سازمان بنادر و دریانوردی

دستورالعمل اجرایی برگزاری دوره آموزشی و آزمونهای شایستگی دریانوردی سمت

افسر دوم برروی کشتیهای باظرفیت ناخالص ۵۰۰ یا بیشتر- سفرهای نامحدود

The Code of Practice for Conducting Second Officer on ships of Gross Tonnage (GT≥500) engaged on Unlimited Voyages Training Course and Competency Assessments

کد مدرک: P6-W23

شماره بازنگری	تاریخ بازنگری	شرح تغییرات (علت و محل)	تهیه کننده	تأیید کننده	تصویب کننده
۰۳	۱۳۹۳/۰۵/۰۶	براساس بازنگری کلی کنوانسیون STCW 78, As Amended	رئیس اداره استانداردهای دریانوردان نصرت اله علی پور	مدیر کل امور دریانوردان حسین میرزایی	معاون امور دریایی سید علی استیری

فهرست مندرجات

مقـــدمـــه

سازمان بنادر و دریانوردی در راستای اجرای وظایف و اختیارات قانونی ناشی از ماده ۱۹۲ قانون دریایی جمهوری اسلامی ایران مصوب شهریور ماه ۱۳۴۳ و بند ۱۰ ماده ۳ آئین نامه تشکیل سازمان بنادر و دریانوردی مصوب بهمن ماه ۱۳۴۸ کمیسیون های خاص دو مجلس که صدور هر گونه سند یا گواهینامه و پروانه مربوط به کشتی ، فرماندهان ، افسران و کارکنان کشتیها را در صلاحیت این سازمان قرار داده و در راستای رعایت مفاد کنوانسیون بین المللی استانداردهای آموزش، صدور گواهینامه و نگهبانی دریانوردان (STCW- as amended) مصوب مرداد ماه ۱۳۷۵ مجلس شورای اسلامی ایران و با عنایت به مقرره II/1 کنوانسیون مذکور "دستورالعمل اجرایی برگزاری دوره های آموزشی و آزمونهای شایستگی دریانوردی سمت افسر دوم بر روی کشتیهای با ظرفیت ناخالص ۵۰۰ یا بیشتر (GT≥500) - سفرهای نامحدود " را تدوین نموده و پس از تصویب هیأت عامل قابل اجرا می باشد.

یادداشت: قانون تغییر نام سازمان بنادر و کشتیرانی به سازمان بنادر و دریانوردی در تاریخ ۱۳۸۷/۰۲/۱۰ به تصویب مجلس شورای اسلامی رسید.

۱–هدف از تدوین

هدف از تدوین این دستورالعمل ارائه حداقل نیازمندیهای برگزاری دوره آموزشی و آزمونهای شایستگی دریانوردی سمت افسر دوم بر روی کشتیها ی با ظرفیت نا خالص ۵۰۰ یا بیشتر (GT≥500) – سفرهای نامحدود می باشد.

۲– دامنه کاربرد

این دستورالعمل برای کلیه مراکز آموزشی مورد تایید سازمان و مجری برگزاری دوره آموزش سمت افسر دوم بر روی کشتیها ی با ظرفیت نا خالص ۵۰۰ یا بیشتر (GT≥500) – سفرهای نامحدود ، کاربرد دارد.

۳–تعاریف

اصطلاحات استفاده شده در راستای اهداف این دستورالعمل دارای معانی ذیل می باشند.

۳–۱ گواهی خدمت دریایی مورد تایید (Approved Seagoing Service/ Documentary Evidence)

به معنای تأییدیه خدمت دریایی دریانوردان جهت شرکت در دوره های آموزشی/آزمونهای دریانوردی و صدور گواهینامه های دریانوردی می باشد که می بایست علاوه بر ثبت در شناسنامه دریانوردی ، تاییدیه شرکت کشتیرانی/ مالک کشتی و یا اتحادیه مالکان کشتیها به صورت فرم کامپیوتری (computer sheet)، نامه اداری شماره شده و یا فرم تعریف شده(به ضمیمه این دستورالعمل) قابل ارائه است.

۳–۲ گواهینامه شایستگی (Certificate of Competency)

به معنای گواهینامه صادره و یا شناسایی شده ای است که مطابق الزامات فصل‌های ۲، ۳، ٤ و یا ۷ کنوانسیون برای فرماندهان، افسران و افسران مهندس الکترونیک صادر و یا تایید می‌شود و دارنده‌ی قانونی آن محق به خدمت در مقام و عمل به وظایف مربوطه در سطح مسئولیت مشخص شده در آن است.

۳–۳ گواهینامه مهارت (Certificate of Proficiency)

به معنای گواهینامه‌ای به غیر از گواهینامه شایستگی صادر شده برای دریانورد است که الزامات فصل‌های مرتبط با کنوانسیون را نشان می‌دهد و الزامات آموزشی، شایستگی‌ها یا خدمت دریایی مندرج در کنوانسیون را برآورده می نماید.

۳–۴ دستگاه نظارت مرکز (Central Monitoring Office)

به معنای اداره یا بخشی که وظیفه صدور مجوز فعالیت آموزش دریانوردی و نظارت بر مراکز آموزشی را بر عهده دارد. دستگاه نظارت در ستاد سازمان، اداره استانداردها ی دریانوردان می باشد. مدیر کل امور دریانوردان نیز جزء دستگاه نظارت مرکز بوده و می تواند صدور مجوز فعالیت آموزش دریانوردی و نظارت بر مراکز آموزش دریانوردان را تایید نماید.

۳-۵ کشتی حمل مواد شیمیایی (Chemical Tanker)

به معنای کشتی است که برای حمل فله‌ی هر گونه فرآورده مایع فهرست شده در فصل ۱۷ آیین‌نامه بین‌المللی مواد شیمیایی فله ساخته یا سازگار می‌شود، و یا مورد استفاده قرار می‌گیرد.

۳-۶ افسر اول (Chief Mate)

به معنای افسری است که جانشین فرمانده کشتی می باشد و بر اساس مقرره II/2 و مفاد مربوطه این دستور العمل واجد شرایط بوده و در مواقع عدم توانایی فرمانده، مسئولیت فرماندهی کشتی را نیز بر عهده می گیرد.

۳-۷ دستورالعمل (Code of Practice)

به معنای مجموعه قوانین، مقررات ملی و الزامات مندرج در این دستورالعمل است که توسط اداره کل امور دریانوردان تدوین و به تصویب هیات عامل سازمان رسیده است.

۳-۸ شرکت کشتیرانی (Company)

به معنای مالک کشتی، هر شخصی مانند مدیر، یا اجاره کننده دربست کشتی است، که مسئولیت عملیات کشتی از طرف مالک کشتی بر وی فرض شده است، و با قبول چنین مسئولیتی، کلیه وظایف و مسئولیت‌های محول شده بر شرکت توسط این دستورالعملها را بر عهده گرفته است.

۳-۹ گواهی طی دوره (Course Completion Certificate or Documentary Evidence)

به معنای گواهی است که مرکز آموزشی مورد تایید سازمان به فراگیر پس از گذراندن موفقیت آمیز دوره مربوطه ارائه می دهد.

۳-۱۰ افسر عرشه (Deck Officer)

به معنای افسری است که مطابق مفاد فصل دوم کنوانسیون صلاحیت دارد.

۳-۱۱ کارکرد (Function)

به معنای مجموعه ای از امور ، وظایف و مسئولیت ها جهت انجام عملیات در کشتی، ایمنی جان اشخاص در دریا و حفاظت از محیط زیست که در آیین نامه STCW درج شده است می باشد.

۳-۱۲ گواهینامه عمومی اپراتور سیستم جهانی اضطرار و ایمنی دریانوردی

GMDSS General Operator Certificate (GMDSS GOC)

به معنای شخصی است که مطابق با الزامات مقرره ٤/٢ (IV/2) کنوانسیون STCW و بخش ب – ٤/٢ (B- IV/2) بندهای ۲۹ الی ۳٦ آئین نامه STCW دارای صلاحیت است.

۳-۱۳ کاربر مخابرات (GMDSS Radio Operator)

به معنای فردی است که بر اساس فصل IV کنوانسیون و مفاد دستورالعمل نحوه صدور، تمدید و تجدید گواهینامه های شایستگی و مهارت دریانوردان واجد شرایط باشد.

۳-۱۴ گواهینامه محدود اپراتور سیستم جهانی اضطرار و ایمنی دریانوردی

GMDSS Restricted Operator Certificate (GMDSS ROC)

به معنای شخصی است که مطابق با الزامات مقرره ٤/٢ (IV/2) کنوانسیون STCW و بخش ب – ٤/٢ (B-IV/2) بندهای ٣٧ الی ٤٤ آئین نامه STCW دارای صلاحیت است.

۳-۱۵ ظرفیت ناخالص کشتی (Gross Tonnage)

به معنای ظرفیت ناخالص حجمی محاسبه شده شناور بر اساس مقررات مربوطه می باشد.

