CO01: Describe the normal physiology and pathophysiology of the system(s) to which
CO01.01: List the important hormones produced by the pancreas, including the
specific cell-types where they are formed
CO01.02: List important enhancers and inhibitors of insulin release from the
pancreas
CO01.03: Describe the insulin receptor, its activation and operation, and the
important signaling systems to which it is linked
CO01.04: Describe the sequence of events, which allows the beta-cell to release
insulin in the presence of glucose
CO01.05: Describe the various physiological effects of insulin on the liver, skeletal
muscle and adipose tissue especially with respect to carbohydrate, lipid, and protein
metabolism
CO01.06: Describe the biochemical processes, which lead to ketone body formation
and ketoacidosis
CO01.07: Differentiate between Type 1 and Type 2 diabetes mellitus and compare
and contrast the clinical characteristics of both
CO01.08: Identify important long-term complications of diabetes mellitus with
particular emphasis on neuropathies and microvascular disease
CO01.09: Explain how the aldose reductase pathway participates in pathological
processes associated with long-term diabetes mellitus
CO01.10: Identify the various pharmaceutical preparations of insulin, how they are
formulated, their onset and duration of actions, and side effects of insulin therapy
identify the clinical role of discussed drugs in therapy
CO01.11: Identify the signaling molecules that regulate the release of thyroid
hormones
CO01.12: List the steps in the synthesis and release of thyroid hormones
CO01.13: Describe key physiological effects of thyroid hormones

CO01.14: Outline the body systems manifestations of hypo- and hyper-thyroidism
CO01.15: Name and discuss the various disease states presenting with hypo- or
hyper-thyroidism
CO01.16: Describe the bone remodeling process including key signaling molecules
involved in the process
CO01.17: List the effects of PTH, Vitamin D, and calcitonin on the GI, renal and
bone handling of Ca+2
CO01.18: Describe the synthesis of the active and inactive forms of Vitamin D
CO01.19: Identify commercially -available analogs/formulations of GnRH, LH, and
FSH and their clinical uses
CO01.20: Describe the physiological events of the follicular and luteal phases of the
human menstrual cycle

CO01.21: Describe the action of estrogen vs. progesterone on the endometrial lining
CO01.22: Describe key physiological actions of estradiol and progesterone
CO01.23: Describe testicular anatomy and the physiological regulation of sperm and
testosterone production in the testis
CO01.24: Recognize key physiological actions of androgens
CO01.25: Cite uses of androgens for other than replacement therapy
CO01.26: Discuss the physiological regulation of the release of cortisol and other adrenal steroids from the adrenal gland
CO01.27: Discuss the key physiological actions of cortisol

CO01.28: Outline the synthetic pathways of the various steroids of the human body
CO01.29: Describe the mechanism of activation, and the workings of, the glucocorticoid
CO01.30: Name the various disease states associated with either and excess or deficiency of cortisol or aldosterone, and their clinical presentation
CO01.31: Outline the various gastric aggressive and protective factors
CO01.32: Describe in detail the regulation of the release of HCL from the parietal cell, including key physiological mediators and the receptors/signaling systems at which they act
CO01.33: Describe the role of the intrinsic and motor neurons of the submucosal and myenteric plexes in regulating gastrointestinal motility
CO01.34: Identify key physiological modulators of gastrointestinal motility, their receptors, and their sites of action
CO01.35: Outline the synthesis and metabolism of serotonin
CO01.36: Review important physiological receptors for serotonin, the processes that they mediate, and the messenger systems too which they are coupled
CO01.37: Describe the components of the "trigeminovascular" theory of migraine headache
CO01.38: Describe the interacting anatomical sites that mediate the emetic response, cite key receptors mediating the emetic response at these sites, and provide the names of representative anti-emetics agents acting at a particular receptor sites
CO01.39: Compare and contrast the various 5-HT3 receptor antagonists
CO01.40: Recognize the "ergot" nucleus
CO01.41: Identify receptor sites for individual ergots, and state whether the ergot acts as an agonist, partial, agonist or antagonist at that receptor
CO01.42: List and recognize the four cardinal symptoms of PD
CO01.43: Review some of the proposed causes of PD
CO01.44: Identify the structures comprising the "basal ganglia" and define the "extra pyramidal motor systems"
CO01.45: Describe the "wiring" of the basal ganglia, thalamus, and motor cortex and identify how dopamine and acetylcholine modify neurotransmission within key circuits connecting these structures
CO01.46: Explain the concept of dopamine vs. acetylcholine "balance" in regulating movement
CO01.47: State the primary deficit, which leads to PD
CO01.48: Describe the synthesis and metabolism of dopamine, including key enzymes and their locations in the periphery and CNS
CO01.49: Define the terms "dyskinesia", "ballismus", "athetosis", "tis", and "chorea"
CO01.50: Describe the clinical features of each of the movement disorders discussed in class
CO01.51: Cite postulated etiologies of the movement disorders, if known
CO01.52: Identify those movement disorders that display a familial inheritance pattern
CO01.53: Differentiate between a "psychosis" and a "neurosis"
CO01.54: Describe schizophrenia in terms of characteristic symptoms, genetics, and good or poor prognosis
CO01.55: Classify a symptom as either a "positive" or "negative" symptom of schizophrenia
CO01.56: List the major dopaminergic pathways in the CNS and the processes they are believed to mediate
CO01.57: Define "hypofrontality" as it applies to schizophrenia
CO01.58: Outline the postulated pathophysiology of schizophrenia particularly with respect to dopaminergic, serotonergic, and glutaminergic neural systems
CO01.59: Describe the proposed pathologies of positive vs. negative symptoms of schizophrenia
CO01.60: Differentiate between "Type 1" and Type II" bipolar affective disorder
CO01.61: Discuss evidence for an against the "biogenic amine", "receptor sensitivity" and "serotonin" hypotheses of depression
CO01.62: Recognize the various disease states that have depression as a component, and state appropriate therapeutic measures for the disease state
CO01.63: Name and describe the clinical characteristics of the various anxiety disorders
CO01.64: Discuss the role of locus coereleus in the genesis of anxiety
CO01.65: Discuss the subunit composition of the chloride ionophrone complex
CO01.66: Describe in detail the workings of the chloride ionophore complex and identify the actions of each of the following at the complex: GABA, BDZ agonist, BDZ antagonist, BZD inverse agonist, barbiturates, and picrotoxinin
CO01.67: Define the "neurogenic", "chemical", and "hypoxic" respiratory drives
CO01.68: Describe key features of NREM and REM sleep
CO01.69: State the major differences between the sleep pattern of the young adult versus that of elderly
CO01.70: Define "sleep latency"
CO01.71: Describe the physiology of melatonin release
CO01.72: Define epilepsy
CO01.73: State the difference between a "seizure" and a "convulsion"
CO01.74: Outline potential causes or triggers of seizures
CO01.75: Discuss the various animal models of epilepsy, and the ability of a model to predict an agent's efficacy in treating a particular seizure type
CO01.76: Identify and be able to provide a detailed description of the clinical features of the various seizure types that comprise epilepsy

