefact), casodex, Degarelix (Firmagon), Endometriosis, Uterine fibroids, Polycystic ovary disease
Repeat dispensing
Prescription charges, prescribing budgets, repeat dispensing, repeat prescribing, convenience, safety, compliance, repeat dispensing trial, intervention, control, outcome measures, satisfaction, legislation, prescription charges, dispensing interval, batch issues

Nursing and residential homes
Older people, nursing homes, legislation, regulation, anti-psychotics, hypnotics and anxiolytics, psychoactive drugs, chemical restraints, OBRA 1987, consultant pharmacists, Minimum data set, falls, collaboration, Fleetwood project, cluster randomised controlled trial, interventions

Advances in pharmaceutical care
Pharmaceutical care, medicines management, therapeutic outcomes, optimal drug therapy, patient education, patient outcomes, outcome measures, documentation, randomised controlled trial, compliance, monitoring, interventions, clinical, humanistic, economic, health-related quality of life, hospital admissions, smoking cessation, efficacy, effectiveness, efficiency

Business Services Organisation/Drug Tariff
Family practitioner services, Health and Social Care Board, pharmaceutical services, pharmaceutical payments, ingredient cost, Drug Tariff, discount, on-cost, dispensing fees, coding fees, Essential Small Pharmacy, residential and nursing homes, Minor Ailments, Nicotine Replacement Therapy, Repeat Dispensing, Multiple Dispensing, Substitute Prescribing

Organisation of Health and Social Services in Northern Ireland
Demographics, morbidity, mortality, lifestyle, risk, economy, budget, reforms, Review of Public Administration, Independent Contractor Services, DHSSPS, Trusts, policy, commissioning, Health and Social Care Board, medicines management

Clinical Governance and Continuing Professional Development
Clinical and Social Care Governance, quality, continuous quality improvement, standard operating procedures, standards, audit, risk management, medicines governance, clinical guidelines, competence, continuing education, continuing professional development, reflection, planning, action and evaluation, learning needs, assessment criteria, portfolios, scheduled and unscheduled learning needs

Medicines and Poisons Information Services
Information service, medicines management, pharmaceutical care, formulary, communication, competency, clinical governance, audit, risk management, specialist information advisory services, primary literature, Cochrane reviews, documentation, adverse reactions, paediatric dosing, pharmacokinetics, drugs in pregnancy and breast milk, complementary medicine

Total Quality Management (clinical audit)
Clinical audit, clinical governance, ethical requirement, pharmacy contract, pre-registration training, improvement in quality of patient care, current practice, best practice, evidence-based approach, systematic reviews, national guidelines, agreement, team, organisation, multidisciplinary, audit cycle, audit template, criteria, standards, data collection, data analysis, problem identification, sub-standard practice, implement change, barriers to change, monitor change, continuous process
Domiciliary visiting
domiciliary; visiting; service; supply; prescribed; medicines; OTC; over-the-counter; compliance; stockpiling; patient; doctor; child-resistant closure; CRC; carer; adverse drug reaction; ADR; health; medical care; social factors; alcohol; smoking; labels; mental impairment; hearing; plan; storage; medicine; hospital admission; GP; referral; patient safety; intervention; pharmacist; house; home; side-effects;

Medicines Governance
Medication safety, medicines governance, risk awareness, medication incidents, medication errors, prevention of medication incidents, patient safety, management of medication incidents, patient harm, patient injury, preventable incidents, potential incident rate, NPSA, error mythology, safe dispensing, prescription interpretation, dispensing error analysis scheme, DEAS, wrong medicine, wrong dose, wrong preparation, wrong supply, labelling errors, system approach, risk awareness – self, risk awareness – task, high risk processes, risk awareness- context, Heinrich’s pyramid, system failures, reporting medication incidents, risk analysis.

Veterinary Pharmacy
Veterinary dosage forms, short acting parenterals, controlled release parenterals, intramammary formulations, implants, pour on formulations, flea collars, ear tag formulations, e liver fluke, ectoparasites, licensing veterinary dosage forms

Pharmaceutical Company Structure
Drug development, pharmaceutical product development, legal framework, registration of pharmaceutical products, quality assurance in pharmaceutical manufacturing, intellectual property, pharmaceutical industry economics, entrepreneurship, API (active pharmaceutical ingredient), cGMP (current good manufacturing practice, ICH (international conference on harmonisation), licensing, formulation development, scale-up, NCE (new chemicals entity), safety assessment, drug metabolism, ADME (absorption, distribution, metabolism, excretion), packaging, clinical trials supplies, analytical development, specifications, phase I clinical trial, phase II clinical trial, phase III clinical trial, phase IV clinical trial, regulatory affairs, MHRA, EMA, FDA, IND, NDA, CSA (clinical studies application), CTX (clinical trial exemption certificate, market leader, innovator product, first-line treatment, marketing authorisation, marketing authorization.

Pharmaceutical Research and Development
Excipient, bulk drug, preformulation, formulation, scale-up, market image, biobatch, life cycle management, intellectual property, pre-formulation, scale-up, drug delivery, oral delivery, routes of administration, systemic delivery, local delivery, first pass metabolism, dosage forms, tablets, immediate release, sustained release, targeted release, buccal, sub-lingual, chewable, effervescent, lyophilise, hard gelatine capsules, soft gelatine capsules, solutions, suspensions, powders, pharmacokinetics, AUC, Tmax, Cmax, half-life, CACO-2, dosage, homogeneity, mixing, particle flow, stability, drug potency, clinical trials supplies, regulatory dossier

Quality Assurance in Pharmaceutical Manufacturing
Quality, quality assurance, cGMP (good manufacturing practice), quality control, internal audit, supplier audit, batch release, batch record, environmental monitoring, sampling, qualified person, GLP (good laboratory practice), GCP (good clinical practice), SOP (standard operating procedure), in-process quality control, statistical quality control, master formula and record, sources of quality variation, raw materials specifications, normal
Entrepreneurship
Entrepreneurship, business, marketing, customer-oriented, business plan, patents, copyright, business law, sales, finance, accounts

Pharmaceutical Production
Stability programme, scale-up, validation batches, pre-approval inspection, line development, pharmaceutical manufacturing, bulk transfer processes, gravity feed, pneumatic transfer, containment, batch size, raw materials, marketing projections, process automation, reimbursement policy, generics, SUPAC (scale-up and post-approval changes), MHRA (Medicines and Health Products Regulatory Agency), UK regulatory system, USA and EU regulatory systems and agencies, MAA (marketing authorisation application), official standards for pharmaceutical products and drugs, European Pharmacopoeia, British Pharmacopoeia, pharmacopoeial monographs, specifications

Production of Biopharmaceutics
Biologic, biological medicinal product, fermentation, vaccines, immunosera, hormones, cytokines, enzymes, recombinant DNA technology, microbial cultures, cell culture, embryos, cells, biological tissue, current good manufacturing process, cGMP, raw materials, MHRA, personnel, premises, animal quarters, quality control, BCG, sterilisation, sterilization, seed lot, cell bank, clean-in-place, sterilise in place, CIP, SIP

Patenting and the pharmaceutical industry
Patent law, research and development, monopoly, HIV/AIDS, intellectual property, IP, non-obvious, prior art, enabling, novel, first to invent, first to file, patent co-operation treaty, PCT, biologics, genes, transgenics, human cloning, embryos

Business law – contract law
Criminal law, civil law, negligence, clinical negligence, court system, law of contract, contract law, Sale of Goods Act, misconduct, product liability, basic legal terminology, criminal proceedings, civil proceedings, prosecution, defence, appellant, respondent, supreme court, court of appeal, high court, county court, crown court, magistrate’s court, coroner’s court, royal courts of justice, simple contracts, offer, acceptance, two-way consideration, capacity, legal intent, legality, consensus ad idem, form, invitation to treat, clearly stated terms, intention to do business, communication of that intention,

Contract law
Express terms, implied terms, exclusion clauses, termination of contract, breach of contract, remedies for a breach of contract, case law, rejection, counter-offer, past consideration, executed consideration, adequacy, restraint of trade, contracts of employment, solus agreements, misrepresentation, duress, undue influence, deeds, terms of a contract, contractual terms, exclusion of liability, terms and conditions, warranties, statutory controls, discharge of the contract, damages, equitable remedies, recission, injunction,

Contract of Employment
Contract terms, employer’s responsibilities, employee’s responsibilities, unfair dismissal, redundancy, constructive dismissal, discrimination, Employment Rights NI Order 1996, written statement, pension rights, minimum wage, collective agreements, unions, length of notice, express terms, implied terms, work and staff rules, common law rights, common

**Consumer law and law of tort**

**NHS funding and remuneration**
NHS funding, remuneration, community pharmacy contract, NHS medicines, remuneration for services, NHS organisation, Health and Social Care, HSC model, Business Services Organisation, BSO, HSC Trusts, HSC resource allocation, DHSSPS, Independent Contractors, Pharmacy Leads, Control of Entry, Essential Small Pharmacies Scheme, additional professional services, additional pharmaceutical services, patient medication records, health promotion materials, Out-of-Hours, Domiciliary Oxygen, Advice to Registered Homes, Medicines Management, Repeat Dispensing, Minor Ailments, Smoking Cessation, Substitute Prescribing, Needle Exchange, Local Pilot Schemes, Palliative Care, Winter Pressures/Flu Vaccination, DUMP Campaigns
Regional/National Pilot Schemes, Building Community-Pharmacy Partnerships, Health Promotion, Supplementary/Independent Prescribing, managing your medicines, prescription processing for payment, Electronic Prescribing and Eligibility System, EPES, pharmaceutical industry, medicines rationing, pharmaco-economics, cost effectiveness, NICE guidelines, blacklist, practice budgets, prescribing analysis, generic prescribing, national formularies, evidence-based medicine, cost effectiveness, cost utility, quality-adjusted life-years, decision analysis, number needed to treat, clinical need, branded medicines, prescribing strategy.

**Medicines Governance workshops (uni-prof & multiprofessional)**
High risk medicines, insulin, IV medicines, a safe dispensing environment, dispensary layout, interpreting prescriptions, handwriting, abbreviations, Five rights of dispensing, right patient, right medicine, right time, right dose, right route, acute lymphoblastic leukaemia, intrathecal, vincristine, maladministration, methotrexate toxicity, accidental overdose, heparin units, heparin, pharmacy students, nursing students, medical students, risk analysis, preventative measures, safety systems, patient safety, teamwork, multidisciplinary team, inter-professional education
Travel Health
Motion sickness, antihistamine, anticholinergic, sedation, malaria prophylaxis, parasitic
disease, fever, sweating, insect repellent, DEET, sunscreen, permethrin,
chemoprophylaxis, chloroquine, proguanil, mefloquine, doxycycline, malarone, malaria
symptoms, vaccination, childhood vaccination schedule, diphtheria, tetanus, polio, typhoid,
hepatitis A, yellow fever, Japanese encephalitis, tick-borne encephalitis, live vaccine,
pregnancy, breastfeeding, inactivated vaccine, insect sting, inflammation, itching,
erythema oedema, local anaesthetic, hydrocortisone, aluminium acetate, crotamiton, anti-
histamine, sunburn, UV rays, prickly heat, allergy, SPF, sun protection, blistering,
emollients, analgesics, barotrauma, Eustachian tube, jet lag, circadian rhythm, deep vein
thrombosis, risk factors for DVT, flight socks, aspirin, travellers’ diarrhoea, oral rehydration,
loperamide, antibiotic, water purification.

Pain & Analgesia
CNS, headache, migraine, classic migraine, aura, common migraine, triggers, stress, diet,
photophobia, nausea, vomiting, cluster headache, tension headache, sinusitis, temporal
arteritis, medication overuse, trigeminal neuralgia, intracranial pressure, paracetamol,
NSAID, ibuprofen, aspirin, codeine, caffeine, dihydrocodeine, isometheptene, sumatriptan,
prochlorperazine, insomnia, sleep hygiene, diphenhydramine, musculoskeletal conditions,
tendons, ligaments, joints, knee, shoulder, elbow, acute low back pain, lumbar, sacral,
spine, sciatica, osteoarthritis, analgesics, anti-inflammatories, topical products,
rubefacients, capsaicin, hyaluronidase, heparinoid, massage, glucosamine, PRICE, rest,
ice, compression, elevation, protection, HARM, heat, alcohol, running, massage, spray,
strain, fracture, rotator cuff, frozen shoulder, tennis elbow, chondromalacia, Achilles
tendon, plantar fasciitis, shin splint, bursitis, repetitive strain injury.