۳-۱۶ آئین نامه ی امنیت کشتی ها (ISPS Code)

به معنای آئین نامه بین المللی امنیت کشتی ها و تسهیلات بندری (کد ISPS) که از ۱۲ دسامبر ۲۰۰۲ طی قطعنامه شماره ۲ کنفرانس دولتهای متعاهد به کنوانسیون بین المللی جان اشخاص در دریا ۱۹۷٤ (SOLAS) به تصویب رسیده و ممکن است توسط سازمان بین المللی دریانوردی بر اساس اصلاحیه های بعدی تغییر یابد.

۳-۱۷ کشتی حمل گاز مایع (Liquefied Gas Tanker)

به معنای کشتی است که برای حمل فله‌ی هرگونه گاز مایع یا سایر فرآورده‌های فهرست شده در فصل ۱۹ آیین‌نامه بین‌المللی کشتی‌های حمل گاز ساخته یا سازگار می‌شود، و یا مورد استفاده قرار می‌گیرد.

۳-۱۸ فرمانده (Master)

به معنای شخصی است که عهده‌دار فرماندهی کشتی می باشد.

۳-۱۹ گواهینامه سلامت پزشکی (Medical Fitness Certificate)

به معنای گواهینامه ای است که توسط پزشک معتمد سازمان جهت متقاضیانی که از نظر پزشکی از سلامت برخوردار باشند، صادر می گردد.

۳-۲۰ کشتی تجاری (Merchant Ship)

به معنای هر نوع شناوری است (به استثنای شناورهای خدماتی، سکوهای متحرک فراساحلی، صیادی و یا نظامی) که در امر جابجایی کالاهای تجاری، مسافر و بار تسهیلات مربوط به کالاهای تجاری بکار گرفته می شود.

۳-۲۱ سفرهای نزدیک به ساحل (Near Coastal Voyages / NCV)

به معنای سفر هایی است که در نزدیکی سواحل هر کشور متعاهد، مطابق با مقرره ی I/3 کنوانسیون STCW و تعریف ارائه شده آن متعاهد انجام می شود. در ایران سفرهای نزدیک به ساحل آبهای خلیج فارس، دریای خزر و محدوده تعریف شده در دریای عمان (آبهای واقع در غرب خطی که نقطه جغرافیایی با مشخصات ۲۲ درجه و ۳۲ دقیقه شمال و ۵۹ درجه و ٤٨ دقیقه شرق « راس الحد- عمان» را به نقطه جغرافیایی دارای مشخصات ۲۵ درجه و ٤ دقیقه شمال و ٦١ درجه و ۲۲ دقیقه شرق «گواتر- ایران» وصل می نماید) می باشد.

۳-۲۲ افسر (Officer)

به معنای عضوی از خدمه‌ی شناور به غیر از فرمانده است که بر اساس قوانین و مقررات ملی و یا بین المللی انتخاب شده باشد.

۳-۲۳ کشتی حمل مواد نفتی (Oil Tanker)

به معنای کشتی است که برای حمل فله‌ی نفت و فرآورده‌های نفتی ساخته می‌شود و مورد استفاده قرار می‌گیرد.

۳-۲۴ دفترچه کارورزی در کشتی (On Board Training Record Book)

به معنای دفترچه کارورزی مورد تایید سازمان می باشد که آموزشهای عملی و تئوری دریانورد می بایست بر اساس مفاد مندرج در آن تکمیل گردد.

۳-۲۵ سطح عملیاتی (Operational Level)

به معنای سطحی از مسئولیت اطلاق می گردد که بعنوان افسر دوم (افسر ناوبر مسئول نگهبانی)، افسر مهندس سوم (افسر مهندس مسئول نگهبانی) و افسر مهندس الکترونیک یا به عنوان افسر مهندسی که وظیفه معینی در موتورخانه بدون خدمه به او محول گشته، یا بعنوان اپراتور رادیو و GMDSS، درکشتی ها خدمت می کند و همچنین در حیطه وظایف محوله و تحت نظر سطح مدیریت مربوطه، مراقبت، انجام و کنترل مستقیم تمام کارها را با روش مطلوب دارا می باشد.

۳-۲۶ کشتی مسافربری (Passenger Ship)

به معنای کشتی است که بر اساس مقرره ۲ کنوانسیون اصلاح شده سولاس بیش از ۱۲ مسافر حمل کند.

۳-۲۷ سازمان (Ports & Maritime Organization of Ian(Islamic Republic)

به معنای سازمان بنادر و دریانوردی جمهوری اسلامی ایران می باشد.

۳-۲۸ مقررات (Regulations)

به معنای مجموعه مقررات مندرج در کنوانسیون و آئین نامه می باشد.

۳-۲۹ منطقه دریایی A1 (Sea Area A1)

به معنای محدوده ای از دریا است که تحت پوشش حداقل یک ایستگاه ساحلی VHF با قابلیت هشدار دائم DSC باشد.

۳-۳۰ منطقه دریایی A2 (Sea Area A2)

به معنای محدوده ای خارج از منطقه A1 است که تحت پوشش حداقل یک ایستگاه ساحلی رادیو تلفنی MF بوده و همچنین قابلیت هشدار دائمی DSC در باند مربوطه را نیز دارا باشد.

۳-۳۱ منطقه دریایی A3 (Sea Area A3)

به معنای محدوده ای خارج از مناطق A1 و A2 می باشد و همچنین منطقه تحت پوشش ماهورهای اینمارست قرار داشته و قابلیت هشدار دائم در آن وجود داشته باشد.

۳-۳۲ منطقه دریایی A4 (Sea Area A4)

به معنای محدوده ای است که خارج از مناطق دریایی A1 ، A2 و A3 باشد.

۳-۳۳ خدمت دریایی (Seagoing Service)

به معنای مدت زمان دریانوردی بر روی کشتی است که می بایست مرتبط با صدور و یا تجدید گواهینامه های شایستگی و یا مهارت در یانوردان می باشد.

۳-۳۴ افسر دوم GT>500 سفرهای نامحدود

به معنای افسر عرشه ای است که مسئولیت ناوبری و نگهبانی (O.O.W) بر عملکرد ایمن کشتی را در زمان معینی بر عهده دارد و بر اساس مقرره II/1 کنوانسیون و مفاد مربوطه در دستورالعمل نحوه صدور، تمدید و تجدید گواهینامه های شایستگی و مهارت دریانوردان واجد شرایط باشد.

۳-۳۵ وظایف امنیتی (Security Duties)

به معنای تمامی مسئولیتها و وظایف امنیتی روی کشتی ها مطابق با تعریف مندرج در کنوانسیون بین المللی جان اشخاص در دریا ، ۱۹۷٤ (اصلاح شده) و آیین نامه بین المللی امنیت کشتی و تسهیلات بندری (ISPS) می باشد.

۳-۳۶ افسر امنیتی کشتی (Ship Security Officer)

به معنای افسری است بر روی کشتی که در برابر فرمانده پاسخگو می باشد و توسط شرکت کشتیرانی به عنوان مسئول امنیتی کشتی انتخاب می گردد و وظایف وی شامل اجرا ، حفظ و نگهداری طرح امنیتی کشتی جهت ارتباط با افسر امنیتی شرکت کشتیرانی و افسر امنیتی تسهیلات بندری تعیین شده است.

۳-۳۷ کنوانسیون (STCW Convention)

به معنای کنوانسیون اصلاح شده بین المللی استانداردهای آموزشی، صدور گواهینامه و نگهبانی دریانوردان (STCW-78 as amended) می باشد.

۳-۳۸ آئین نامه ی کنوانسیون (STCW Code)

به معنای آئین نامه ی آموزش، صدور گواهینامه ها و نگهبانی دریانوردان (STCW) که طی قطعنامه ی شماره ۲ کنفرانس 1995 تصویب که ممکن است توسط سازمان بین المللی دریانوردی بر اساس اصلاحیه های بعدی تغییر یابد.

۳-۳۹ مرکز آموزشی(Training Center)

به معنای دانشگاه، شرکت، موسسه یا هر ارگانی که بر اساس مجوز اخذ شده از سازمان در زمینه آموزش های دریانوردی فعالیت می کند

۳-۴۰ سفرهای نامحدود (Unlimited Voyages)

به معنای سفرهای بین المللی که محدود به سفرهای نزدیک به ساحل نباشد.

۴- مسئولیت‌ها

۴-۱ مسئولیت بازنگری این دستورالعمل بر عهده دستگاه نظارت مرکز می‌باشد.

۴-۲ مسئولیت تایید اصلاحیه ها به این دستورالعمل بر عهده اداره کل امور دریانوردان می‌باشد.

۴-۳ مسئولیت تصویب اصلاحیه ها به این دستورالعمل برعهده معاون امور دریایی به نیابت از هیات عامل سازمان می باشد.

۴-۴ مسئولیت اجرای کامل دوره آموزشی بر اساس عناوین اعلام شده بر عهده مرکز آموزشی می باشد.

۴-۵ مسئولیت نظارت بر حسن اجرای این دستورالعمل در مراکز آموزشی دریانوردی بر عهده دستگاه نظارت مرکز می باشد.

۴-۶ مسئولیت برگزاری آزمون بر اساس عناوین اعلام شده در بند ۱-۶-۵ بر عهده اداره امتحانات و اسناد دریانوردان (در تهران و یا بنادر) می باشد.