CO02: Identify generic and trade names of discussed drugs, as well as, marketed dosage
CO02.01: For the drugs used to treat Type II diabetes students should be able to a. Identify generic and trade names of discussed drugs; and familiarize themselves with their commercially-available dosage forms
CO02.02: Identify commercially-available analogs/formulations of GnRH, LH, and FSH and their clinical uses
CO02.03: Cite the various testosterone formulations that are marketed for replacement therapy

CO02.04: List the various antiglucocorticoids that are available and their clinical use
CO02.05: Outline the structure-activity relationships of the glucocorticoid receptor agonists
CO02.06: Discuss the clinical uses of the marketed glucocorticoids, their dosing regimens, and available formulations
CO02.07: List drugs of choice and alternative agents for treating a particular seizure type

CO03: Describe the mechanism of action of discussed drugs, including their specific
CO03.01: State the mechanism of actions of the bisphosphonates, their side effects, and their clinical uses
CO03.02: Identify those agent used to treat osteoporosis, Pagets Disease, and hypercalcemia and cite their mechanisms of action
CO03.03: Classify the various commercially-available formulations with estrogen like activity and identify common clinical uses of these agents
CO03.04: Describe the workings of the estrogen receptor in terms of agonists, partial agonists, antagonists and SERMs
CO03.05: Differentiate between a C-21 vs. C-19 progestin and state the physiological attributes of both
CO03.06: Discuss the various therapeutic agents that modify or antagonize female gonadal hormone actions in terms of their mechanism of action, adverse effects, and clinical uses
CO03.07: Describe the mechanism of action of oral contraceptives and the various regimens/formulations that are commercially-available
CO03.08: Discuss the anti-androgens in terms of mechanism of action, clinical uses, and adverse side effects
CO03.09: Discuss the stat of the art of male contraception
CO03.10: Describe the mechanism(s) of action of the "triptan" anti-migraine agents, their adverse effects and their contraindications
CO03.11: Identify specific drug therapies for the individual movement disorders and state their mechanisms of action
CO03.12: Describe the pharmacological profiles that distinguish a "typical" antipsychotic agent from an "atypical" one
CO03.13: Explain the pharmacological mechanisms that are responsible for the reduced incidence of EPS associated with atypical agents as well as their increased efficacy in treating negative symptoms
CO03.14: Rank in order the binding affinities of the atypical antipsychotics for various neurotransmitter receptors and utilize these rankings to predict the pharmacological and side effect profile of an individual agent.

CO03.15: Compare and contrast the advantages and disadvantages of using lithium vs. antipsychotics in the treatment of bipolar disorder (BD).

CO03.16: Describe the various theories of the mechanism of action of lithium in the treatment of BD.

CO03.17: Discuss the role that lithium plays in the modulation of the phosphatidyl inositol second messenger system.