Eye, Ear and Mouth
Eye, ear, mouth, ophthalmology, red eye, conjunctivitis, bacterial conjunctivitis, glaucoma,
scleritis, keratitis, uveitis, viral conjunctivitis, chloramphenicol, antibiotics, eye drops, eye
ointment, ocular drug delivery, sympathomimetics, eyelid, blepharitis, sty, chalazion, dry
eye, adverse drug reaction, Hormone replacement therapy, evidence base, Hypromellose,
artificial tears, preservatives, ear wax, ear wax impaction, middle ear, outer ear, inner ear,
ear canal, cerumenolytics, peanut allergy, otitis externa, otitis media, earache, analgesia,
otalgia, dermatitis, eardrum, oral cavity, mouth, mouth ulcer, oral thrush, squamous cell
 carcinoma, corticosteroids, topical anaesthetics, topical drug delivery, choline salicylate,
Reye’s syndrome, candidiasis, leukoplakia, Miconazole, gingivitis, dental, oral hygiene,
periodontitis, chlorhexidine, simple hygiene measures, smoking cessation, pregnancy,
breastfeeding, children, harm minimisation, diabetes, salicylate gel, antifungal, diagnosis.

Skin
Skin, dermatology, topical drug delivery, epidermis, dermis, hair, sweat gland,
hyperproliferative disorders, psoriasis, papule, vesicle, comedone, lesion, plaque
psoriasis, scalp, scalp psoriasis, rash, dermatitis, evidence base, emollients, keratolytics,
coal tar, dithranol, dandruff, pityriasis capitis, seborrhoeic dermatitis, cradle cap,
ketocanazole, antifungal, seborrhoeic dermatitis, atopic dermatitis, fungal skin infections,
athlete’s foot, tinea corporis, tines pedis, tinea cruris, jock itch, ringworm, imidazole,
Clotrimazole, Terbinafine, fungal nail infection, onychomycosis, diagnosis, skin
examination, amorolfine, hair loss, alopecia, pregnancy, breastfeeding, children, minoxidil,
wart, verruca, human papilloma virus, molluscum contagiosum, corn, basal cell carcinoma,
diabetes, salicylic acid, callus, bunion, scabies, insect bites, permethrin, malathion,
crotamiton, itching, acne vulgaris, acne rosacea, puberty, benzoyl peroxide,
Complementary and Alternative Medicine, CAM, diet, cold sore, herpes simplex virus,
angular cheilitis, impetigo, antibiotic, aciclovir, antiviral, penciclovir, eczema, allergy, irritant, topical corticosteroid, hydrocortisone, cream, ointment, skin cancer, sun, melanoma, suncream, aqueous cream, moisturiser, dry skin, paraffin, patient safety

Health promotion
Childhood obesity; Colorectal cancer; Promoting health in the elderly; Coeliac disease; Drug abuse; Sexual Health; Heart disease; Nutrition; Stroke awareness; Exercise and health; Sleep disorders; Anxiety and depression; Food poisoning; Pregnancy; Alcohol; Men’s health; Smoking cessation; Oral health; Anaphylaxis; Eating disorders; communication skills; leaflet; powerpoint; presentation; group work; peer assessment; verbal; publishing

Generic – all practical weeks
Communication skills; counselling; questioning; ASMETHOD; symptoms; patient; pharmacist; over-the-counter; OTC; Pharmacy medicines; P; GSL; general sales list; POM to P; deregulation; disease; minor illnesses; health; referral; doctor; ailment; product; warnings; interactions; side-effects; advice; diagnosis

Recent POM to P switches
deregulation; prescription only medicine; Pharmacy medicine; simvastatin; tamsulosin; orlistat; Alli; Flomax relief; prostatic hypertrophy; BMI; diet; overweight; obesity; cholesterol; LDL; HDL

GI
Dyspepsia, gastroenterology, differential diagnosis, non-ulcer dyspepsia, functional dyspepsia, indigestion, gastro-oesophageal reflux disease, GORD, gastritis, duodenal ulcers, gastric ulcers, prevalence, epidemiology, aetiology, helicobacter pylori, heartburn, nausea, vomiting, abdominal discomfort, peptic ulceration, mid-epigastric pain, GI bleeds, gastric ulcers, gastric ulceration, nature of pain, location of pain, radiation of pain, aggravating symptoms, social history, severity of pain, medicine-induced dyspepsia, irritable bowel syndrome, gastric carcinoma, ALARM symptoms, anaemia, loss of weight, anorexia, melaena, dysphagia, haematemesis, oesophageal cancer, atypical angina, treatment failure, over the counter medicines, OTC medicines, misuse, overuse, antacids, milk-alkali syndrome, interactions, chelation, absorption, alginates, H2 antagonists, ranitidine, famotidine, proton pump inhibitors, omeprazole, constipation, diarrhoea, acute diarrhoea, diarrhoea and vomiting in children, fluid management, antidiarrhoeals, Shigella, Campylobacter, salmonella, e coli, inflammatory bowel disease, chronic diarrhoea, colon cancer, giardiasis, dehydration, assessing dehydration, blood in stool, mucous in stool, steatorrhoea, faecal impaction, malabsorption syndromes, ulcerative colitis, Crohn’s disease, medicine-induced diarrhoea, acute infective diarrhoea, oral rehydraion solution, ORS, rice-based ORS, loperamide, bismuth subsalicylate, kaolin and morphine, rotavirus vaccine, constipation in children, NICE guidelines, underlying causes, history taking, clinical efficacy, first-line treatment, GP referral, urgent referral, constipation, clinical features, lifestyle changes, pain on defecation, change of diet, presence of blood, medicine-induced constipation, functional causes, depression, colorectal cancer, hypothyroidism, evidence base, uncomplicated constipation, colicky abdominal pain, laxatives, bulk-forming laxatives, stimulant laxative, osmotic laxative, comparative trial data, ispaghula husk, methycellulose, senna, sterculia, bisacodyl, glycerol, sodium picosulfate, lactulose, macrogols, magnesium salts, liquid paraffin, docusate sodium, irritable bowel syndrome, hyoscine, antispasmodics, mebeverine, alverine, peppermint oil, herbal remedies, side effects, interactions, pregnancy, breastfeeding, haemorrhoids,
anatomical, physiological, mechanical, varicose veins, prolapsed, grades, classification, internal haemorrhoids, external haemorrhoids, rectal bleeding, associated symptoms, dermatitis, anal fissure, upper GI bleed, manual reduction, diet, pharmacological interaction, anaesthetics, lidocaine, benzocaine, cinchocaine, astringents, allantoin, bismuth, zinc, peru balsam, anti-inflammatory, hydrocortisone, protectorants, shark fish oil, sclerosing agents, lauromacrogol, wound-healing agents, yeast cell extract, flavinoids, left upper quadrant pain, splenic enlargement, splenic rupture, right upper quadrant pain, acute cholecystitis, choledolithiasis, hepatitis, ulcers, acute pancreatitis, renal colic, myocardial ischaemia, herpes zoster, shingles, lower abdominal pain, diverticulitis, intestinal obstruction, appendicitis, gastroenteritis, peritonitis, endometriosis, salpingitis, ectopic pregnancy, domperidone.

**Children’s Health**

Head lice, pediculosis capitis, seborrhoeic dermatitis, nits, itching, wet combing, dimeticone, clinical effectiveness, cure rates, insecticides, non-insecticidal methods, phenothrin, malathion, tea tree oil, bug busting kits, application, threadworm, enterobius vermicularis, eggs, helminth infection, faecal-oral route, retroinfection, inhalation, environmental factors, night-time perianal itching, excoriation secondary infection, roundworm, tapeworm, contact irritant dermatitis, mebendazole, piperazine, hygiene measures, colic, rule of threes, excessive crying, inconsolable crying, rhythmical screaming attacks, acute infection, cow’s milk intolerance, lactase enzymes, simeticone, atopic dermatitis, inflammatory skin condition, psoriasis, herpes simplex infections, crustung lesions, emollients, dry skin, avoiding irritants, corticosteroids, sedating antihistamines, chlorphenamine, clemastine, cyproheptadine, promethazine, fever, pyrogens, thermoregulation, normal oral temperature, facial flushing, shivering, NICE guidelines, lymph node enlargement, viral infection, febrile convulsion, stiff neck, joint swelling non-blanching rash, dehydration signs, glandular fever, infectious mononucleosis, urinary tract infection, medicine-induced fever, meningitis, pneumonia, paracetamol, ibuprofen, differential diagnosis, napkin rash, salicylate gels, teething, possetting, aggravating symptoms, clinical efficacy, first-line treatment, GP referral, urgent referral, middle ear infection, infection controls, infection control in schools, infection control in childcare settings, chickenpox, topical calamine lotion, chlorphenamine, varicella zoster virus, molluscum contagiosum, impetigo, measles, german measles, rubella, mumps, irritant nappy rash, psoriasiform nappy eruptions, satellite lesions, skin care, hygiene measures, practical advice, barrier creams, candidal infections, papules, pustules, exudate, preventative measures

**Coughs, colds, sore throats, rhinitis**

productive cough, chesty cough, unproductive, dry, tickly, phlegm, sputum, Medicines and Healthcare Products Regulatory Agency (MHRA) cough and cold guidance, evidence, effectiveness, efficacy, safety, pseudoephedrine, ephedrine, misuse, abuse, viral, bacterial, croup, postnasal drip, allergy-related cough, acute bronchitis, chronic bronchitis, asthma, pneumonia, tuberculosis (TB), bronchiectasis, heart failure, carcinoma, lung abscess, wheeze, shortness of breath, pain on inspiration, chest pain, suppressant, antitussive, expectorant, demulcent, antihistamine, decongestants, sympathomimetics, systemic, topical, influenza, vaccination, common cold, sinusitis, otitis media, throat, tonsillar exudate, cervical glands, herpetiform ulcer, herpes simplex ulcer, hoarseness, laryngitis, Streptococcal, glandular fever, infectious mononucleosis, pharynx, smoke, smoker, agranulocytosis, GORD, gastro-oesophageal reflux disease, anti-inflammatories, analgesia, paracetamol, non-steroidal anti-inflammatory drugs (NSAIDs), complementary and alternative medicine (CAM), gargle, lozenge, pastille, dysphagia, oral mucosa,
rhinitis, hay fever, perennial, allergic rhinitis, pollen, spores, dust mite, animal dander, eczema, vasomotor rhinitis, intrinsic rhinitis, rhinitis medicamentosa, rebound congestion, nasal blockage, nasal obstruction, foreign body, corticosteroid, mast cell stabiliser

**Women’s Health**
cystitis, urinary tract infection (UTI), pyelonephritis, vaginitis, sexually transmitted disease (STD), sexually transmitted infection (STI), vaginal discharge, oestrogen deficiency, flank pain, pregnancy, contraceptive, alkalinising agent, vaginal thrush, bacterial vaginosis, atrophic vaginitis, trichomoniasis, imidazoles, fluconazole, dysmenorrhoea, period pain, menstruation, menstrual cycle, endometriosis, endometrial, carcinoma, pelvic inflammatory disease (PID), pelvic pain, non-steroidal anti-inflammatory drugs (NSAIDs), hyoscine, paracetamol, premenstrual syndrome (PMS), premenstrual tension (PMT), complementary and alternative medicines (CAM), heavy menstrual bleeding (HMB), menorrhagia, postcoital, tranexamic acid, levonorgestrel, emergency contraception, ethical guidance, personal beliefs, Faculty of Sexual and Reproductive Healthcare (FSRH), intrauterine device (IUD), missed pill, barrier method, condom, contraceptive failure, unprotected sex, chlamydia, azithromycin, deregulation, antibacterial, NAAT, nucleic acid amplification testing, diagnostic testing
PMY4005
Project
Aspects of project management
Project, research, project management, scope, time, risk, initiation, planning, execution, controlling, closing, information, specifications/designs, equipment, materials, project failure, sensitivity, technical knowledge, leadership, communication skills, interpersonal skills, time management, Gantt Chart.