۵- روش اجرا

۵-۱ هدف از برگزاری دوره آموزشی

هدف از برگزاری این دوره آموزشی ، آماده نمودن فراگیران برای کسب توانمندی های مندرج در ستون ۱ از جدول بخش II/1 – الف آیین نامه کنوانسیون STCW می باشد.

۵-۲ طـول دوره

۵-۲-۱ طول دوره حداقل ۱۶۶۸ ساعت و بر اساس ۱۲۹۰ ساعت نظری (تئوری)، ۱۰۴ ساعت عملی و ۲۷۴ ساعت تمرین (بدون احتساب مدت زمان آموزش کارورزی) می باشد.

۵-۲-۲ حداکثر مدت زمان آموزش روزانه برای هر فراگیر ۸ ساعت می باشد.

۵-۳ تعـداد شـرکت کنندگـان در دوره

۵-۳-۱ حداکثر فراگیران شرکت کننده در هر دوره ۲۰ نفر می باشد.

۵-۳-۲ در صورت افزایش حداقل فضا، تجهیزات و امکانات کمک آموزشی مرتبط بر اساس دستورالعمل نحوه صدور مجوز و نظارت بر اجرای دوره ها در مراکز آموزشی دریـانوردی و پـس از اخـذ تاییدیـه از دسـتگاه نظارت ذیربط، تعداد شرکت کنندگان در دوره می تواند حداکثر تا ۳۰ نفر افزایش یابد.

۵-۴ شـرایـط ورود بـه دوره

۵-۴-۱ داشتن حداقل ۱۸ سال سن

۵-۴-۲ دارای گواهینامه سلامت پزشکی معتبر بر اساس دستورالعمل مصوب سازمان

۵-۴-۳ دارا بودن مدرک تحصیلی حداقل دیپلم کامل متوسطه رشته ریاضی فیزیک ، تجربی و یا دیپلم ناوبری هنرستانهای دریایی

۵-۵ دانش ، درک و مهارت مورد انتظار

۵-۴-۱ توانایی برنامه ریزی و هدایت و راهبری کشتی و تعیین موقعیت

۵-۴-۲ توانایی برقراری و انجام نگهبانی و دریانوردی ایمن

۵-۴-۳ توانایی برقراری ناوبری ایمن با بکارگیری از تجهیزات کمک ناوبری AIS

۵-۴-۴ توانایی عکس العمل و پاسخ در مواقع اضطراری

۵-۴-۵ توانایی پاسخ و عکس العمل به علائم اضطراری در دریا

۵-۴-۶ آشنایی و بکارگیری از زبان تخصصی دریایی(SMCP)

۵-۴-۷ توانایی ارسال و دریافت اطلاعات به وسیله علائم دیداری

۵-۴-۸ آشنایی با عملیات مانور کشتی

۹-٤-٥ توانایی نظارت بر بارگیری ، بارچینی ، مهار و تخلیه کالا و همچنین اقدامات ایمنی در نگهداری کالا در سفرهای دریایی

۱۰-٤-٥ توانایی بررسی و گزارش نقایص و صدمات وارده به انبار کالا ، درب انبارها و مخازن آب شور

۱۱-٤-٥ توانایی نظارت و جلوگیری از آلودگی محیط زیست دریایی

۱۲-٤-٥ توانایی حفظ و نگهداری قابلیت دریانوردی شناور

۱۳-٤-٥ آشنایی با قوانین دریایی

۱٤-٤-٥ مهارت در راهبری و کار گروهی

۱۵-٤-٥ توانایی مشارکت در حفظ ایمنی کارکنان و شناور

۶-۵ عناوین دروس ، ریز مواد درسی و آزمون

عناوین دروس و جدول نمایانگر تعداد سؤالات، مدت، نوع، حدنصاب قبولی و مواد امتحانی آزمونهای شایستگی دریانوردی برای داوطلبین سمت " افسر دوم بر روی کشتیهای با ظرفیت نا خالص ۵۰۰ یا بیشتر (GT≥500)- سفرهای نامحدود " به شرح ذیل می باشد.

۱-۶-۵ جدول نمایانگر تعداد سؤالات، مدت، نوع، حدنصاب قبولی و مواد امتحانی آزمونهای شایستگی سمت افسر دوم بر روی کشتیهای با ظرفیت ناخالص ۵۰۰ یا بیشتر (GT≥500) سفرهای نا محدود

ردیف	نام آزمون	تعداد سؤالات	مدت (ساعت)	نوع آزمون	حدنصاب قبولی (درصد)	مواد درسی (ماده ۲-۶-۵)	ملاحضات
۱	ناوبری نجومی	۵	۲/۵	کتبی	٪۶۰	1.1.1.2-1.1.1.4-1.1.1.6-1.1.1.7-1.1.1.8-1.1.1.9-1.1.1.10-1.1.1.11-1.1.1.12	
۲	ناوبری ساحلی ، سطحی	۵	۲/۵	کتبی	٪۷۰	1.1.2.5-1.1.2.6-1.1.2.7-1.1.2.8-1.1.2.9-1.1.2.10-1.1.2.11	
۳	سیستمهای الکترونیکی و کمک ناوبری	۵	۲/۵	کتبی	٪۵۵	1.1.3-1.1.4-1.1.5-1.1.6	
٤	کاربا کالا و بار چینی	۵	۲	کتبی	٪۵۵	2.1.1-2.2.2	
٥	تعادل و ساختمان کشتی	٦	۳	کتبی	٪۵۵	3.2.1-3.2.2	تعادل ۳ سئوال ۵۰ نمره ساختمان ۳ سئوال ۵۰ نمره
٦	شفاهی/ عملی/ شبیه ساز	-	-	شفاهی / عملی / شبیه ساز	-	1.1.1.5-1.1.2.12-1.1.2.13-1.1.2.14-1.1.2.15-1.1.2.18-1.2.1-1.2.2-1.3.1-1.4.1-1.5.1-1.6.1-1.7.1-3.1.1-3.3.1-3.4.1-3.4.2-3.4.3-3.4.4-3.4.5	در زمان آزمون شفاهی به همراه داشتن شناسنامه دریانوردی و دفترچه کارآموزی الزامی می باشد

در آزمون شفاهی / عملی / شبیه ساز علاوه بر مواد درسی مربوطه، ممکن است برحسب مورد سؤالاتی از سایر مواد درسی پرسیده شود.

۲-٦-۵ حداقل مواد درسی دوره آموزشی سمت افسر دوم بر روی کشتیهای با ظرفیت نا خالص ۵۰۰ یا بیشتر (GT≥500)- سفرهای نامحدود در بخش انگلیسی این دستورالعمل می باشد.

۵-۷ امکانات مورد نیاز جهت برگزاری دوره

جهت برگزاری دوره های آموزشی علاوه بر فضای آموزشی قید شده در "دستورالعمل نحوه صدور مجوز و نظارت بر مراکز آموزشی دریانوردی "مصوب سازمان، تجهیزات کمک آموزشی مشروحه زیر نیز مورد نیاز می باشد:

۵-۷-۱ سالن/ کلاسها می بایست مجهز به سیستم تهویه و نورکافی و وسایل سمعی و بصری و امکانات مورد نیاز برای تدریس باشد (وسائل کمک آموزشی شامل: میز نقشه، وایت بورد/ تخته سفید، کامپیوتر و دستگاه ویدئو پروژکتور چند رسانه ای، پرده ویدئو پرژکتور)

۵-۷-۲ کتابخانه مجهز به کتب تخصصی مورد نیاز تدریس و اطلاعات جامع دیگر در خصوص دوره (تعداد مناسب کتب مرجع مانند : آلمانک، نوریس، جداول جزر و مد و غیره).

۵-۷-۳ سالن سمعی و بصری و امکانات مورد نیاز برای تدریس زبان انگلیسی تخصصی و عمومی.

۵-۷-٤ سالن /کلاس نقشه (Chart Room) مجهز به امکانات و تجهیزات مورد نیاز برای تدریس مواد درسی کار بر روی نقشه و ناوبری ساحلی(Chart Work Facilities) برابر با تعداد فراگیران دوره.

۵-۷-۵ فیلم های آموزشی مرتبط در خصوص دوره.

۵-۷-٦ مدل کره زمین، مدلهای مختلف بویه های دریایی ، ماکت و مدلهای مختلف شناورها با علائم شناسایی شناورها در روز و شب، ماکت و مدلهای اسکله و حوضچه برای تمرین قوانین راه و پهلو گیری و جدا سازی از اسکله ، ماکت کشتیها که شماتیک جرثقالها و دیگر تجهیزات عرشه را نشان دهد.

- Working models of derricks and cranes to illustrate different rigs in handling cargo models or drawings of various types of hatch cover and their operating and securing arrangements, examples of head and heel cargo blocks.
- Cut-away three-dimensional models showing the structure of parts of the ship.
- Photographs, drawings and plans illustrating various types of ship and constructional details.
- A floating ship stability demonstration model and a flotation tank. The model should be capable of demonstrating the effects of adding or removing masses, shifting masses, suspending masses and free liquid surface.
- Copies of approved stability information books and computer loading programmes from ships.
- Schematic model of a product tanker, tanks and pump-room, showing piping and valves.
- Schematic model of a crude carrier, tanks and pump-room, showing piping and valves.
- Photographs, drawings and plans to illustrate different types of ship.
- Examples of cargo plans for various types of ship.