CO03.18: State how each class of clinically-useful antidepressant specifically affects serotonergic neurotransmission.

CO03.19: Compare the 2° and 3° TCAs with regard to reuptake selectivity, receptor interactions, and pharmacological profile.

CO03.20: Discuss the pharmacological profiles of clomipramine and fluvoxamine and cite their use in the treatment of OCD.

CO03.21: Compare the benzodiazepine anxiolytics to buspirone in terms of mechanism of action, clinical uses, onset of actions and side effect profiles.

CO03.22: State the reason why zopidem, zaleplon, and eszoplicone are selective hypnotics while BDZs are not.

CO03.23: Describe in detail the metabolism of the BZDs and triazolo-BZDs including active metabolites, and relate this to the durations of actions of individual agents.

CO03.24: Describe the pharmacological mechanisms by which barbiturates are more "generalized" depressants than BZDs.

CO03.25: Match specific clinical uses of the barbiturates to the duration of action of individual agents.

CO03.26: Compare the effects of the various chemical classes of hypnotic agents of REM and NREM sleep.

CO03.27: Outline common mechanisms of action of the antiepileptic drugs.

CO03.28: For the drugs used to treat Type II diabetes students should be able to describe the mechanism of action of the drug.

CO04: Recognize idiosyncratic and pharmacologically-based side effects of discussed:

CO04.01: Recognize common side effects of the oral contraceptives, and where possible indicate if they are attributable to the estrogen vs. progestin component of the oral contraceptive.

CO04.02: Cite severe adverse effects associated with oral contraceptive use, and evaluate the risks involved with O.C. use.

CO04.03: Describe adverse effects of estrogen and progestin products.

CO04.04: Describe adverse effects of androgen therapy.

CO04.05: Cite adverse effects of glucocorticosteroid use.

CO04.06: Describe the structure-activity relationship of the phenothiazines including specific receptors that they antagonize, and, as a consequence, their side effect profiles.

CO04.07: List common actions/side effects of the "typical" antipsychotic agents.
CO04.08: List and describe the clinical presentation(s) of the various extra pyramidal syndromes associated with antipsychotic use, and cite treatments for each syndrome
CO04.09: Discuss common adverse effects of lithium therapy
CO04.10: Identify the more serious toxicities of lithium therapy and state the blood levels (ranges) at which these severe toxicities are likely to occur
CO04.11: Describe how serum/renal Na+ concentrations affect the toxicity or efficacy of lithium
CO04.12: Discuss the side effect profiles of the MAOIs, phenelzine and tranylcypromine
CO04.13: Compare pharmacological profiles of the TCAs vs. SSRIs with regard to side effects and major toxicities
CO04.14: Recognize the symptoms of "the serotonin syndrome"
CO04.15: Discuss the underpinnings of the so-called "cheese effect" associate with MAOI use and list several dietary restrictions
CO04.16: Describe the pharmacological actions of the benzodiazepine anxiolytics including their side effects
CO04.17: Discuss the uses and side effects of flumazenil
CO04.18: Define "cross-tolerance" as it applies to CNS depressants and identify its significance in drug withdrawal
CO04.19: Identify those CNS depressants that are cross-tolerant and those that are not
CO04.20: For the drugs used to treat Type II diabetes students should be able to: c. List important side effects of the drug
CO05: Cite relevant pharmacokinetic properties of the discussed drugs where appropriate
CO05.01: For the drugs used to treat Type II diabetes students should be able to: d. Cite relevant pharmacokinetic properties of the discussed drugs where appropriate
CO05.02: Compare and contrast the individual "triptans" with regard to onset and duration of action, and available formulations
CO05.03: Cite the advantages and disadvantages of L-dopa vs. direct-acting dopamine agonists in the treatment PD
CO05.04: Classify the individual hypnotic agents as either "long-", "intermediate-", or "short-" acting
CO05.05: Choose an appropriate agents to treat a sleep disorder based on the onset of action and duration of action of the agent
CO06: Identify the clinical role of discussed drugs in therapy
CO06.01: Compare and contrast the various thyroid hormone preparations used for replacement therapy
CO06.02: Describe the various drug and non-drug treatments available for the treatment of hyperthyroidism
CO06.03: Discuss other uses of antipsychotic agents besides that of schizophrenia
CO07: Identify potential and known drug interactions
CO07.01: Describe the mechanisms by which L-dopa therapy may be neurotoxic vs. potential neuroprotective effects of MAO-B inhibitors
CO07.02: Cite drug interactions that can lead to the "serotonin syndrome"
CO07.03: Discuss how thiazide diuretics can increase the toxicity of lithium
CO07.04: Describe the pharmacological profile of the barbiturates, with particular emphasis on toxicities, tolerance and dependence, and potential for drug interactions
CO07.05: Identify potential drug interactions when utilizing more than one agent to treat epilepsy

CO08: Cite contraindications associated with the use of a drug
CO08.01: List therapeutic agents that are contraindicated when being treated with an MAOI