Spectroscopic methods
spectroscopy, UV-visible, fluorescence, Raman, infrared, quantitative analysis, qualitative analysis, data interpretation, electromagnetic spectrum, electronic excitation, wavelength, calibration, calibration curve, absorbance, drug concentration, high pressure liquid chromatography, HPLC, chromophore, conjugation, analysis, Beer-Lambert law, molar extinction coefficient, pathlength, specific absorbance, drug release, polymer, peak area, peak height, reaction rate, kinetics, determination, phosphorescence, planar, internal conversion, quinine, emission, emission intensity, scattering, laser, molecular vibration, vibration, mode of vibration, inelastic scattering, light scattering, Rayleigh scattering, lactose, sucrose, mixtures, fingerprint, interaction, spectrum, sample preparation, interference, reaction monitoring, identification, excipients, polymorph, polymorphism, polymer analysis, conformation, identification, sorbitol, aspirin, acetyl salicylic acid, caffeine, paracetamol, acetaminophen, tablet, mapping, ranitidine, covalent bond, database, functional group analysis, amine, alcohol, ester, carbonyl, Anadin Extra, attenuated total reflectance,

Protease Inhibitors
Protease catalytic mechanisms, assay of amidolytic activity, inhibitor classes, types of inhibition (reversible, irreversible), inhibitor assays, structure-guided design, examples of protease inhibitors as drugs.
Carmel Hughes

Evidence into practice in primary care
Primary care, practice, policy, research, randomised controlled trial, evidence base, qualitative, quantitative, Cochrane Library, over-the-counter, older people, interventions, appropriateness, observational, pharmaceutical care, nursing homes, infection control, MRSA, prevalence

Writing dissertation
writing style, journal style, time management, introduction, ability to place result question in context, critical examination of research findings, results presentation, table presentation, abstract writing

Lab notebooks and data recording
notebook preparation, management of time and resources, principles of lab notebook keeping, protocol recording, data storing, intellectual property protection, inventions

Assessing prescribing in older people
Older people; ageing population; medication usage review; drug usage review; polypharmacy; drug-drug interactions; drug-disease interactions; inappropriate prescribing; risk factors; co-morbidities; screening tools; implicit; explicit; judgement; rules; prescribing indicators; independent of diagnoses; considering diagnoses; Improving Prescribing in the Elderly Tool (IPET); Beers’; STOPP; START; ACOVE; medication appropriateness index (MAI); PRISCUS; score; multidisciplinary; multi-site; primary care; secondary care; deliph validation; consensus panel; likert measurement; evidence based; disease burden; drug burden; cognitive load; pharmacist
Pharmaceutical Statistics
Experimental design, null/alternative hypotheses, choosing statistical tests, testing for outliers, power, sample size

Health and Safety
Risk assessment, COSHH regulations, CHIP regulations, local safety rules, chemical safety, biological safety, genetically modified organisms, documentation

Drugs discovery from natural sources – islet proteomics
Natural peptides; discovery; proteomics; chromatography; HPLC; mass spectrometry; bioinformatics; peptide synthesis; confocal laser microscopy; antibody generation; tissue/cell localisation

Applications of Blotting Techniques
Molecular methods for the detection of DNA-RNA-Protein; Probe- Target e.g. Southern Blotting DNA-DNA; Northern Blotting DNA-RNA; Western Blotting Antibody – Protein; Gel electrophoresis; Transfer of DNA,RNA or Protein to a membrane; Blocking non-specific binding; Probe preparation; DNA probe via nick Translation, Random Priming or End Labelling; Protein Probes – Primary and Secondary Antibodies; Hybridisation; Washing unbound probes; Detection of Probe-Target Hybrids.

Solid dispersion Processing
solubility, product development, patent, biopharmaceutical classification system, BCS Class II, cyclodextrins, solid dispersions, salts, salt, cocystal, cocrystals, liposomes, nanoparticles, amorphous, crystalline, bioavailability, glass solution, extrusion, felodipine, extrusion, PXRD, DMTA, Arrhenius equation, Flory-Huggins Interaction parameters, Gibb’s free energy of mixing

Research methods for protease detection and quantification
Proteases, enzymes, proteins, antibodies, enzyme-linked immunosorbent assay (ELISA), sodium dodecyl sulphate polyacrylamide gel electrophoresis (SDS-PAGE), spectrofluorimetry, substrates, active site-dependent probes, Western blotting, zymography

Medicinal Substances; Drug design
Biological systems, drug substances, sources, structures, properties, characterisation, drug properties, primary metabolites, secondary metabolites, nucleic acids, protein, amino acids, DNA, RNA, sugar, carbohydrates, lipids, steroids, secondary metabolites, biological targets, peptic targets, nucleic targets, enzymes, receptors, activity, potency, therapeutic index, leads, analogues, pharmacophores, physiological response, active conformation, conformation, bioavailability, solubility, Lipinski rules, lipinski’s rule, hydrogen bonds, h-bond donor, h-bond acceptor, rotatable bond, stability, structure, stereoisomers, covalent binding, natural origin, natural sources, synthetic drugs, semi-synthetic drugs, mode of action, analogues, ethnopharmaceutical sources, plant sources, marine sources, animal sources, compound collection, HTS, screening, development process, lead identification, lead optimisation, process development, preclinical trials, lack of efficacy, ADME, formulation, toxicity, pharmacokinetic properties, pharmacodynamic properties, therapeutic effect, me too drugs, virtual screening, non-virtual screening, protein structure, ribbon structure, CPK, natural product, statins, mevastatin, NMR, crystallography, functional groups, synthesis, topless schemes, potency, SAR, structure activity relationship, drug-receptor complex, Hydrogen bonding, dipole dipole interactions, pi-pi interactions,
Culture and molecular detection of bacteria in chronic pulmonary infection
Culture detection of bacteria, Non-culture detection of bacteria, Chronic respiratory infection, Cystic fibrosis, CF, anaerobic bacteria, aerobic bacteria, cystic fibrosis transmembrane regulator, CFTR, pulmonary infection, Pseudomonas aeruginosa, P. aeruginosa, hypoxia, lungs, aminoglycosides, Prevotella, Veillonella, Propionibacterium & Actinomyces, Terminal Restriction Fragment Length Polymorphism, T-RFLP, pulmonary exacerbation, antibiotic treatment, bacterial abundance, microbial community composition, tobramycin, ceftazidime, Non-CF bronchiectasis, 454 sequencing

Molecular Cloning
molecular cloning, venom, peptide drug discovery, mRNA, cDNA library, PCR, primer, cloning, ligation, restrictive digestion, ligase, vector, plasmid, transformation, E.coli, competent cells, ampicillin, blue-white screening, lacZ gene, β-galactosidase, IPTG, X-Gal, culture, colonies, lysis, DNA sequencing reaction, sequencing, sequences, sequence alignment

Thermal Analysis
Thermal analysis, calorimetry, Thermogravimetric analysis, mass, temperature, heat, melt, glass transition, recrystallization, calibration, heat capacity, enthalpy, endotherm, exotherm, solvent, Karl-Fischer

Applications of PCR
Polymerase chain reaction, PCR, DNA, deoxyribonucleic acid, DNA amplification, DNA template, Denaturation, Annealing, Polymerization, Taq DNA polymerase, DNA polymerase, nucleotides, oligonucleotide DNA primer, gel electrophoresis, Reverse-transcriptase PCR, gene expression, Real-time quantitative PCR, DNA fingerprinting
Dementia and Alzheimer’s Disease
Epidemiology; symptoms; prevalence; incidence; progression; Alzheimer’s disease; Vascular dementia; Mixed Dementia; Lewy body disease; Parkinsonism; Alcohol abuse; Huntington’s disease; Prion dementias; irreversible; progressive; degenerative; neuropsychiatric symptoms; Early onset; late onset; cognitive ability; activities of daily living; Behavioural changes; diagnosis; brain autopsy; Mini Mental State Examination; Mild, moderate and severe Cognitive Impairment; Environmental factors; genetic factors; presenilin 1 & 2 genes; Apolipoprotein E protein; Neurtitic plaques; β-amyloid peptide; amyloid precursor protein; secretases; Aβ42; Neurofibrillary tangles; hyperphosphorlated tau; cerebral atrophy; Cholinergic neurons; acetylcholine; Current management; Non-pharmacological Interventions; Emotion; Stimulation; Cognition; Behaviour; Pharmacological Interventions; Cholinesterase inhibitors; specialist; Donepezil Hydrochloride; Galantamine; Rivastigmine; Memantine; N-methyl-D-aspartate (NMDA) receptor antagonist; NICE; secondary symptoms; Current research; Statins; NSAIDs; ACE Inhibitors/ ARBs

Multiple Sclerosis
Inflammatory; demyelination; CNS; Epidemiology; Geographic distribution; UK; Myelin sheath; nerve fibres; nerve impulses; node of ranvier; axon; genetics; viral; autoimmune; blood-brain barrier; Auto-reactive T-cells, inflammatory cytokines, Lymphocytes; macrophages; pathology; nerve conduction; Peri-vascular inflammation, Plaques; formation phase; symptoms; remission phase; remyelination; Relapsing Remitting; Secondary Progressive; Primary Progressive; Progressive Relapsing; Diagnosis; Clinical history; neurological examination; MRI; Sensory symptoms; motor system; Muscle pain; Cerebellar signs; in-coordination; gait; articulation; balance; treatment; Gluco-corticosteroids; Immunosuppressive; anti-inflammatory actions; T-cell apoptosis; cytokine release; speed; prevention of relapse; Recombinant interferon beta 1a & 1b; Protein; immune response; antiviral effects; anti-inflammatory cytokines; disease progression, glatiramer acetate; NICE; DoH; symptomatic treatment;

Parkinson’s Disease
Epidemiology; Pathophysiology; Aetiology; Clinical features; Differential diagnosis; treatment; outcomes; Progressive neurodegenerative; tremor; muscle rigidity; bradykinesia; Mortality; Symptoms; Mean survival; motor cortex; Pyramidal system; motor neurones; spinal cord; extrapyramidal system; movement; Dopamine;Acetylcholine; Dopaminergic neurones; substantia nigra; synapse; caudate nucleus; genetic mutations; environmental; “Pill-rolling”; Micrographia; Muscle rigidity; tone; lead pipe; Cogwheeling; flexor muscles; Bradykinesia; akinesia; Postural Disturbances; Postural hypotension; Dyskinesia; Non-motor symptoms; dopamine-blocking drugs; Antipsychotics; Antiemetics; Antihistamines; Methydopa; autopsy; Hoehn and Yahr Scale; Levodopa; Dopamine agonists; COMT inhibitors; MAO-B inhibitors; Anticholinergics; Blood Brain Barrier; Co-beneldopa; Co-careldopa; Monotherapy; adjunct therapy; Ergot derivatives; Non-ergot derivatives; side effects; contra-indications; cautions;

Epilepsy & drug treatment
Epidemiology; Aetiology; Diagnosis; Classification; seizures; treatment; outcomes; Lifestyle; neurological; periodic; transient; stereotyped; neurotransmitters; presynaptic nerve terminal; synapse; Glutamate; NMDA, AMPA & kainate receptors; GABA; GABAA; GABAB; Neuronal excitation; brain; seizure threshold; Synchronisation; entire brain; localised; metabolic disorders; hypoglycaemia; over hydration; hypocalcaemia; pyrexia; hyperventilation; phenothiazines; genetic; brain tumour; infection; meningitis; brain damage; degenerative brain disorders; emotional states; EEG; Generalised; Partial; Partial
with secondary generalization; Tonic; Clonic; Tonic-clonic; Absence; Myoclonic; Atonic,
Partial Seizures, treatment objectives; driving; SIGN; NICE; compliance; adverse effects;
add-on therapies; carbamazepine; enzyme inhibitor; plasma levels; Na+ channels;
Phenytoin; Lamotrigine; Inhibitory neurotransmitter; inhibits neurological firing; Vigabatrin;
inhibits GABA-transaminase; Gabapentin; GABA analogue; Tiagabine; inhibits GABA
reuptake; topiramate; contra-indications; cautions; SANAD (Standard and New
Antiepileptic Drugs); pregnancy; SUDEP – Sudden Unexpected Death in Epilepsy