۵-۷-۷ سالن آشنایی با وسایل مختلف مورد استفاده در کشتیها (Instrument Room) شامل:

Thermometers, Stevenson Screen, Aneroid Barometer, Psychrometer, Marine Hydrometer , Sea Temperature Bucket, Hygrometer, Chronometer, Marine Sextant, Magnetic Compass, Binnacle With Magnetic Compass/ Accessories and Sighting Devices, Gyro Compass and Pelorus , Azimuth Mirror, International Code of Signal and Flags and a set of Visual Signalling Equipment and Accessories(or a computer based system), SART, EPIRB, Line Throwing Apparatus and Pyrotechnics.

۸-۷-۵ دستگاه عمق یاب (Echo Sounder)، دستگاه GPS، دستگاهVHF، دستگاه Weather , AIS, NAVTEX facsimile receiver and speed log (جایگزین نمودن نرم افزار مناسب برای شبیه سازی دستگاههای مندرج در این بند و یا استفاده از کشتی های مستقر در بندر با تجهزات مربوطه جهت تشریح بصورت بازدید، و با اخذ تائیدیه از دستگاه نظارت صادر کننده مجوز و یا اداره استانداردهای دریانوردان مرکز مورد قبول می باشد).

۹-۷-۵ کارگاه ملوانی شامل تجهیزات: کارگاه با نیمکتها و میز کار مناسب برای اجرای آموزشهای عملی، یک عدد عمق یاب دستی دارای درجات مناسب، نردبان راهنما (Pilot Ladder) و وسایل ساخت آن، نمونه هایی از طنابهای الیافی، نمونه هایی از طنابهای سیمی (together with stoppers and various types of shackles)، پنج سری ابزار و متعلقات لازم برای گره زنی، خفت زنی و پلاس زنی، صندلی ملوانی(Bosun Chair)، داربست (Stage)، انواع قرقره ها، دو حلقه کنتر(Joining Shackle) با ابزار مناسب برای پیاده کردن/ باز کردن آنها، طنابهای پهلوگیری و مهار (سیمی و الیافی)، دوارها و نگهدارنده های لازم برای اجرای آموزش عملی(Winch/ Windlasses and mooring Arrangements)، پنج عدد کاردک ملوانی، یک عدد ماشین تراشه برداری، نمونه هایی از رنگهای مختلف دریایی، انواع گوناگون برس و غلتک رنگ زنی، یک دستگاه رنگ پاش بدون هوا و مقدار کافی رنگ برای اجرای آموزش عملی، اتصالات طنابهای سیمی.

۸-۵ شرایط مدرسین و مربیان دوره:

۱-۸-۵ مدرسین و مربیان دوره های آموزشی مندرج در این دستورالعمل می بایست علاوه بر گذراندن دوره مدرسی مورد تأیید سازمان دارای حداقل مدارک و تجارب مشروحه زیر باشند:

۱-۱-۸-۵ مدرسین

۱-۱-۱-۸-۵ جهت تدریس دروس

- Plan and conduct a passage and determine position
- Maintain a Safe navigational watch
- Respond to emergencies
- Maneuver the ship
- Monitor the loading, Stowage, Securing, handling and Care during the voyage and the unloading of Cargoes
- Inspect and report defects and damage to cargo spaces, hatch covers and ballast tanks.
- Ensure compliance with pollution prevention requirements.

- Monitor Compliance with legislative requirements.

دارای حداقل گواهینامه شایستگی معتبر افسر اولی بر روی کشتیهای با ظرفیت ناخالص GT≥3000 سفرهای نامحدود با ۲٤ ماه خدمت دریایی در آن سمت باشند.

۲-۱-۱-۸-۵ جهت تدریس دروس تخصصی (بجزء موضوعات مندرج در بند۱-۱-۱-۸-۵)، دارای حداقل مدرک تحصیلی فوق لیسانس علوم دریایی (یا فوق لیسانس مرتبط) با ۱۲ ماه سابقه تدریس مرتبط (در مراکز آموزش دریانوردی) و یا دارای حداقل مدرک تحصیلی لیسانس علوم دریایی (یا لیسانس مرتبط) با ۳٦ ماه سابقه تدریس مرتبط (در مراکز آموزش دریانوردی) باشند.

۳-۱-۱-۸-۵ دارندگان مدرک تحصیلی فوق لیسانس یا بالاتر در رشته هواشناسی می توانند مدرس موضوع هواشناسی باشند.

٤-۱-۱-۸-۵ دارندگان مدرک تحصیلی فوق لیسانس یا بالاتر در رشته معماری و سازه کشتی می توانند مدرس موضوعات تعادل در کشتی و ساختمان کشتی باشند.

۵-۱-۱-۸-۵ مدرسین کارآموزی در دریا (افسر آموزشی) میبایست از حداقل شرایط مشروحه زیر برخوردار باشند:

۱-۵-۱-۱-۸-۵ مدرسین کارآموزی داوطلبان گواهینامه افسر دوم بر روی کشتیهای با ظرفیت ناخالص ۵۰۰ یا بیشتر سفرهای نامحدود می بایست ضمن گذراندن دوره مدرسی مورد تأیید سازمان، حداقل دارای گواهینامه شایستگی معتبر افسر اولی بر روی کشتیهای با ظرفیت ناخالص GT≥3000 سفرهای نامحدود با ۲٤ ماه خدمت دریایی در آن سمت باشند.

۲-۱-۸-۵ مربیان

۱-۲-۱-۸-۵ دارای حداقل مدرک تحصیلی فوق دیپلم دریایی (ناوبری) با حداقل ۲ سال خدمت دریایی و یا دارای گواهینامه معتبر ملوان عرشه با حداقل ۵ سال خدمت دریایی در آن سمت و بر روی کشتیهای تجاری باشند.

۹-۵ ارزیابی و صدور گواهینامه

۱-۹-۵ در صورت موفقیت فراگیران در ارزیابی های حین و یا پایان دوره، گواهی طی موفقیت آمیز دوره مربوطه توسط مرکز آموزشی مورد تایید و مجری برگزاری دوره صادر می گردد.

۲-۹-۵ سپس فراگیران می توانند درخواست حضور در آزمون های شایستگی و مهارت دریانوردی سازمان را بر اساس مفاد بند ۱-٦-۵ این دستورالعمل ارائه نمایند؛ و

۳-۹-۵ نهایتا اداره امتحانات و اسناد دریانوردان سازمان (در تهران و یا بنادر) برای آن دسته از شرکت کنندگان که آزمون های مربوطه را با موفقیت طی نموده باشند و حائز دیگر شرایط لازم باشند، گواهینامه مرتبط بر اساس دستورالعمل صدور، تمدید و تجدید گواهینامه های شایستگی و مهارت دریانوردان صادر می نماید.

۱۰-۵ شرایط تمدید/ تجدید گواهینامه

گواهینامه های شایستگی و مهارت دریانوردی بر اساس مفاد دستورالعمل صدور ، تمدید و تجدید گواهینامه های شایستگی و مهارت دریانوردان تمدید و یا تجدید می گردد.

۱۱-۵ روش تأیید دوره

تأیید دوره بر اساس مفاد مندرج در دستورالعمل صدور مجوز و نظارت بر اجرای دوره‌ها در مراکز آموزش دریانوردی صورت می پذیرد.

۶-سوابق

کلیه سوابقی که نشان دهنده رعایت موارد مندرج در این دستورالعمل باشد.

۷-مراجع

۷-۱ کنوانسیون اصلاح شده STCW و آیین نامه مربوطه

۷-۲ مدل کورس سازمان بین المللی دریانوردی (IMO) شماره ۷/۰۳

۷-۳ دستورالعمل صدور ، تمدید و تجدید گواهینامه های شایستگی و مهارت دریانوردان

۷-٤ دستورالعمل صدور مجوز و نظارت بر اجرای دوره ها در مراکز آموزشی دریانوردی

۸- ضمائم

ندارد.

PMO

The Code of Practice for Conducting Second Officer on ships of Gross Tonnage (GT≥500) engaged on Unlimited Voyages, Training Course and Competency Assessments

P6-W23

Revision No.	Date of revision	Comment on revision	Draft provider	approving amendments authority	endorsing amendments authority
03	28/07/2014	STCW Convention, as amended	Head of Seafarers' Standards' Directorate	Director General of Seafarers' Affairs	PMO's Deputy for Maritime Affairs

Introduction

Ports and Maritime organization (P.M.O) of the Islamic republic of Iran in performing its duty and in exercising its prerogative resulting from article 192 of the Islamic republic of Iran maritime code, 1964 and paragraph 10 of article 3 of P.M.O manifesto, 1970 enabling it to issue any document, certificate or license for ships, masters, officers and other ship personnel and also in accordance with the provisions of the international convention on standards of training, certification and watch keeping for seafarers (STCW), 1978, as amended adopted by the Islamic consultative assembly in 1996 and taking into account regulations II/1 of the mentioned Convention develops this " The Code of Practice for Conducting Second Officer on ships of Gross Tonnage (GT≥500) engaged on Unlimited Voyages, Training Course and Competency Assessments" which is applicable after endorsement by the board of executives of Ports & Maritime Organization.