Skin 1
Dermatological conditions, skin structure, melanocytes, epidermis, dermis, stratum
germinativum, stratum corneum, basal cell membrane, sweat glands, primary lesion,
secondary lesions, photo-aging, intrinsic aging, xerosis, nodule, papule, macule, patch,
vesicle, bulla, cyst, pustule, plaque, erythema, scale, excoriation, lichenification, ulcer,
crust, atrophy, patient history, differential diagnosis, patient history, atopic eczema,
dermatitis, seborrhoeic eczema, contact dermatitis, acne vulgaris, acne, rosacea,
diagnostic criteria, infantile phase, childhood phase, adult phase, localized variants, non-
pharmacological management, emollients, topical corticosteroids, calcineurin inhibitor,
infantile seborrhoeic eczema, Salicyclic acid, Selenium sulphide, ketoconazole

Skin 2
Allergic contact dermatitis, allergens, irritant contact dermatitis, napkin rash, acne vulgaris,
acne rosacea, patient history, patient education, differential diagnosis, transient erythema,
telangiectasia, rhinophyma, ocular involvement, follicular keratinisation, keratolytics,
benzoyl peroxide, topical antibiotics, topical retinoids, systemic antibiotics, isotretinoin

Skin 3
Psoriasis, pathogenesis, drug induced, Köebner’s Phenomenon, Plaque psoriasis, Guttate
psoriasis, Erythrodermic psoriasis, Pustular psoriasis, Nail psoriasis, Psoriatic arthritis,
Scalp psoriasis, Inverse psoriasis, biological abnormalities, emollients, dithranol, coal tar,
corticosteroids, vitamin D analogues, topical retinoids, systemic corticosteroids, systemic
Retinoids, Methotrexate, Ciclosporin, Tacrolimus, Psoralens, Biologic therapy agents,
phototherapy, PUVA, UVA, UVB

Skin 4
Scabies, Sarcoptes scabiei, Crusted (Norwegian) scabies, permethrin, malathion, correct
application, pruritis, crotamiton, oral antihistamines, drug induced reactions, allergic
reactions, toxic reactions, erythematous reactions, erythroderma, exfoliative dermatitis
fixed drug eruption, urticaria and angiodema exacerbation of psoriasis, erythema
multiforme, toxic epidermal necrolysis, Stevens Johnston Syndrome, photosensitivity,
pharmacists role, effects of the sun on the skin, UV, UVA, UVC, skin cancer, melanoma,
non-malignant melanoma, malignant melanoma, squamous cell carcinoma, basal cell
carcinoma, epidermal melanocytes, melanocytic naevi, Lentigo maligna, superficial
spreading malignant melanoma, Nodular melanoma, acral lentiginous melanoma, surgical
excision, lymph nodes, weighted 7-point checklist, major features of the lesions, Change in
size, Irregular shape, Irregular colour, Minor features of the lesions, Largest diameter
7 mm or more, Inflammation, Oozing, Change in sensation, ABCDE checklist

Tropical Diseases
W.H.O, Statistics; AIDS; Malaria; Schistosomiasis; Amoebiasis; Trichomoniasis; Giardiasis,
Onchoceriasis; Leishmaniasis; Trypanosomiasis; Threadworm Infection; Ascariodes
(Round worm); Filariasis; Travel Medicine Role of Pharmacist; Refugees and Migrants;
Tuberculosis Hepatitis B and C; Travelers Diarrhoea; Respiratory Tract Infections; SARS;
Avian Flu; Swine Flu; Skin Infections; Sexually Transmitted Infections; Rabies; Hendra Virus; Food Poisoning; Anti-Malarial Prophylaxis; Malarone; Chloroquine; Riamet; Artemether; Ciprofloxin; Azithromycin; Fifaximin; Vaccination; Poliomyolitis; Tetanus Childhood Immunisations; XDR-TB; Triple E Virus; Counterfeit Drugs; Yellow Fever; Medronidazole; Mebendazole; Praziquantel; Ivermectin.

Veterinary Pharmacy
RCVS, Royal College of Veterinary Surgeons, POM-V, POM-VPS, NFA-VPS, AVM-GSL, parasitology, toxicology, human health, animal health, economic impact, helminths, ectoparasites, protozoa, nematodes, cestodes, trematodes, tapeworms, flukes, roundworms, Toxocara canis, visceral larva migrans, life cycle, larval stages, direct life cycle, indirect life cycle, paratenic host, ocular larva migrans, poor hygiene, Dipylidium caninum, proglottid, strobili, scolex, hermaphrodite, hydatid, fleas, Taenia saginata, Taenia solium, Fasciola hepatica, Schistosomiasis, Bilharzia, mollusc, paedogenesis, miracidium, cercaria, water cress, lice, flies, insects, arachnids, mites, ticks, mosquitoes, midges, selective toxicity, anthelmintics, therapeutic index, tubulin, benzimidazoles, thiabendazole, oxidative phosphorylation, closantel, clorsulon, glycolytic pathway, calcium permeability, praziquantel, fenbendazole, triclabendazole, febantel, prodrug, microtubule formation, colchicine, Panacur, Drontal, Drontal Plus, Trivanter, nitroxinil, diamfendetide, voltage-gated calcium channels, Droncit, pyrantel, anticholinesterase, dichlorvos, cholinergic agonists, levamisole, cholinergic antagonists, paraherquamide, GABA agonists, piperazine, muscle hyperpolarisation, avermectins, ivermectin, organophosphates, serine hydrolase, acetylcholine, carbamates, alidacar, Jake, Jamaica Ginger, TOCP, tri-ortho-cresyl phosphate, metrifonate, haloxon, nicotinic agonist, Strongid, piperidine, benzylpiperazine, ecstasy, GABA receptors, ligand-gated ion channel, chloride channel, pinworms, Enterobius vermicularis, Pripsen, threadworm, macrolides, glutamate-gated chloride channels, milbemycin, ligand-gated ion channels, flaccid paralysis, spastic paralysis, P-glycoprotein, ABC transporter, multi-drug resistance, ATP-Binding-Cassette, loperamide, digoxin, ondansetron, doxorubicin, frame shift mutation, stop codon, collies, eqvalan, pyrethrroids, pyrethrins, metaflumizone, cats, dogs, horses, cattle, pigs, nitenpyram, Capstar, imidacloprid, Advantage, nicotinic receptor, pyriprole, fipronil, Frontline, lufenuron, Program, dicyclanil, sheep dip, S-methoprene, cyromazine, chitin synthesis, amitraz, Aludex, sarcoptic mange, Acclaim, NSAIDs, chocolate, theobromine, aspirin, ibuprofen, paracetamol, raisins, sultanas, grapes, currents, xylitol, insulin, metaldehyde, poisoning, toxicity, equipalazzone, finadinye, flusinix, rimadyl, phenylbutazone, bute, carprofen, pharmacokinetics, entero-hepatic circulation, half-life, metabolism, glutathione, NAPQI, glucuronidation, sulphation, GSH conjugation, N-acetylcysteine, methaemoglobinemia, para-aminophenol, PAP, haemotoxicity, N-acetyltransferase, NAT, phosphodiesterase inhibitor, caffeine, theophylline, eatmiphylline, Millophylline, Veterinary Medicines Directorate, National Office of Animal Health, Veterinary Poisons Information Service,

Drugs at the extremes of age: Drugs in neonates 1
Pharmacokinetics, dosages in neonates, differences between adults & children, parameters, physiological processes, absorption, oral, intra-muscular, percutaneous, rectal, pH, gastric acid, gastric emptying, penicillin, transit time, GIT pathology, reflux, enterohepatic circulation, bile salts, biliary function, lipophilic drugs, pancreatic enzymes, amylase, lipase, bilirubin, competition, jaundice, distribution, bioavailability, volume of distribution, plasma proteins, albumin, a1-acid glycoprotein, total body water, extracellular fluid, adipose tissue, muscle mass, haemoglobin, kernicterus, neonates, infants, unlicensed medicine, off-label medicines and indications,

Drugs at the extremes of age: Drugs in neonates 2
Neonates, infants, metabolism, phase 1 metabolism reactions, phase 11 metabolism, first pass metabolism, oxidation, reduction, hydroxylation, hydrolysis, in utero drug exposure, CYP enzymes, CYP1A2, CYP450, CYP2D6, isoenzymes, liver development, receptor, glucuronidation, glucuronyl transferase, UGT, haemoglobin, elimination, GFR, tubular secretion, reabsorption, renal development, perfusion, blood flow, clearance, UV light, paracetamol, toxicity, chloramphenicol, Grey baby syndrome, jaundice, sulfonamides, theophylline and caffeine metabolism, demethylation, acetylation, sulphate conjugation, glycine conjugation, gentamicin clearance, half life, urinary metabolites

Introduction to Therapeutic Drug Monitoring
therapeutic drug monitoring, clinical pharmacokinetics, therapeutic window, creatinine clearance, pharmacokinetics, clearance, volume of distribution, dosage regimen design, renal failure, first order kinetics, numeracy, logarithms, exponentials

Aminoglycoside antibiotics
aminoglycoside antibiotics, therapeutic drug monitoring, clinical pharmacokinetics, therapeutic window, therapeutic range, renal toxicity, ototoxicity, post-antibiotic effect, intravenous infusions, creatinine clearance, pharmacokinetics, clearance, volume of distribution, dosage regimen design, renal failure, plasma concentration of drug, population pharmacokinetic parameters, patient specific pharmacokinetic parameters, paediatrics, pediatrics, drug analysis in body fluids, numeracy, logarithms, exponentials, probability, uncertainty, likelihood, first order kinetics

Digoxin
digoxin, therapeutic drug monitoring, clinical pharmacokinetics, therapeutic window, therapeutic range, toxicity, creatinine clearance, pharmacokinetics, clearance, volume of distribution, dosage regimen design, renal failure, plasma concentration of drug, population pharmacokinetic parameters, patient specific pharmacokinetic parameters, congestive heart failure, atrial fibrillation, drug interactions, drug analysis in body fluids, numeracy, logarithms, exponentials, probability, uncertainty, likelihood, first order kinetics

Theophylline / Aminophylline
theophylline aminophylline, therapeutic drug monitoring, clinical pharmacokinetics, pharmacokinetics, therapeutic window, therapeutic range, toxicity, intravenous infusions, clearance, volume of distribution, dosage regimen design, plasma concentration of drug, population pharmacokinetic parameters, patient specific pharmacokinetic parameters, asthma, COPD, COAD, smoking, congestive heart failure, drug interactions, paediatrics, pediatrics, drug analysis in body fluids, numeracy, logarithms, exponentials, probability, uncertainty, likelihood, first order kinetics

Phenytoin
phenytoin, therapeutic drug monitoring, clinical pharmacokinetics, therapeutic window, therapeutic range, toxicity, creatinine clearance, pharmacokinetics, clearance, plasma protein binding, volume of distribution, dosage regimen design, renal failure, plasma concentration of drug, population pharmacokinetic parameters, patient specific pharmacokinetic parameters, epilepsy, drug interactions, non-linear pharmacokinetics, enzyme kinetics, Michaelis-Menten, Ludden plot, drug analysis in body fluids, simultaneous equations, numeracy, logarithms, exponentials, probability, uncertainty, likelihood, first order kinetics, zero order kinetics

Aminoglycoside antibiotics
aminoglycoside antibiotics, therapeutic drug monitoring, clinical pharmacokinetics, therapeutic window, therapeutic range, renal toxicity, ototoxicity, post-antibiotic effect, intravenous infusions, creatinine clearance, pharmacokinetics, clearance, volume of distribution, dosage regimen design, renal failure, plasma concentration of drug, population pharmacokinetic parameters, patient specific pharmacokinetic parameters, paediatrics, pediatrics, drug analysis in body fluids, numeracy, logarithms, exponentials, probability, uncertainty, likelihood, first order kinetics, problem solving, patient case studies, peer assessment, self assessment

**Digoxin**
digoxin, therapeutic drug monitoring, clinical pharmacokinetics, therapeutic window, therapeutic range, toxicity, creatinine clearance, pharmacokinetics, clearance, volume of distribution, dosage regimen design, renal failure, plasma concentration of drug, population pharmacokinetic parameters, patient specific pharmacokinetic parameters, congestive heart failure, atrial fibrillation, drug interactions, drug analysis in body fluids, numeracy, logarithms, exponentials, probability, uncertainty, likelihood, first order kinetics, problem solving, patient case studies, peer assessment, self assessment

**Theophylline / Aminophylline**
theophylline aminophylline, therapeutic drug monitoring, clinical pharmacokinetics, pharmacokinetics, therapeutic window, therapeutic range, toxicity, creatinine clearance, pharmacokinetics, clearance, plasma concentration of drug, population pharmacokinetic parameters, patient specific pharmacokinetic parameters, asthma, COPD, COAD, smoking, congestive heart failure, drug interactions, paediatrics, pediatrics, drug analysis in body fluids, numeracy, logarithms, exponentials, probability, uncertainty, likelihood, first order kinetics, problem solving, patient case studies, peer assessment, self assessment

**Phenytoin**
phenytoin, therapeutic drug monitoring, clinical pharmacokinetics, therapeutic window, therapeutic range, toxicity, creatinine clearance, pharmacokinetics, clearance, plasma protein binding, volume of distribution, dosage regimen design, renal failure, plasma concentration of drug, population pharmacokinetic parameters, patient specific pharmacokinetic parameters, epilepsy, drug interactions, non-linear pharmacokinetics, enzyme kinetics, Michaelis-Menten, Ludden plot, drug analysis in body fluids, simultaneous equations, numeracy, logarithms, exponentials, probability, uncertainty, likelihood, first order kinetics, zero order kinetics, problem solving, patient case studies, peer assessment, self assessment

**Drugs in pregnancy**
pregnancy; prescribing; OTC; over-the-counter; health promotion; smoking cessation; diet; trimester; organogenesis; development; foetus; foetal; physiology; placenta; teratogenic; teratogens; pharmacokinetics; teratogenicity; embryo; neural tube defects; ACE inhibitor; animals; risk; thalidomide; non-drug management; non-pharmacological; therapeutic conservatism; polypharmacy; exposure; chronic; asthma; epilepsy; diabetes; hypertension; beta-2 agonists; corticosteroids; methylxanthines; sodium cromoglicate; nedocromil sodium; leukotriene receptor antagonists; anticonvulsants; folic acid; carbamazepine; malformations; sodium valproate; lamotrigine; levetiracetam; topiramate; epilepsy register; diabetes; gestational; diet; Hba1c; metformin; ACE inhibitors; statins; insulin; dosing regimen; hypoglycaemics; glibenclamide; glitazones; hypertension; pre-eclampsia; proteinuria; NICE guidance; angiotensin receptor blocker; ARB; methylldopa; labetalol; beta-blockers; calcium channel blockers; diuretics; alpha-blockers; pain; nausea; vomiting;
heartburn; constipation; haemorrhoids; coughs; colds; allergic rhinitis; hayfever; vaginal infections; cystitis; codeine; diphenhydramine; salicylates; herbal; homeopathic; aromatherapy;

**Drugs in the elderly**
elderly; medicines; drugs; prescription; demographics; physiology; pharmacokinetics; absorption; distribution; metabolism; elimination; pharmacodynamics; homeostatic reserve; homeostasis; orthostatic responses; postural control; hypnotics; tranquillizers; thermoregulation; cognitive function; smooth muscle; receptors; benzodiazepines; cholinergic; sedatives; hangover effect; incontinence; tricyclic antidepressants; antidepressants; lithium; neuroleptics; digoxin; NSAIDs; diuretics; falls; hyponatraemia; hypokalaemia; National Service Framework; NSF; prescribing support and advice; monitoring; repeat prescribing; medication review; education; training; stroke; mental health; ADRs; adverse drug reactions; compliance; polypharmacy; patient medication record; PMR; inequivalence; prescriptions; stockpiling; DUMP campaign; synchronise; brown bag scheme; domiciliary visit; compliance aids; disease prevention; medicines information; diet; smoking cessation; immunisation; exercise;

**Drugs in breast milk**
excretion; breast; milk; feeding; colostrum; antibodies; allergy; advantages; production; mammary; lobules; alveoli; basement membrane; drug transfer; lactation; prolactin; transitional; mature; casein; lipid; protein; drugs; lipophilicity; ionisation; protein binding; modelling; pharmacokinetics; milk plasma ratio; exposure index; clearance; adverse effects; pH; molecular weight;

**Clinical skills**
Clinical skills, medication history, patient counselling, pharmaceutical care plan, clinical pharmacist, learning into practice, research skills, project, audit, communicate effectively, patient, healthcare professionals, professional behaviour, multiprofessional, management, interactive, ward-based tasks, self-directed learning, teacher practitioner, feedback, assessment, case notes, work shadowing, Chronic kidney disease (CKD), eGFR, IV antibiotics, respiratory tract infection, laboratory results, medicines reconciliation, Cockcroft and gault, clinically significant, interactions, intravenous administration, diluents, concentration, rate of administration, atrial fibrillation, diabetes, hypertension, myocardial infarction, lifestyle, ECG, HbA1c, fasting lipids, Patients Own Medicines (POM), aspirin, indapamide, clopidogrel, gliclazide, fenofibrate, hypertension, code of conduct, PSNI, discharge planning, co-morbid states, kardex monitoring, medicines kardex, observation charts, medical notes, formulation, dose adjustment, doses, external factors, altered organ function, side-effects, patient monitoring, contraindications, concurrent disease, presenting complaint, diagnosis, allergy status, complementary medicines, pharmacy medicines, GSL, BMI, indication, ADR, drug-drug interaction, drug-disease interaction, drug-nutrient interaction, drug-laboratory test interaction, clinical significance, cost-effective, PSIP, therapeutic duplication, patient issues, quality of life, therapeutic goals, drug use review, level of performance, lithium, excess alcohol, Depakote, fluoxetine, SSRIs, diclofenac, omeprazole, haematemesis, NICE, quality, specific criteria, WHO, explicit, standards, cyclical process, performance, analyse, OSCE, apply clinical skills, realistic, feedback.

**Schizophrenia**
Schizophrenia; psychoses; psychosis; delusion; delusional; acute mania; psychotic; depression; schizoaffective disorder; drug induced; organic psychosis; reality testing; voices; hallucination; perceptual disturbances; paranoia; paranoid; cognitive impairment; genetic; environmental; biological; birth complications; brain
Introduction to Mental Illness & Depression

Depression; counselling; ICD 10; DSM-IV; schizophrenia, psychotic disorders; mood; affective disorders; mania; neurotic; Generalised anxiety disorder; GAD; Obsessive Compulsive disorder; OCD; psychological disturbances; substance misuse; alcoholism; organic mental disorders; Alzheimer’s disease; Diagnostic and Statistical Manual of the American Psychiatric Association: International Classification of Disease; psychiatry; NICE; Panic Disorder; acute mania; bipolar disorder; BPD; BPAD; psychotic depression; paranoia; paranoid psychosis; diagnosis; bereavement; anhedonia; psychomotor agitation; psychomotor retardation; worthlessness; guilt; poor concentration; suicide; suicidal; suicidal ideation; suicidal thoughts; insomnia; hypersomnia; weight loss; weight gain; mild depression; major depressive disorder; severe depression; functional impairment; dysthymia; NICE screening Questions; self harm; monoamine; monamine theory; noradrenaline; NA; Serotonin; 5HT: dopamine; vigilance; impulse; motivation; cognitive function; drive; neurotransmitters; reuptake inhibition; antidepressant; second messengers; receptors; post synaptic; pre-synaptic; upregualtion; receptor sensitivity; tricyclic; TCA; Serotonin reuptake inhibitor; SSRI; SRI: mono amine oxidase inhibitors; MAOI; MAOI-A; MAOI-B; BNF; mechanism of action; side effects; adverse effects; adverse reaction; amitriptyline; trazodone; clomipramine; lofepramine; imprimine; nortriptyline; sedation; sedative; non -sedating; M1; H1; anticholinergic; antimuscarinic; alpha adrenoceptor blockade; seizure; seizure threshold; dosulepin; cardiac arrhythmia; overdose; constipation; blurred vision; drowsiness; weight gain; hypotension; blood pressure; tachycardia; vagal tone; membrane stabilising; elderly; cognitive blunting; confusion.
epilepsy; fatal toxicity index; FTI; fluoxetine; citalopram; escitalopram; sertraline; paroxetine; fluvoxamine; nausea; diarrhoea; anorexia; bleeding; NSAID; libido; sexual dysfunction; serotonin syndrome; serotonergic; tramadol; pethidine; restlessness; myoclonus; drug interaction; interaction; half life; t1/2; withdrawal; withdrawal reaction; mirtazapine; reboxetine; venlafaxine; duloxetine; agomelatine; melatonin; circadian rhythm; antagonist; phenelzine; tranylcypromine; moclobamide; reversible inhibitor; tyramine; wash out; cheese; pickled herring; yeast extract; addictive; addiction; dependence; tolerance; receptor rebound; flu like symptoms; Stepped Care Model; psychosocial intervention; Cognitive behavioural therapy; CBT; sleep hygiene; discontinuation; remission; relapse; response; compliance; adherence. No-compliance; non-adherence; clinical trials; toxicity; lithium; augmentation; antipsychotic; unlicensed; cross tapering; ECT; Electro convulsive therapy;

**Bipolar Disorder**
Bipolar; BPAD: BPD; Mania; hypomania; bipolar 1; Bipolar 2; rapid cycling; mixed affective states; bipolar depression; DSM-IV; genetic factors; elation; euphoria; grandiosity; trigger factors; antipsychotics; typical; atypical; mood stabilisers; antimanic; hypnotics; valproate; valproic acid; semi-sodium valproate; GABA; teratogenicity; neural tube defects; NTD; folic acid; lithium; second messanger; dopamine; serotonin; suicide; kidney damage; renal failure; hypothyroidism; lithium toxicity; Ebstein’s Anomaly; therapeutic index; eGFR; lamotrigine; Stevens-Johnson’s syndrome; SJS; carbamazepine; olanzapine; risperidone; quetiapine; aripiprazole; NICE; antidepressants

**Anxiety Disorders**
Panic disorder; phobia; post traumatic stress disorder; PTSD; Generalised anxiety disorder; GAD; Obsessive Compulsive Disorder; OCD; Social Phobia; amygdale; hippocampus; behavioural inhibition system; noradrenaline; serotonin; 5HT; GABA; dopamine; non-pharmacological management; anger management; cognitive behavioural therapy; CBT; benzodiazepines; diazepam; buspirone; antidepressants; SSRIs; beta blockers; antipsychotics; pregabalin; anxiolytic; dependence; withdrawal; insomnia; anxiety; disinhibition; 5HT1a; partial agonist; propranolol; oxprenolol; Tricyclic antidepressants; TCA: citalopram; escitalopram; fluoxetine; fluvoxamine; paroxetine; sertraline; venlafaxine;

**Sleep disorders**
Cognitive function, restorative function, REM sleep, rapid eye movement,Non-REM sleep, Paradoxical sleep, insomnia, Transient insomnia, chronic insomnia, Restless Legs Syndrome, RLS, Sleep apnoea, Jet Lag, Sleep Hygiene, Chloral hydrate, Clomethiazole, antihistamines, Melatonin, benzodiazepines, Rebound insomnia, Zopiclone, Zolpidem, Zaleplon, Narcolepsy, Modafinil
PMY4070
Social & Behavioural Aspects of Pharmacy 2
Pharmacy in primary care

Primary health care, secondary care, general practice, Strategic Health Authorities, Primary Care Trusts (PCTs), Review of Public Administration, policy, Trusts, Health and Social Care Board, Business Services Organisation, commissioning, pharmaceutical advisors, practice pharmacists, generic prescribing, repeat prescribing, formularies, Medicines and Healthcare Products Regulatory Agency, National Prescribing Centre, medication review, prescribing costs, efficacy, compliance, adherence, over-the-counter medication, minor ailments scheme, cluster randomised controlled trial, outcomes, intervention, control, qualitative, GP contract, General Medical Services (GMS), Quality and Outcomes Framework (QOF), Community Pharmacy Contract, essential services, enhanced services, advanced services, pharmacy prescribing, Crown report, supplementary prescribing, independent prescribing, clinical management plan (CMP), focus groups, semi-structured interviews