NOTE: The title of Ports and Shipping Organization changed to Ports and Maritime Organization dated 29.04.2008 through parliamentary act and approved by Islamic council assembly.

1-Objective

The objective of this code of practice is to specify the minimum requirements for conducting Second Officer on Ships of Gross Tonnage GT≥500 engaged on Unlimited Voyages training course and competency assessments.

2-Scope of application

This code of practice is applicable to all approved training centers that conduct Second Officer on Ships of Gross Tonnage GT≥500 engaged on Unlimited Voyages training course.

3-Definition

3-1 Approved Seagoing Service / Documentary Evidence

Means approved sea going service required to be presented for participating in a training course, maritime examination and issuance of certificate. These documentary evidence should be inserted in CDC and authenticated by company or ship owner or ship owner's associations and in addition be presentable in a form of computer sheet, official letter or other forms as defined in the annex to this code of practice.

3-2 Certificate of Competency (COC)

Means a certificate issued and endorsed for masters, officers and GMDSS radio operators in accordance with the provisions of chapters II, III, IV or VII of the STCW Convention and entitling the lawful holder thereof to serve in the capacity and perform the functions involved at the level of responsibility specified therein.

3-3 Certificate of Proficiency (COP)

Means a certificate, other than a certificate of competency issued to a seafarer, stating that the relevant requirements of training, competencies or seagoing service in the STCW Convention have been met.

3-4 Central Monitoring Office

Central monitoring office which is responsible for approving and monitoring training courses is the Seafarer's standard directorate of the PMO.

3-5 Chemical Tanker

Means a ship constructed or adapted and used for the carriage in bulk of any liquid product listed in chapter 17 of the International Bulk Chemical Code.

3-6 Chief Mate

Means the officer next in rank to the master and upon whom the command of the ship will fall in the event of the incapacity of the master.

3-7 Code of Practice

Means all national rules, regulations and requirements specified in this document which have been drafted by the PMO's General Directorate of Maritime affairs and endorsed by the PMO's board of executive

3-8 Company

Means the owner of the ship or any other organization or person such as the manager, or the bareboat charterer, who has assumed the responsibility for operation of the ship from the ship owner and who, on assuming such responsibility, has agreed to take over all the duties and responsibilities imposed on the company by these Codes of practices.

3-9 Course Completion Certificate or Documentary Evidence

Means a certificate issued through the training center, after successfully completion of training program by the applicants

3-10 Deck Officer

Means an officer qualified in accordance with the provisions of chapter II of the STCW Convention.

3-11 Function

Means a group of tasks, duties and responsibilities, as specified in the STCW Code, necessary for ship operation, safety of life at sea or protection of the marine environment.

3-12 GMDSS General Operator Certificate (GMDSS GOC)

Means a person who is qualified in accordance with the provisions of regulation IV/2 of the STCW Convention and section B-IV/2, paragraphs 29 to 36 of the STCW Code

3-13 GMDSS Radio Operator

Means a person who is qualified in accordance with the provisions of chapter IV of the STCW Convention.

3-14 GMDSS Restricted Operator *Certificate* (GMDSS ROC)

Means a person who is qualified in accordance with the provisions of regulation IV/2 of the STCW Convention and section B-IV/2, paragraphs 37 to 44 of the STCW Code

3-15 Gross Tonnage

Means the volume of all enclosed spaces of a vessel calculated in accordance with relevant regulations.

3-16 ISPS Code

Means the International Ship and Port Facility Security (ISPS) Code adopted on 12 December 2002, by resolution 2 of the Conference of Contracting Governments to the International Convention for the Safety of Life at Sea (SOLAS), 1974, as may be amended by the Organization.

3-17 Liquefied Gas Tanker

Means a ship constructed or adapted and used for the carriage in bulk of any liquefied gas or other product listed in chapter 19 of the International Gas Carrier Code.

3-18 Master

Means the person having command of a ship

3-19 Medical Fitness Certificate

Means a certificate issued by the PMO's recognized medical practitioner to the candidates who found to be medically fit.

3-20 Merchant Ship

Means any ship (other than servicing vessel, mobile offshore platform, fishing and naval ships) used for carriage of cargoes, passenger and/or provisions

3-21 Near-Coastal Voyages (NCV)

Means voyages between ports situated in the Persian Gulf and Gulf of Oman (positions from LAT 22 0 32' N 0590 48' E to 25 0 04' N 061 0 22' E) or between Caspian Sea ports.

3-22 Officer

Means a member of the crew, other than the master, designated as such by national law or regulations or, in the absence of such designation, by collective agreement or custom.

3-23 Oil Tanker

Means a ship constructed and used for the carriage of petroleum and petroleum products in bulk.

3-24 On Board Training Record Book

Means on board training record book approved by Port and Maritime Organization in which practical and theoretical training of seafarer shall be fulfilled according to its content.

3-25 Operational Level

Means the level of responsibility associated with serving as second officer (officer in charge of navigational watch), third engineer officer (officer in charge of engineering watch) and electro technical officer or as designated duty engineer for periodically unmanned machinery spaces or radio operator and GMDSS, on board a seagoing ship, and also maintaining direct control over the performance of all functions within the designated area of responsibility in accordance with proper procedures and under the direction of an individual serving in the management level for that area of responsibility.

3-26 Passenger Ship

Means a ship as defined in the International Convention for the Safety of Life at Sea, 1974, as amended.

3-27 PMO

Means Ports & Maritime Organization (PMO) of the Islamic Republic of Iran

3-28 Regulations

Means regulations contained in the annex to the STCW Convention

3-29 Sea Area A1

Means an area within the radiotelephone coverage of at least one VHF coast station in which continuous DSC alerting is available, as may be defined by a Contracting Government;

3-30 Sea Area A2

Means an area, excluding sea area A1, within the radiotelephone coverage of at least one MF coast station in which continuous DSC alerting is available, as may be defined by a contracting government;

3-31 Sea Area A3

Means an area, excluding sea areas A1 and A2, within the coverage of an INMARSAT geostationary satellite in which continuous alerting is available;

3-32 Sea Area A4

Means an area outside sea areas A1, A2 and A3;

3-33 Seagoing service

Means service on board a ship relevant to the issue or revalidation of a certificate or other qualification.

3-34 Second Officer

Means officer in charge of a navigational watch qualified in accordance with the relevant provisions of the Code of practice for issuing, revalidation, renewal certificates of competency and proficiency for seafarers.

3-35 Security duties

Include all security tasks and duties on board ships as defined by chapter XI-2 of the International Convention for the Safety of Life at Sea (SOLAS 1974, as amended) and the International Ship and Port Facility Security (ISPS) Code

3-36 Ship Security Officer

Means the person on board the ship, accountable to the master, designated by the Company as responsible for the security of the ship, including implementation and maintenance of the ship security plan and for liaison with the company security officer and port facility security officers.

3-37 STCW Convention

Means international convention on standards of training, certification and watch keeping for Seafarers, 1978, as amended.

3-38 STCW Code

Means the seafarers' training, certification and watch keeping (STCW) code as adopted by the 1995 conference resolution 2,as it may be amended by the international maritime organization.

3-39 Training center

Means maritime university/center/ directorate/ department/company and/or any organization conducting maritime training course approved by PMO

3-40 Unlimited Voyages

Means voyages not limited to the near coastal voyages.

4- Responsibilities:

4-1 Central monitoring office is responsible for revising this code of practice.

4-2 General Director of Seafarers' Affairs is responsible for approving amendments to this code of practice.

4-3 Deputy of maritime affairs is responsible to endorse amendments to this code of practice on behalf of PMO's board of executive.

4-4 Training centers are to conduct training course in accordance with this Code of practice.

4-5 Central monitoring office is responsible for supervising the implementation of this code of practice in training centers.

4-6 Seafarers' Examination and Documents Directorate (in Tehran or Ports) is responsible to conduct the competency assessments mentioned in paragraph 5-6-1 of this code.

5-Procedure

5-1 course objective:

The objective of this Training Course is to prepare trainees to achieve competencies set out in the column 1 of table A-II/1 of the STCW Code.

5-2 course duration:

5-2-1 A minimum of 1290 hours theoretical, 104 hours practical and 274 Hours exercises for each trainee (total of 1668 hours).

5-2-2 Maximum daily contact hours for each trainee is 8 hours.

5-3 number of trainees:

5-3-1 the maximum number of trainees in each course is 20.

5-3-2 the number of trainees may be increased to 30 when the relevant facilities, teaching aids and class-room space are increased as per criteria set out in the code of practice for approving and monitoring training courses and is approved by the central monitoring office.