Public Health

Policy, population, society, collective responsibility, state, multidisciplinary, partnership, health protection and prevention, health improvement, health promotion, social care, life expectancy, mortality, socio-economic groups, health inequalities, Acheson report, determinants of health, social injustice, living conditions, inequitable distribution,

Health promotion and disease prevention

Policy, targets, health promotion, living conditions, interventions, health services, biomedical model of health, lifestyle, GP contract, primary prevention, secondary prevention, Health of the Nation, coronary heart disease, stroke, cancer, mental health, sexual health, accidents, smoking, diet and nutrition, obesity, sedentary lifestyle, sickness absence, premature deaths, physical activity, exercise, levels of health promotion, Pharmacy Healthcare Scheme, clinical and near-patient testing, responding to symptoms,

Evidence-based health care

Hierarchy of evidence, research evidence, clinical expertise, patient values, appropriate and effective treatments, interventions, ethical requirement, decision-making, experts, literature search, Medline, databases, EMBASE, CINAHL, Cochrane reviews, systematic reviews and meta-analyses, meta-analysis, randomised controlled trials, cohort study, case-control study, cross sectional study, case series, case report, prevalence, sample, generalizable, sampling frame, target population, general practice, community pharmacy, response rate, questionnaire, limitations, social desirability, cases, controls, exposure, retrospective, prospective, association, causal, risk, protection, cause and effect, case ascertainment, eligibility criteria, registries, incident cases, prevalent cases, bias, General Practice Research Database (GPRD), follow-up, confounding, adjust for confounders, randomisation, intervention, sample size, power calculation, concealment to allocation, blinding, outcome measures, follow-up and drop-out, intention-to-treat, cluster randomised controlled trial, Cochrane review, Cochrane Library, forest plot, measure of effect, statistical significance, clinical significance, relative risk, risk ratio, odds ratio, absolute risk reduction, numbers needed to treat, 95% confidence intervals, point estimate, hormone replacement therapy (HRT), menopausal symptoms, cardiovascular disease, osteoporosis, primary prevention, secondary prevention, oestrogen, progestogen, observational studies, bone density, cardioprotection, LDL and HDL cholesterol, Women’s Health Initiative (WHI) study, opposed therapy, unopposed therapy, Million Women Study

HIV-Health and social consequences

AIDS, HIV, Pneumocystic carinii, Kaposi’s sarcoma, epidemiology, life expectancy, breastfeeding, retrovirus, immunodeficiency, CD4 cells, transmission, Centers for Disease Control
Control classification system, AIDS-related complex, opportunistic infection, nucleoside analogue reverse transcriptase inhibitors, protease inhibitors, non-nucleoside analogue reverse transcriptase inhibitors, Highly Active Antiretroviral Therapy (HAART), cytochrome P450, inhibitors, inducers, drug interactions, pharmaceutical care, primary care, medicines management, compliance, needle exchange

Exercise and health
Sedentary lifestyle, physical activity, exercise, obesity, coronary heart disease, stroke, diabetes, cancer, stamina, joint movement, strength training, functional fitness, sarcopenia, disease prevention, blood pressure, blood lipids, American College of Sports Medicine, moderate intensity, vigorous intensity, hypertension, cardiac rehabilitation, osteoporosis, fracture, Women’s Health Initiative (WHI) study, mortality, diet, psychological effects, exercise prescription, physical activity counselling,

Drug abuse
Misuse, abuse, illicit, over-the-counter, dependence, tolerance, addict, addiction, signs and symptoms, opioids, amphetamines, anticholinergics, benzodiazepines, adverse effects, barbiturates, antidepressants, withdrawal, Code of Ethics, antihistamines, laxatives, metabolic madness, sympathomimetics, combination products, analgesics, harm minimisation, communication skills, transtheoretical model of change, cycle of change, precontemplation, contemplation, preparation, action, maintenance, relapse, intervention, motivational interviewing, stimulants, hallucinogens, cannabis, heroin, cocaine, ecstasy, side-effects, routes of administration, needle exchange, substitute prescribing, methadone, buprenorphine, detoxification, supervised consumption,

Compliance
Compliance, adherence, chronic illness, healthcare system, healthcare team, socio-economic factors, condition-related factors, therapy-related factors, patient-related factors, treatment failure, resistance, public health, health economics, disease, age, drug regimen, access, packaging, labelling, risk, monitoring, therapeutic drug monitoring, dried blood spots, adherence aids, psychosocial factors, beliefs about medicines, beliefs about illness, self-efficacy, health locus of control, social support, Highly Active Antiretroviral Therapy (HAART),

Nutrition
Diet and disease, coronary heart disease (CHD), serum cholesterol, blood pressure, body mass index, waist circumference, waist-hip ratio, saturated fat, polyunsaturated fat, mono-unsaturated fat, essential fatty acids, gamma-linolenic acid, linoleic acid, soluble and insoluble non-starch polysaccharide (dietary fibre), sugar, salt, coffee and alcohol, fruit and vegetables, vitamins and minerals, supplements, vitamin A (retinal and carotene), vitamin B complex, vitamin B1 (thiamine), vitamin B2 (riboflavin), niacin, vitamin B6 (pyridoxine), vitamin B12 (cyanocobalamine), folic acid, iron, calcium, magnesium, selenium, zinc, fluoride

Formulary development
Formulary development, rational prescribing, drug bulletins, National Prescribing Centre, analysis, prescribing data, prescribing costs, generic prescribing, adherence, literature search, communications skills, negotiation skills, teamwork, data presentation, writing skills

Critical Appraisal exercise
Study design, aim, inclusion and exclusion criteria, bias, blinding, sample size calculation, follow-up, limitations, evidence-based medicine, critical appraisal, writing skills
PMY4071
Pharmacist Prescribing
Introduction to Prescribing
Learning outcomes, skills, assessment, e-learning, feedback, government policy, key principles, maximising use of professional resources, devolve decision making, evidence-based review, integrate health and social care delivery, greater public involvement in healthcare planning, patient convenience, quality of care, minimising inequality, Crown report, non-medical prescribing, supplementary prescribing, independent prescribing, clinical management plan, Nurses, Physiotherapists, Chiropodists/Podiatrists, Radiographers, Optometrists, training, research, future work.

Critical appraisal of the literature
Critical appraisal, evidence, hypothesis, aim, study design, primary and secondary studies, randomised controlled trials, systematic reviews, meta-analysis, surveys, cohort study, case-control study, bias, inclusion and exclusion criteria, blinding

Legal, policy, professional and ethical aspects of prescribing
legal, legal requirements, professional aspects, ethical aspects, prescribing rights, prescribing responsibility, primary legislation, secondary legislation, probity, funding, legal requirements for PP, Clinical Governance Framework, Competencies, competency framework, Private Practice, Liability & Indemnity arrangements, clinical and social care governance, patient safety, GPhC, PSNI, accredited training programme, annotation of names in register, risk management, CPD, risk management plan, parameters of prescribing, maintaining competency, the consultation, prescribing in context, prescribing effectively, competency-based portfolio, reflective practice, prescribing support, cost-effective prescribing, off-label, unlicensed medicines, mixing of medicines, controlled drugs, shared patient records

CMPs and IP
Clinical management plans, CMPs, clinical assessment, diagnosis, review patient progress, shared patient records, consent, patient consent, review dates, CMP content, controlled drugs, black triangle drugs, pharmacy led clinics, anticoagulation, diabetes, cardiovascular disease

Reflective practice in prescribing
John Dewey, Donald Schön, Reflection-in-action, reflection-on-action, the reflective practitioner, David Kolb Experiential learning, David Boud, reflective practice, educational theory, professional work, learning cycle, CPD, reflection, action, planning, evaluation, changing practice, reflective portfolios, practice-based portfolios, competencies, competency-based portfolios, clinical and social care governance, competency framework, mandatory CPD, Pharmacy Order, continuing education, continuing professional development, reflective account, professional development plan, personal development plan

Patient monitoring
Patient monitoring, pharmacist role, critical issues, patient, respiratory disease, cardiac disease, physician, referral, drug expert, chronic disease, access to care, increased communication, healthcare professionals, ADRs, accessible, NHS, GP, minor ailment scheme, dose adjustment, medication review, unrequired medications, communication, hospital placement, pharmacist-led assessment, triage, clinical improvement, clinical worsening, COPD, asthma, pulmonary function tests, PEFR, spirometry, CVD, exercise treadmill, BP, HR, holter monitor, tilt table test, rheumatoid arthritis, CRP, rheumatoid factor, liver impairment, LFTs, renal impairment, U&E, requesting investigations, diagnosis, management, prognosis, severity of disease, BNP, monitor progress, BP measurement,
disease-drug complications, ADRs, exercise stress test, success of treatment, failure of treatment, objective measurement, clinical significance, diagnosis, airway abnormalities, monitor effects of therapy, FEV, FVC, blood gases, oxygen saturation, drug levels, theophylline, volume and capacity, dynamic lung volumes, classification, spirometry, questions, pharmaceutical care plan, therapeutic management, therapeutic goals, compliance, exacerbating factors, symptoms, medication, FLAG, TFTs, inhaler technique, BTS guidelines, side-effects, candidiasis, lifestyle, smoking cessation, NRT, anaemia, co-morbid, trigger factors, deterioration of asthma, control, follow up, echocardiogram, troponin, CHD, ECG, PCI, fluid balance, NSTEMI, chest pain, investigations, family history, chest x-ray, risk factors, BMI, waist circumference, NICE guidelines, clopidogrel, aspirin, CV risk, beta-blocker, fasting lipids, impotence, muscle pain, co-morbid state, confidence, competence.

Assignment and examination
Case notes, patient-based case notes, guidelines, application of guidelines, good practice, word count, references, NICE guidance, ESC guidance, BNF, structured approach, assessment, exemplars, good example, bad example, CHF, Heart failure, kardex, investigations, beta-blockers, ACE inhibitors, diuretics, pain relief, supplementary prescriber, consultant, independent prescriber, CMPs, furosemide, dose adjustments, interventions, assignment, pass mark, submission dates, submission instructions, professional decision making, cardiovascular, legislation, warfarin, digoxin, evidence-based practice, liability

Case notes workshop
Case notes, NICE guidelines, refresher, diagnostic assessment, patient safety, COPD, chronic obstructive pulmonary disease, long term oxygen therapy, antibiotics, corticosteroids, inhaled corticosteroids, co-morbidities, social history, smoking, smoking cessation, warfarin, digoxin, spirometry, short-acting beta2 agonists, long-acting beta2 agonists, long-acting muscarinic antagonist, short-acting muscarinic antagonist, acute exacerbation, breathlessness, quality of life, progressive disease, pharmacist prescribing, monitoring, referral criteria.

Consultation and communication skills
Communication skills, consultation skills, verbal skills, verbal communication, non-verbal cues, non-verbal communication, OSCE, personalised letters, personalised messages, considering the needs of the recipient, use of abbreviations or acronyms, short, simple messages, use of non-words, listener involvement, eye contact, posture, facial expression, appearance, rapport, inappropriate humour or self disclosure, starting communication, open questions, closed questions, leading questions, screening questions, probing questions, reflective question, effective listening, physical barriers, effective communication, making assumptions, attending to non-verbal cues, active listening, body language, misreading of body language, noise or interference, shared decision making, history taking, peer review, patient counselling, product demonstration, addressing concerns, Calgary-Cambridge Observation Guide, Demonstrates respect, negotiates agenda, greeting, identifies problem, clarifies patient statements, attends to timing, closing statements, confidence, empathy, structures consultation.

Physical examination skills
Physical examination, examination skills, consent, history taking, health and safety, communication, patient safety, respiratory examination, assessment of breathing, peak flow, spirometry, auscultation of breath sounds, sputum examination, relevant palpation and inspection, breathe sounds, lung disease, respiratory abnormalities, respiratory
developing a clinical management plan
Clinical management plans, CMPs, clinical assessment, diagnosis, review patient progress, shared patient records, consent, patient consent, review dates, CMP content, controlled drugs, black triangle drugs, Communication skills, consultation skills, verbal skills, verbal communication, non-verbal cues, non-verbal communication, OSCE, personalised letters, personalised messages, considering the needs of the recipient, use of abbreviations or acronyms, short, simple messages, use of non-words, listener involvement, eye contact, posture, facial expression, appearance, rapport, inappropriate humour or self disclosure, starting communication, open questions, closed questions, leading questions, screening questions, probing questions, reflective question, effective listening, physical barriers, effective communication, making assumptions, attending to non-verbal cues, active listening, body language, misreading of body language, noise or interference, shared decision making, history taking, peer review, patient counselling, product demonstration, addressing concerns, Calgary-Cambridge Observation Guide, Demonstrates respect, negotiates agenda, greeting, identifies problem, clarifies patient statements, attends to timing, closing statements, confidence, empathy, structures consultation, patient-centred approach, building effective relationships, functions of the consultation, questioning, listening, reflection, beginning the interview, detailed history taking, structure interview.

Physical exam skills and patient monitoring
Physical examination, examination skills, consent, history taking, health and safety, communication, patient safety, respiratory examination, assessment of breathing, peak flow, spirometry, auscultation of breath sounds, sputum examination, relevant palpation and inspection, breathe sounds, lung disease, respiratory abnormalities, respiratory disease, patient appearance, cardiac examination, blood pressure measurement, pulse measurement, JVP, auscultation of heart sounds, palpation and inspection, simman, simulation. hypertension, blood pressure, anatomy, respiratory distress, AF, treatment adjustment, Patient monitoring, pharmacist role, critical issues, patient, respiratory disease, cardiac disease, physician, referral, drug expert, chronic disease, access to care, increased communication, healthcare professionals, ADRs, accessible, dose adjustment, medication review, unnecessary medications, communication, pharmacist-led assessment, clinical improvement, clinical worsening, COPD, asthma, pulmonary function tests, PEFR, spirometry, CVD, exercise treadmill, BP, HR, LFTs, renal impairment, U&E, requesting investigations, diagnosis, management, prognosis, severity of disease, BNP, monitor progress, laboratory tests, BP measurement, disease-drug complications, ADRs, exercise stress test, success of treatment, failure of treatment, objective measurement, clinical significance, diagnosis, airway abnormalities, monitor effects of therapy, FEV, FVC, blood gases, oxygen saturation, drug levels, theophylline, volume and capacity, dynamic lung volumes, classification, spirometry, questions, pharmaceutical care plan, therapeutic management, therapeutic goals, compliance, exacerbating factors, symptoms, medication, TFTs, nephrotic syndrome, haematological tests, inhaler, blood gases, technique, BTS guidelines, side-effects, candidiasis, lifestyle, smoking cessation, NRT, anaemia, co-morbid, trigger factors, deterioration of asthma, control, follow up, echocardiogram, troponin, CHD, ECG, PCI, fluid balance, NSTEMI, chest pain, investigations, family history, chest x-ray, risk factors, BMI, waist circumference, NICE guidelines, CV risk, beta-blocker, fasting lipids, muscle pain, co-morbid state, competence.
Influences on and psychology of prescribing
Influences on prescribing, psychology of prescribing, demand versus need, patient
demand, patient expectations, overseas visitors, prescribers views, expectations for
prescriptions, cultural needs, ethnic needs, prescribing and ethnic needs, ethnic groups
and needs, non-compliance, poor compliance, compliance, concordance, inappropriate
use of medicines, external influences on prescribing, attitudes, inappropriate use of
medicines, underuse of medicines, misuse of medicines, abuse of medicines, public health
approach, patient’s beliefs, medical literature, pharmaceutical industry, media, formularies,
national bodies, risk management, CPD, recognising limitations, measuring competency,
competency documents, attitudes and prescribing, four stages of listening.
Pharmacoepidemiology
Null/Alternative hypotheses, experimental design, confidence intervals, parametric and non-parametric statistical tests, statistical distributions, binomial calculations, two sample statistical tests, multiple hypothesis statistical tests, ANOVA, Kruskal-Wallis, a priori and post hoc tests, calculating statistical power, calculating sample size, Relative risk, Odds Ratio, Bias, Mantel-Haentzel Odds Ratio, Association, Causation

Social Science in Pharmacy – the role of qualitative research
Qualitative research methods, preferences of qualitative researchers, definition of qualitative research, understanding social phenomena in natural settings, qualitative versus quantitative research, ensuring rigour, systematic and non-probabilistic sampling, information-rich participants, theoretical sampling, analysis, validity, triangulation, minimising researcher bias, observational methods (research roles: complete participant, participant as observer, observer as participant, complete observer), interviews (structured, semi-structured, in-depth), interviewing process, focus groups, group composition, topic guide, case study evaluations, audio-recording, transcription, text analysis, coding, computer-assisted analysis of qualitative data (CAQDAS), reporting, questions to ask of a qualitative study.

Complementary and Alternative Medicines (CAM)
complementary and alternative medicines (CAM), complementary and alternative (CAM) disciplines, complementary medicines (CM), alternative medicines, integrative medicine, integrated medicine, quackery, natural, unorthodox, unconventional, National Center for Complementary and Alternative Medicine (NCCAM), Medicines and Healthcare products Regulatory Agency (MHRA), The Complementary and Natural Healthcare Council (CNHC), yellow card scheme, evidence of effectiveness, evidence-base, professional guidance, ethical guidance, community pharmacy, National Health Service (NHS), placebo effect, research, safety, adverse effects, intrinsic effects, extrinsic effects, interactions, herbal medicine, regulation, traditional herbal medicine registration (THR) scheme, herbalist, consultation, homeopathy, homeopath, homeopathy, homoeopath, Hahnemann, pharmacopoeia, law of similars, mother tincture, succussion, serial dilution, decimal dilution, centesimal dilution, potentisation, potencies, proving, ultra-dilute, single remedies, minimal doses, vital force, vital energy, National Rules Scheme, reflexology, Eunice Ingham, acupuncture, acupoints, trigger points, needles, Qi, meridians, acupressure, touch and massage therapy, Traditional Chinese Medicine (TCM), Bach Flower remedies, aromatherapy, dermal absorption, olfactory stimulation, essential oil, carrier oil, administration.

Epidemiology of asthma
Epidemiology; asthma; wheeze; lungs; airways; hyper-responsive; reversibility; bronchoconstriction; diagnosis; genetics; allergy; smoking; diet; nutrition; antibiotics; C-section; risk factors; environmental; pollution; sensitisation; air; hygiene hypothesis; Strachan; T-helper 1 lymphocytes; endotoxin; IgE; prevalence; morbidity; mortality; problems; classification; self-reporting; questionnaires; genotype; single nucleotide polymorphism; pharmacogenetics

Epidemiology of diabetes
Epidemiology; diabetes; incidence; insulin; Type 1; Type 2; Type 3; Type 4; Type 5; pancreatic disease; gestational; malnutrition; complications; aging; urbanization; obesity; physical inactivity; exercise; prevalence; sex; gender; developing world; developed; mortality; cost; coronary heart disease; CHD; renal; prescribing costs; aetiology; viral;
seasonal; diet; epidemiological transition; genetics; socio-economic; age; ethnicity; children; micro-vascular; onset; childhood;

Health and Illness 1
Health, sociology, public health, lay beliefs, lifestyle, wellbeing, illness, disease, illness behaviour, behaviour, individual, society, collectivist, symptom iceberg, response to illness, sick role, public, community pharmacy, social norm

Health and Illness 2
Compliance, concordance, adherence, pharmacy services, health belief model, health behaviour, obesity, theory of reasoned action, intention, behaviour, attitude, social norm, beliefs, theory of planned behaviour, behavioural control, subjective norm, self-efficacy, stages of change theory, smoking cessation, pre-contemplation, contemplation, preparation, action, maintenance, relapse

Health and Illness 3
Inequality, social class, mortality, morbidity, occupation, infant mortality, life expectancy, smoking, cholesterol, blood pressure, suicide, health, illness, investing for health, Government, public health, poverty, mental health, community pharmacy, community

Social Consequences of Obesity
Obesity, society, BMI, body mass index, waist measurement, NICE, BMI centile chart, childhood obesity, epidemic, diet, exercise, physical activity, social class, gender, cardiovascular disease, type 2 diabetes, osteoarthritis, mental health, economic cost
Ashely Agus

Pharmacoeconomics 1
Pharmacoeconomics, health economics, full economic evaluation, partial economic evaluation, cost-effectiveness, value for money, expenditure, effective use of limited/scarc resources, opportunity costs, decision making, National Institute for Health and Clinical Excellence (NICE), NICE guidelines, economic evaluation is the comparative analysis of alternative courses of action in terms of both their costs and consequences, incremental cost, incremental effects

Pharmacoeconomics 2
Cost-effectiveness analysis (CEA), cost-utility analysis (CUA), cost-benefit analysis (CBA), cost per unit of effect, natural units, health-related quality of life, utilities, quantity and quality of life, mortality and morbidity, generic outcome, quality adjusted life years (QALYs), budget, measuring preferences, cost-analysis, “identify, measure, value and compare costs and consequence”, viewpoint/perspective of analysis, resource utilisation, unit costs

Pharmacoeconomics 3
Discounting, sensitivity analysis, incremental analysis, average cost-effectiveness ratio (ACER), incremental cost-effectiveness ratio (ICER), cost-effectiveness plane, quadrants, dominance, willingness-to-pay (WTP) threshold, ceiling ratio, revealed preferences, arbitrary rules, league tables, cost per QALY, non-parametric bootstrapping, scatterplot, cost-effectiveness acceptability curve (CEAC), probability of being cost-effective.

Pharmacoeconomics 4
Costing exercise, healthcare resource use, patient & family resource use, case report forms, questionnaires, interviews, databases, published unit costs, measuring preferences, direct elicitation techniques, generic preference-based instruments, choice-based
methods, time-trade off (TTO), standard gamble (SG), visual analogue scale (VAS), EQ-5D, Health utilities index (HUI), SF-6D

Pharmacoeconomics 5
Choice-based methods of preference elicitation, level of risk accepted, amount of time traded-off, point of equivalence/indifference, utility value, generic-preference based instruments, descriptive system, scoring algorithm, clinical trials, designing a cost-effectiveness analysis,

Pharmacoeconomics workshop
Critical assessing an economic evaluation
PMY4073
Infectious Diseases
Antiviral Chemotherapy
viral replication, antiviral chemotherapy, antiviral drugs, RNA virus, DNA virus, intracellular parasite, metabolically inert, Herpes simplex, coldsore, HIV, AIDS, latency, aciclovir, viral replication, tropism, thymidine kinase, polymerase, DNA chain termination, nuceloside analogues, Varicella zoster, inhibitors of viral genome transcription, foscarin, penciclovir, Influenza, pandemic flu, enveloped virus, neuraminidase, hemagglutinin, neuraminidase inhibitors, antigen drift, antigen shift, adamantanes, Reverse transcriptase, selective toxicity, HIV-1, human immunodeficiency virus, non-nucleoside reverse transcriptase inhibitors (NNRTIs), Nucleoside reverse transcriptase inhibitors (NRTIs), Zidovudine, HIV Aspartyl protease, Protease inhibitor, Gag, GagPol polyprotein, ritonavir, Highly active antiretroviral therapy (HAART), CD4 count, salvage therapy, resistance, immunosuppression, Lymphocyte, Post exposure prophylaxis (PEP)

HIV Antiretrovirals
British HIV Association Guidelines, adverse drug reactions, side effects, lipodystrophy syndrome, Reverse transcriptase, selective toxicity, HIV-1, human immunodeficiency virus, non-nucleoside reverse transcriptase inhibitors (NNRTIs), Nucleoside reverse transcriptase inhibitors (NRTIs), Zidovudine, HIV Aspartyl protease, Protease inhibitor, Gag, GagPol polyprotein, ritonavir, Highly active antiretroviral therapy (HAART), CD4 count, salvage therapy, resistance, immunosuppression, Lymphocyte, Post exposure prophylaxis (PEP), pregnancy, vertical transmission, horizontal transmission, exposure category, BNF, Formulary Development, Pharmaceutical Care

Immunology
Antigen, Alloantigen, allele, chromosome, immune system, transplantation, transplant rejection, blood typing, graft, donor, end-stage organ failure, corneal transplant, T Cell, Lymphocyte, Major Histocompatibility (MHC) antigen, acute graft rejection, passenger leukocytes, cross-matching, hyperacute graft rejection, alloreactivity, immunosuppressive drugs,