5-4 Course entry requirement:

The course trainees should, at least;

5-4-1 be 18 years old

5-4-2 hold valid medical fitness certificate issued by a medical practitioner recognized by the PMO; and;

5-4-3 hold general education diploma in mathematics, physics, or nautical

5-5 Expected Knowledge, Understanding and Proficiency:

5-5-1 Knowledge of planning and conducting of a passage and for determining position;

5-5-2 Proficiency in maintaining a safe navigational watch;

5-5-3 Proficiency in use of AIS to maintain safety of navigation;

5-5-4 Knowledge of responding to emergencies;

5-5-5 Knowledge of responding to a distress signal at sea;

5-5-6 Ability to use IMO standard marine communication phrases;

5-5-7 Proficiency in transmission and receipt of information by visual signaling;

5-5-8 Proficiency in maneuvering the ship;

5-5-9 Knowledge of monitoring the loading, stowage, securing and unloading of cargoes and their care during the voyage;

5-5-10 Knowledge of inspecting and reporting defects and damage to cargo spaces, hatch covers and ballast tanks;

5-5-11 Knowledge of compliance with pollution-prevention requirements;

5-5-12 Proficiency in maintaining the sea-worthiness of the ship;

5-5-13 Proficiency in monitoring compliance with legislative requirements;

5-5-14 Proficiency in leadership and team working skills;

5-5-15 Proficiency in contribution to safety of personnel and ship;

5-6 Course syllabi and competency assessment:

5-6-1 Competency assessment details;

No.	Title	Number of Question	Time (hours)	Type	Pass mark	Subjects	Remarks (if any)
1	Celestial navigation	5	Maximum 2.5 hours	written	60%	1.1.1.2-1.1.1.4-1.1.1.6-1.1.1.7-1.1.1.8-1.1.1.9-1.1.1.10-1.1.1.11-1.1.1.12	
2	Coastal Navigation	5	Maximum 2.5 hours	written	70%	1.1.2.5-1.1.2.6-1.1.2.7-1.1.2.8-1.1.2.9-1.1.2.10-1.1.2.11	
3	Electronic Navigational Aids	5	Maximum 2.5 hours	written	55%	1.1.3-1.1.4-1.1.5-1.1.6	
4	Cargo Handling & Stowage	5	Maximum 3.0 hours	written	55%	2.1.1-2.2	
S	Ship Stability & Construction	6	Maximum 3.0 hours	written	55%	3.2.1-3.2.2	Ship Stability and Construction each part 3 question and 50 marks
6	Oral	-	-	Oral/practical /simulator	To the discretion of assessor	1.1.1.5-1.1.2.12-1.1.2.13-1.1.2.14-1.1.2.15-1.1.2.18-1.2.1-1.2.2-1.3.1-1.4.1-1.5.1-1.6.1-1.7.1-3.1.1-3.3.1-3.4.1-3.4.2-3.4.3-3.4.4-3.4.5	At the time of oral examination seaman book and record book must be presented

In Oral/practical/simulator assessment question from written assessments may also be asked.

5-6-2-Course minimum syllabi

Function: 1. Navigation at the operational level

Competence: 1.1 Plan and conduct a passage and determine position

1.1.1. Celestial Navigation

- **Ability to use celestial bodies to determine the ship's position**

.1 Solar System 12hrs (T) + 0hrs (P) + 0hrs (E).

Knowledge of;

- Composition and dimension of the solar system.
- Earth's elliptical orbit, and approximate Perihelion and Aphelion distances and dates.

Eccentricity of the earth's orbit.

Inclination of the earth's axis to the plane of the orbit and the stability of the axis (ignoring precession) and its effect on season's changes.

- Concept of the earth's axial rotation giving day and night.
- Varying length of daylight and darkness throughout the year.
- Daylight and darkness conditions in various latitudes at the Solstices and Equinoxes.
- Significance of the tropics of cancer and Capricorn and of the Arctic and Antarctic circles.
- Precession of the Equinoxes and its effect on the Pole Star.
- Relative orbits of inferior and superior planets and its effect on the rate of change of the planet's GHA.

Understanding of;

- Calendar year and the reasons for leap years and compensation over the centuries.
- Moon's orbit around the earth.
- Motion of the moon in the celestial sphere and the consequent daily retardation of the moon's meridian passage.
- How the moon exhibits phases.
- Occurrence of lunar solar eclipses.

Familiarity with;

- Planets useful for navigation.
- Dates of the Solstices and Equinoxes.
- Major stellar constellations and the classification of stars by 'stellar magnitude'.
- Kepler's laws and shows its effect on the length of the seasons.
- 'Tropical year'.
- Latitude, Longitude, LHA, GHA, SHA, LMT, GMT.

.2 The Equinoctial, Daily Motion and Horizontal System of Co-ordinates

8hrs (T) + 2hrs (P) + 2hrs (E).

Knowledge of;

- Ecliptic and the first point of Aries as a fixed reference point in space.
- Equinoctial as a fixed reference plane and the direction of the first point of Aries as a reference direction (ignoring precession).
- Importance of the first point of Aries.
- Equinoctial and horizon system of co-ordinates.
- Earth's axial rotation causing change in the hour angle of bodies.
- Relationship between 'Greenwich Hour Angle (GHA), Local Hour Angle (LHA) and longitude.
- Rate of change GHA of the sun and Aries.

Understanding of;

- Relationship between azimuth and true bearing (quadrantal bearings and 360 notation bearing).
- Parts of the PZX triangle.
- Plane of the rational horizon and of the observer's celestial meridian, using the equidistant projection to show the position and motion of heavenly bodies.

Familiarity with;

- 'Rational horizon', 'zenith' and 'nadir'.
- 'Vertical circle' and 'prime vertical circle'.
- 'Elevated pole' and 'depressed pole'.
- Observer's upper and lower celestial meridian.
- 'True altitude', 'azimuth' and 'true zenith distance'.
- Apparent daily path of all heavenly bodies.

- Rising and setting points and amplitude.
- Term circumpolar and the conditions necessary for a body to be circumpolar.
- Conditions necessary for a body to cross the prime vertical.

Ability to;

- Prove that the altitude of the elevated pole is equal to the observer's latitude.

.3 Celestial Sphere And Equinoctial System of Co-Ordinates 4hrs (T) + 0hrs (P) + 4hrs (E).

Knowledge of;

- Celestial sphere and associated definitions.
- Apparent motion of the sun.
- Celestial pole.
- Celestial meridian.
- Mean sun.
- True sun.
- 'Equinoctial' and the 'obliquity of the ecliptic'.
- Equinoctial system of coordinates and defines sidereal hour angle, declination and polar distance.

Understanding of;

- Rate of change of hour angle of the Aries, sun, planets and moon.
- 'V' correction and the necessity for it.

Familiarity with;

- Information given in star diagrams of nautical almanac.
- Apparent annual motion of the sun and the concept of the ecliptic.

Ability to;

- Draw figures (approximate and to scale) on the plane of the rational horizon and of the observer's celestial meridian, using the equidistant projection to illustrate navigational problems and principles.
- Determine the geographical position of a heavenly body for any given GMT.

.4 Nautical Almanac 2hrs (T) + 0hrs (P) + 6hrs (E).

Familiarity with;

- Information contained in general in the nautical almanac and in the daily pages.

Ability to;

- Use the tables of correction and incremental corrections in the nautical almanac.
- Tabulate of SHA, GHA and declination ('d' and 'v' corrections), First point of Aries.
- Find the LHA of a body, given the date, GMT and longitude of the observer.
- Find the LHA of Aries, given the date, GMT and longitude of the observer.
- Find the declination of all heavenly bodies.
- Extract information from the star diagrams in the nautical almanac.
- Use the information in the nautical almanac to obtain the LMT of meridian passage of a body to the nearest minute and interpolates for the observer's longitude when necessary.

.5 The Marine Sextant 2hrs (T) + 2hrs (P) + 0hrs (E).

Knowledge of;

- Basic principle and parts of the marine sextant.

Understanding of;

- Errors of the sextant and their causes and methods of adjustment of the sextant errors.
- 'Index error' and demonstrating the different methods of obtaining it.
- Care and maintenance of the sextant.

Ability to;

- How to retrieve and return a Sextant into the storage box.
- How to read a Sextant.
- Describe the different parts of the sextant.
- Demonstrate the correct handling of the sextant.
- Demonstrate the use of the sextant to observe altitudes, and vertical and horizontal sextant angles.

.6 Sextant and Altitude Correction 8hrs (T) + 0hrs (P) + 6hrs (E) .

Understanding of;

- 'Sextant altitude'.
- Purpose of altitude correction.
- 'Visible', 'sensible' and 'rational' horizons.
- 'Dip', 'refraction', 'semi-diameter', 'augmentation of semi-diameter', 'horizontal parallax' and 'parallax in altitude'.

Ability to;

- Apply index error.
- Apply the corrections.
- Illustrate the effect of terrestrial refraction on the dip and distance of the sea horizon.
- Correct the altitude using the tables in the nautical almanac, including reference to critical tables, interpolation tables and low altitude correction tables.
- Obtain the true zenith distance from the true altitude of the body.
- Correct the sextant altitude of all heavenly bodies using nautical tables.