CNS Infections: Meningitis & meningococcal disease
aetiology; serogroups; pathophysiology; prevalence; clinical features; diagnosis; drug treatment; prophylaxis; inflammation; meninges; CNS; brain; spinal cord; meningococcal disease; meningitis; septicemia; viral; fungal; bacterial; neisseria meningitides; streptococcus pneumonia; haemophilus influenza; meningococcus; saccharide capsule; meningococcal serogroups; nasopharynx; transmission; risk factors; incubation; colonisation; blood-CSF barrier; bulging fontanel; petechial/purpuric rash; warning signs; progression; lumbar puncture; WBCs; protein; glucose; microbial DNA; treatment; BNF; empiric therapy; benzylpenicillin; cefotaxime; pneumococcal meningitis; H. influenza meningitis; chloramphenicol; outbreaks; close contacts; prophylactic antibiotics; rifampicin; ciprofloxacin; ceftriaxone; prophylactic vaccination; polysaccharide vaccines; conjugate vaccine

Sexually transmitted diseases
Sexually transmitted disease, sexually transmitted infection, genitor-urinary medicine (GUM) clinics, bacteria, bacterium, bacterial, bacteriology, virus, viral, viruses, virology, protozoan, protozoa, protozoal, unsafe sex, safer sex, safe sex, National Strategy for Sexual Health and HIV, screening, partner testing, vaccine, vaccination, contraception, discharge, dysuria, postcoital bleeding, vesicles, warts, chlamydia trachomatis, elemental body, reticulate body, symptom, asymptomatic, complications, ophthalmia neonatorum, pelvic inflammatory disease, infertility, ectopic pregnancy, sexually acquired reactive arthritis, dyspareunia, epididymo-orchitis, proctitis, non-gonococcal urethritis, fitz-hugh-
curtis syndrome, trachoma, nucleic acid amplification test (NAAT), Clamelle, contact tracing, antibiotics, treatment, management, gonorrhoea, neisseria gonorrhoeae, gram-negative diplococcic, virulence factors, meningitis, septicaemia, fallopian tubes, polyarthritis, pelvic pain, men, women, male, female, transmission, spread, exposure, incubation period, co-infection, microorganism, genital herpes, recurrent genital herpes, herpes simplex, HSV-2, HSV-1, pathogenicity, cold sores, shallow ulcer, ulceration, antiviral, genital warts, cervical cancer, cervical smear, human papillomavirus (HPV), anus, vulva, vagina, cryotherapy, laser, surgical excision, syphilis, treponema pallidum, spirochaete, primary syphilis, secondary syphilis, latent syphilis, tertiary syphilis, abortion, miscarriage, dementia, heart, central nervous system, rash, stillbirth, chancre, pubic lice, pubic louse, crab lice, permethrin, malathion, doxycycline, erythromycin, azithromycin, penicillin, scabies, sarcoptes scabiei, hepatitis a (HAV), hepatitis b (HBV), hepatitis c (HCV), bacterial vaginosis, metronidazole, clindamycin, trichomoniasis, lymphogranuloma venereum (LGV), donovanosis, chancroid, soft chancre, human immunodeficiency virus (HIV), acquired immune deficiency syndrome (AIDS), orphan, heterosexual, homosexual, blood, vertical transmission, semen, cervical, retrovirus, lentivirus, HIV-1, HIV-2, DNA, cDNA, RNA, reverse transcriptase, lipid bilayer, viral envelope, viral core, capsid, GP120, GP41, p17, p24, attachment protein, fusion protein, gene, enzyme, replication, t cell, lymphocyte, CD4, CCR5, CXCR4, integrase, protease, provirus, transcription, translation, assembly, budding, maturation, serum fracture, mononucleosis-like syndrome, viral load, opportunistic infection, kaposi’s sarcoma, tuberculosis, cytomegalovirus, toxoplasmosis, Pneumocystis jiroveci pneumonia, AIDS dementia complex (ADC), Polymerase Chain Reaction (PCR), HIV antibody test, Enzyme-linked Immunosorbent Assay (ELISA), p24 antigen test, fourth generation tests, needle-exchange scheme, microbicide, post exposure prophylaxis (PEP), antiretroviral, highly active antiretroviral therapy (HAART), nucleoside reverse transcriptase inhibitors (NRTI) abacavir, didanosine, emtricitabine, lamivudine, stavudine, tenofovir disoproxil, zidovudine, non-nucleoside reverse transcriptase inhibitors (NNRTI), efavirenz, etravirine, nevirapine, protease inhibitors, atazanavir, darunavir, fosamprenavir, indinavir, lopinavir, nelfinavir, ritonavir, saquinavir, tipranavir, fusion inhibitors, entry inhibitors, enfuvirtide, integrase inhibitors, raltegravir, co-receptor blockers, maraviroc, British HIV Association.

Introduction to the immune system 1
Infectious Agents; extracellular and intracellular agents; fungi; viruses; parasites; exterior defense; inductor and effector concept; antigen; phagocytes; monocytes; macrophages; neutrophils; eosinophils; dendritic cells; phagocytosis; APC’s; auxiliary cells; lymphocytes; B, T & NK; soluble mediators of immunity antibodies, cytokines, complement proteins; organs of the immune system.

Introduction to the immune system 2
Infectious Agents; extracellular and intracellular agents; fungi; viruses; parasites; exterior defense; inductor and effector concept; antigen; phagocytes; monocytes; macrophages; neutrophils; eosinophils; dendritic cells; phagocytosis; APC’s; auxiliary cells; lymphocytes; B, T & NK; soluble mediators of immunity antibodies, cytokines, complement proteins; organs of the immune system.

Response to infectious agents 1 & 2
Defense against microbes; Immunity to bacteria; extracellular and intracellular response; Immune response to fungi; cell-mediated and adaptive response; Immunity to viruses; immunity to parasites; Immune evasion by viruses; immunity to parasites;

Vaccination against infectious agents
Vaccines and adjuvants; Correlates of immune protection; routes of vaccine delivery; current immunisation schedule; travel vaccines; MMR; consent;

Medical devices related to infection
medical device, implant, prosthesis, infection, bacteria, stainless steel, total hip replacement, arthroplasty, catheter, stent, balloon angioplasty, balloon, stent angioplasty, polymer, chemical structure, mechanical properties, biocompatibility, hydrophobic, hydrophilic, patient comfort, patient trauma, morbidity, mortality, cost, metal, alloy, bonding, strength, radiopaque, surgery, biofilm, antimicrobial, gentamicin, poly(methyl methacrylate), PMMA, coronary stent, biliary stent, nitinol, smart polymer, responsive polymer, triggered release, modulated release rate, thrombogenicity, heparin, protein adhesion, inflammation, plasma surface modification, coating, diamond-like coating, encrustation, hydrogel, HEMA, water content, contact lens, silicone, polyurethane, poly(caprolactone), biodegradable, hydrolysis, ester, sutures, crosslinking, etching, functionalisation, surface friction, silver,

Penicillin antibiotics
penicillin, antibiotic, 6-aminopenicillanic acid, 6-APA, penam, carbapenam, β-lactam, penicillin G, enzyme, β-lactamase, transpeptidase, peptidoglycan, electron withdrawing, acid stability, broad spectrum, spectrum of activity, steric blocking, Gram-positive, Gram-negative, mutation, resistance, hydrophilic, hydrophobic, antimicrobial, chemotherapy, synthesis, semisynthetic penicillins, Fleming, Penicillium notatum, Florey, Chain, Hodgkin, benzyl benicillin, oral administration, parenteral administration, meticillin, nafcillin, oxacillin, flucloxacillin, phenoxymethyl penicillin, benzyl penicillin, Penicillin V, neighbouring group participation, deactivation, E. Coli, S. aureus, porin protein, chemical structure

Penicillin antibiotics
penicillin, antibiotic, 6-aminopenicillanic acid, 6-APA, penam, β-lactam, penicillin G, enzyme, β-lactamase, transpeptidase, peptidoglycan, electron withdrawing, acid stability, broad spectrum, chemical structure, spectrum of activity, steric blocking, Gram-positive, Gram-negative, mutation, resistance, hydrophilic, hydrophobic, antimicrobial, chemotherapy, synthesis, semisynthetic penicillins, benzyl benicillin, oral administration, parenteral administration, neighbouring group participation, deactivation

Medical Device-Associated Infection 1
Medical device, medical device-associated infection, pathogenesis, microbial adherence, biofilm, hospital-acquired infection, nosocomial infection, prosthetic heart valve, orthopaedic/orthopedic implant, vascular graft, CSF shunt, central line, urinary catheter, urinary stent, endotracheal tube, continuous ambulatory peritoneal dialysis (CAPD) catheter, bacterial factor, host factor, device factor, bacterial adhesion, biomaterial, tissue substratum, reversible attachment, irreversible attachment, microcolony formation, bacterial biofilm, interactions (electrostatic, hydrophobic, thermodynamic), suspending fluid interface, adhesion, free energy of adhesion, surface tension, bacterium, substratum, liquid interface, interfacial tension, fimbriae, pili, capsule, glycocalyx, cell wall, cell membrane, Type 1 fimbriae, P fimbriae, K1 Escherichia coli (E.coli), Pseudomonas aeruginosa, Staphylococcus, endotoxicity, lipopolysaccharide, immunogenic, nutrition, electrolytes, pH, urea, creatinine, protein, glycoprotein conditioning film, roughness, polymeric composition, coating, hydrophobicity, biocompatibility, smoothness, surface, coefficient of friction, chemical composition, immune killing, clearance, resistant, resistance, antimicrobial, susceptible, susceptibility.

Medical Device-Associated Infection 2
Medical device, medical device-associated infection, urinary tract, urinary device, catheter-associated urinary tract infection (CAUTI), encrustation, urinary stone, catheterisation/catheterization, catheter (Foley, urethral, suprapubic, intermittent, external), self-catheterisation/self-catheterization, ureteral stent, biocompatibility, migration, urethritis, urethral stricture, trauma, mechanical failure, leakage, bacteraemia/bacteremia, risk factors, pathogenesis, symptoms, microbiology, prevention, aseptic technique, antimicrobial catheter, silver-incorporated catheter, chlorhexidine, benzalkonium chloride, polymeric coating, biomimetic, phosphorylcholine, sterile, calcium oxalate, urease-producing bacteria, biofilm, ammonium magnesium phosphate, struvite, calcium phosphate, hydroxyapatite, brushite, carbonate-apatite, uropathogen, Pseudomonas, Proteus mirabilis, Proteus vulgaris, urea-splitting, crystal, deposit, cystine, uric acid, metabolic stone, infection stone, extracorporeal shock wave lithotripsy (ESWL), mushy stone, staghorn stone, bladder stone

Medical Device-Associated Infection 3
Medical device, medical device-associated infection, endotracheal (ET) tube, nosocomial pneumonia, continuous ambulatory peritoneal dialysis (CAPD) peritonitis, ventilator-assisted pneumonia/ventilator-associated pneumonia (VAP), aspiration, reflux, secretions, risk factors, early onset pneumonia, late onset pneumonia, biofilm, symptoms, incidence, prevention, hand washing, isolation, catheter care, selective decontamination of the digestive tract (SDD), bacterial translocation, colonisation/colonization resistance, selective oropharyngeal decontamination (SOD), probiotic, stress-ulcer prophylaxis (SUP), antibiotics (systemic, aerolised/aerolized), biomaterial, infection control, semi-recumbent positioning, drainage of pooled secretions, empiric therapy, monotherapy, combination therapy, end-stage renal disease, clinical presentation, pathogenesis, infection (intraluminal, periluminal, transmutal, ascending, haematogenous), bacterial peritonitis, fungal peritonitis, viral peritonitis, treatment, peritoneal lavage, antibiotic, surgery
Ethics
Inter-professional ethics
Inter-professional ethics, pharmacy, nursing, medicine, code of ethics, code of conduct, ethical theories, decision-making model, four-stage decision-making model, professional decision-making model, ethical dilemma, patient consent, consent, autonomy, patient autonomy, duty of care, negligence, professional negligence, clinical negligence, confidentiality, moral duty, ethical duty, moral code, patient suicide, assisted suicide, criminal law, civil law, whistleblowers, whistle blowing, Trusts, futile, discrimination, age discrimination, NHS resources, treatment, empathy, sympathy, professional behaviour, unprofessional behaviour, belief systems.