.7 Rising And Setting Of Heavenly Bodies And Amplitude 8hrs (T) + 0hrs (P) + 8hrs (E).

Ability to;

- Extract information from the tabulation of the rising and setting of the sun in the nautical almanac.
- Calculate the LMT and GMT of moonrise and moonset.
- Calculate the commencement and end of nautical and civil twilight.
- Calculate the duration of twilight.
- Calculate duration of total night or periods of twilight throughout the night for various latitudes.
- Find latitudes where sun does not set for a particular declination.
- Determine the observed altitude of the sun when the true altitude is zero.
- Explain the effect of latitude on the accuracy of amplitude observations.

.8 Time And Equation of Time 4hrs (T) + 0hrs (P) +4hrs (E).

Knowledge of;

- Apparent solar day and the relationship between LHA (Sun) and Lat.

- Sidereal day and that it is a fixed time interval.

Understanding of;

- Reasons for the sun's irregular rate of change of SHA and hence the necessity to adopt the astronomical mean sun for timekeeping.
- Equation of time and its components.
- Sidereal time, mean time, apparent time, UTC, GMT, and LMT.
- Relationship between time and longitude.
- Zone times and standard times.
- How to alter the ship's time during a passage with increasing or decreasing longitude.
- Use of time signals.

Ability to;

- Calculate the LAT and LMT of the theoretical and visible rising and setting of the sun.
- Calculate the error of a chronometer.
- Determine the equation of time from the nautical almanac and its sign of application.

.9 Latitude by Meridian Altitude

6hrs (T) + 0hrs (P) + 6hrs (E).

Knowledge of;

- Applying zenith distance of body when on the observer's meridian to obtain latitude.
- Relationship between the altitude of the elevated pole and the latitude of the observer.
- What is meant by a circumpolar star, and the terms upper and lower transit.
- Polar distance, applying polar distance to true altitude of a body to obtain latitude.

Ability to;

- Find Position line using ex-meridian by calculation and table.
- Use the LHA of a body when on the observer's meridian at lower transit to calculate the time of meridian passage.
- Use the information in the nautical almanac to obtain the LMT of the meridian passage of the body.
- Apply the true zenith distance of a body when it is on the observer's meridian to the declination of the body, to obtain the observer's latitude.
- Apply the polar distance to the true altitude of a body at a lower transit to find the altitude of the elevated pole and the latitude.
- Calculate the direction of the position line and the latitude of the observer by meridian altitude.

.10 Pole Star Observation

2hrs (T) + 0hrs (P) + 2hrs (E).

Familiarity with;

- Motion of the stars about Polaris.
- Relationship between the altitude of Polaris and the observer's latitude deduce from the above objective that the true altitude of Polaris can be used to find the latitude of the observer.

Ability to;

- Identify Polaris.
- Identify some major constellations.
- Obtain the corrections, -1°, $+a_0$, $+a_1$, $+a_2$, from pole star tables in the nautical almanac and applies them to the altitude of Polaris to find the latitude of the observer.

- Find the true azimuth of Polaris from the tables and the direction of the position line.

.11 Position Fixing 10hrs (T) + 0hrs (P) + 12hrs (E).

Understanding of;

- Assumptions made when plotting celestial position lines and the circumstances in which they may become significant.
- Co-latitude, polar distance and zenith distance and use them as the sides of the PZX triangle.

Ability to;

- Combine the equinoctial and horizon system of co-ordinates to determine the centre and radius of a position circle and its direction in the vicinity of a selected position.
- Apply the principles of a method of enabling the navigator to draw a small part of the position circle in his vicinity to a practical problem.
- Determine the direction of a position line through an observer and a position through which it passes.
- Solve the PZX triangle to find the longitude in which the position line cuts the observer's DR latitude (longitude by chronometer method).
  - This longitude is not the longitude of the observer's position and that it would be so only if the observer is in the DR latitude.
  - This method is not suitable for bodies close to the meridian.
- Combine the position line obtained during a forenoon observation of the sun with a meridian altitude observation and computes the position at meridian passage and thence the noon position.
- Solve the PZX triangle to find the calculated zenith distance of the body when it is out of the meridian.
- Apply calculated zenith distance to the true zenith distance of the body to find the intercept and the intercept terminal point through which to draw the position line (Marcq. St. Hilaire method).
  - This method can be used for any heavenly body at any time.
- Apply a 'reduction' to the zenith distance observed of a body 'near' the meridian and calculates the latitude in which the position line cuts the observer's DR longitude (ex-meridian method).
  - This method is available only for a limited period before and after meridian passage, the period depending on the observer's latitude and the declination of the body.
- Solve the PZX triangle to find the longitude in which the position line cuts the observer's DR Latitude (longitude by chronometer method).
- Determine the true azimuth of the body from tables and hence determines the direction of the position line.
- Find the position of the observer at the time of the final observation, given two or more position lines with the course and distance run between the observations.

.12 Azimuth and Errors of Compasses 4hrs (T) + 0hrs (P) + 6hrs (E).

Ability to;

- Obtain the error of the magnetic compass or gyro compass by comparing the compass bearing of the body with the true azimuth of the body obtained at the time of observation.
- Obtain the azimuth of the body from nautical tables, using GMT of observation, information from the nautical almanac, LHA of the body and the observer's DR position.
- Obtain by tables and by calculation, using the observer's DR position and information from the nautical almanac, the true bearing of a heavenly body on rising or setting, (amplitude problem).
- Determine the error of the compasses by both calculating and nautical tables of a heavenly body.

1.1.2. Terrestrial and coastal navigation

- **Ability to determine the ship's position by use of:**
  .1 landmarks
  .2 aids to navigation, including lighthouses, beacons and buoys
  .3 dead reckoning, taking into account winds, tides, currents and estimated speed
- **Thorough knowledge of and ability to use nautical charts, and publications, such as sailing directions, tide tables, notices to mariners, radio navigational warnings and ships' Routeing information**

.1 Definitions – Earth 8hrs (T) + 0hrs (P) + 0hrs (E).

Understanding of;

- 'Great circle', small circle', 'spherical angle', 'spherical triangle', poles of a great circle'.
- Earth's poles, 'equator' and 'meridians'.
- 'Latitude' and 'parallels of latitude', 'prime meridian' and 'longitude'.
- Position on the earth in terms of latitude and longitude.
- 'Difference of latitude' and 'difference of longitude'.
- Earth as an ellipsoid. Polar and equatorial radius of the earth, 'compression', and its value.
- Variation in the length of the sea mile, nautical mile, cable and knot.

.2 Charts 8hrs (T) + 0hrs (P) + 6hrs (E).

Familiarity with;

- Chart projections, Mercator chart, Gnomonic chart, properties of marine navigational chart, natural scale of chart.
- Production of nautical charts, information on nautical charts, chart numbering system, chart correction system, raster and vector charts.
- Requirement of a navigational chart appropriate for marine navigation.
- Main information shown on a navigational chart.
- Different types of charts and their use.
- Mercator and gnomonic projection.
- 'Scale' on a Mercator chart: scale of longitude, scale of latitude and natural scale.
- Fundamental practices to be followed when using and working with navigational charts – hints on using charts.

Ability to;

- Obtain the magnetic variation for the observer's position, using Isogonal lines or other information on the chart.
- Apply variation to the error of the magnetic compass to find the deviation for the direction of the ship's head.
- Calculate compass error and gyro error from transit bearings and bearings to distant fixed objects.

.3 Datums 2hrs (T) + 0hrs (P) + 0hrs (E).

Familiarity with;

- Rotation of the earth about its axis.
- Directions on the earth's surface.
- Direction of the ship's head on a gyro compass.
- Direction of the ship's head on a magnetic compass (compass course).
- Difference between bearing and course.

- various notations of indicating direction :
  - 'Three-figure', 'quadrantal' and 'relative', and the conversion from one to another.

.4 Distance 4hrs (T) + 0hrs (P) + 0hrs (E).

Understanding of;

- Polar and equatorial circumferences of the earth, rotation of earth, direction on earth surface.
- That the latitude scale along the nearest latitude/mean latitude is used as the scale of distance on a Mercator chart.

Ability to;

- Measure the distance between two positions on a Mercator chart.

.5 Position Lines and Position On Charts 10hrs (T) + 0hrs (P) + 8hrs (E).

Understanding of;

- The methods used to obtain simultaneous cross bearings with least error.
- Different methods of obtaining position lines.
- Fix, 'dead reckoning position (DR)' and 'estimated position' (E.P) and fixed position.
- Different methods of obtaining a fix.
- 'Cocked hat' and its likely causes.
- set, rate, drift, leeway, leeway angle, track, track angle, track made good, heading (ship's head), course to steer, water track, ground track, speed made good, distance made good, steaming speed.

Ability to;

- Plot 'fixes' using position lines obtained by different methods – visual bearing, radar range of a charted object, transits.
- Plot a DR position on the chart given the start position, course and distance.
- Define positions on charts using latitude and longitude, and bearing and distance from a charted object.
- Measure courses and distances between positions on a chart.
- Measure bearings on charts.
- Lay off true bearings and courses on charts.
- Illustrate and describes the standard symbols and terminology to be used on charts for chart work.
- Define and Plot different position line.
- Obtain radar distance off a charted object and plots the position circle on a chart.

.6 Sailings (Plane and Mercator sailing) 14hrs (T) + 28hrs (P) + 30hrs (E).

Knowledge of;

- 'Departure' and the relationship to difference of longitude.
- That the true departure between two places lies along the 'middle latitude' and that it is normally difficult to obtain it.
- Meaning of and derives 'mean latitude'.
- Why the plane sailing formula cannot be used in case of large distances.
- 'meridional parts' and 'difference of meridional parts'.
- Why meridional parts in the tables are given for a spheroid.
- The relationship between minutes of longitude, meridional parts and the secant of the latitude.
- Identify the Mercator chart as a mathematical projection and the principle of its construction.

- Why the scale of longitude is the only fixed scale on a Mercator chart.
- Why the natural scale is true only in one latitude.

Understanding of;

- 'True course' and 'rhumb line'.
- The principle of Mercator sailing formula.
- The principle and use of great circle sailing including composite and limited latitude great circle.
- That only one great circle can be drawn between two positions.
- The characteristics of a great circle track: continuous change of heading, inclination, course at equator.
- The appearance of great circle track on Mercator and gnomonic charts and use of gnomonic charts for plotting the great circle between two points.
- The factors on which the difference between a great circle track and a rhumb line track depends.
- The 'vertex' of a great circle.
- The properties of a vertex.
- The vertex can lie on the track or outside the track between two places and describes the method of ascertaining this.
- Why it may not be possible to follow a great circle track in high latitudes.
- The dangers associated with high latitudes.
- The principle of the composite great circle track.
- How a great circle track can be transferred from a gnomonic chart to a Mercator chart.
- How great circle sailing is actually done in practice.

Familiarity with;

- The relationship between departure and difference of longitude in cases involving a change of latitude, by using mean latitude.
- The layout of a traverse table and its use.
- 'Natural scale' and, given the scale of longitude, calculates it.
- Mercator sailing formula and its use in the calculation of rhumb line courses for any distance.
- That the Mercator formula should be used in preference to the plane sailing method when the difference of latitude is large, the mean latitude is high or when the distances involved is greater than 600 miles.

Ability to;

- Derive the parallel sailing formula.
- Uses the parallel sailing formula :
  - Departure = difference of longitude x cosine of latitude
- Calculate the distance between two places on the same parallel of latitude.
- Calculate the difference of longitude for a given distance run along a parallel of latitude.
- Derive the final position after sailing along a parallel of latitude.
- Calculate the correct departure to use in a plane sailing problem.
- Derive the plane sailing formula.
- Use plane sailing formula in practical examples.
- Calculate the rhumb line course and distance between two positions, using the plane sailing formula.
- Calculate the final position after sailing along a rhumb line for a given distance, using the plane sailing formula.
- Derive the information required in a parallel or plane sailing problem using a traverse table / calculator.
- Use the traverse tables to solve parallel and plane sailing problems.

- use of the parallel sailing formula, plane sailing formula, traverse tables, and the Mercator sailing formula to calculate the:
  - Distance between two places on the same parallel of latitude
  - The final position after sailing along a parallel of latitude
  - Rhumb line course and distance between two positions
  - Final position after sailing along a rhumb line for a given distance
- Use of the traverse tables to solve parallel and plane sailing problems.
- Use 'days' work' method.
- Calculate the initial course and distance along a great circle track between two positions.
- Calculate the difference between the great circle track and a rhumb line track between two positions.
- Calculate the position of the vertex of a great circle track.
- Calculate the initial course and distance along a composite great circle track between two positions given the limiting latitude.
- Calculate a DR position or an estimate position by using the plane sailing formula, given compass course and compass error, distance by log, estimated speed, tidal and current information and leeway.
- Calculate a DR position or an estimate position by 'days' work' method, given compass courses and compass error, distance by log, estimated speed, tidal and current information and leeway.
- Calculate the dimensions of a Mercator chart given the scale of longitude.
- Calculate the natural scale of a Mercator chart for latitude, given the scale of longitude.
- Construct a Mercator chart placing latitudes at appropriate distances apart, given the scale of longitude.
- Calculate the rhumb line course and distance between two positions using the Mercator formula.
- Circulate the final position given the initial position, course and distance steamed using the Mercator formula.

.7 Chart work Exercises **16hrs (T) + 0hrs (P) + 60hrs (E).**

Knowledge of;

- Principles of passage planning, including appraisal, planning, execution and monitoring.
- The term 'running fix' and uses the method to plot a position.
- How to find the actual set, drift and rate of current from two fixes;
  - When no leeway is being experienced
  - When leeway is being experienced
- How to find the estimated position when a current is experienced with leeway and without leeway.
- How to find the course and distance made good in the above objective.
- How to counteract the effect of current (or tidal stream) and leeway, given the speed.
- The principle of the HAS fix.
- How horizontal sextant angles are written down.
- How to observe horizontal sextant angles.
- The rules to follow when choosing objects while fixing position by horizontal sextant angles.
- 'Circular error' and states when this error can occur.
- The principle of the VSA fix and the assumptions made.
- The 'three bearing problem' as a method to find the vessel's ground track but not its position.
- The uses of the above method, its accuracy and assumptions made.
- 'Leading lines and leading marks', and 'clearing lines and clearing bearings' and states their uses.
- That a light's luminous range can be greater than, or smaller than its geographical range.
- how to plot following fixes:
  - Running fix with and without current and leeway
  - Running fix from a known position and thence to find set and drift

- Doubling the angle on the bow and four point fix
- Special angle fixes
- HSA fix and thence to find compass error
- VSA fix
- Fix using astronomical position lines
- Raising and dipping fix

Understanding of;

- 'True north', magnetic north', 'compass north' and 'gyro north'.

Ability to;

- Ability in chart work; deviation from table and variation from charts.
- Converting true course to compass course and vice versa, compass error by transit bearing.
- Applying compass error to the ship's head and compass bearings to convert to true.
- Laying true bearings of charted objects in chart.
- Measuring distance between two positions, position circle by radar distance of a charted object.
- Plot Position by cross bearings, position by bearing and distance off.
- Plotting "DR" and "EP" on charts, position by bearing, horizontal angle.
- Vertical angle and transit line ranges, transferring position lines, running fix.
- Course, speed, and distance made good with tidal stream or current, course to steer allowing for tidal stream or current, set, rate and drift, set and rate of tidal stream or current from charts, set and rate of tidal stream or current from DR and fixed positions.
- Lee way due to wind, double angle on the bow, cocked hat.
- Lay off true course between two positions.
- Find the true course and distance between two positions.
- Calculate the speed to order between two positions given the time available.
- Calculate the time required to steam between two positions along a track given the speed of the ship.
- Apply variation and deviation and converts true course to compass course and vice versa.
- Obtain compass error using transit bearing.
- Lay off true bearings and measures true bearings on charts.
- Plot position lines obtained by different methods – visual bearing, transit, radar range of a charted object, transits, horizontal sextant angle, vertical sextant angle.
- Plot a 'fix' using at least three position lines obtained from the above objective.
- Plot a DR given starting position and course a speed through the water.
- Plot an EP, given current data in addition to the information given in the above objective.
- Calculate the actual set and rate of tidal stream or current from DR and 'fix' position.
- Plot an estimated position on the chart.
- Find the course and distance made good with a tidal stream.
- Find the course to steer allowing for tidal stream.
- Find the set and rate of current from charts.
- Find position by running fix.
- Find position by running fix, in a tidal stream or current.
- Find variation from the charts.
- Apply variation and deviation and converts true course to compass course and vice versa.
- Obtain compass error and gyro error using transit bearings.
- Use of leading lines and clearing lines to follow a predetermined track.
- Find deviation and variation from tables and charts.
- Calculate true course from compass course.
- Calculate compass course from true course.
- Apply gyro error to convert gyro course into true course and vice versa.

- Plot an estimated position on the chart, given the last known position with estimation for leeway, set and drift, and by extrapolation from earlier fixes.
- Find the course, distance made good and ground speed with a tidal stream.
- Find the course, distance made good, and ground speed with a tidal stream and leeway.
- Calculate the actual set and rate of tidal stream or current from DR and 'fix' positions.
- Given the speed, finds the course to steer to counteract tidal stream with and without leeway.
- Find the course to steer and speed in order to reach a certain position within a certain time allowing for tidal stream with and without leeway.
- Find the set and rate of tidal streams and current from charts.
- Find variation from the charts.
- Apply variation and deviation and converts true course to compass course and vice versa.
- Find the beam bearing and beam distance off.
- Find the above information when steering compass courses.
- Find the course to steer and speed to order to reach a certain position within a certain time allowing for tidal stream with and without leeway.
- Find the time and the distance off when objects will appear on the beam.
- Plot a running fix without current or leeway.
- Plot a running fix with current and /or leeway.
- Plot a running fix from a known position.
- Plot the following types of fixes :
  - Doubling the angle on the bow
  - Four point bearing fix
  - Fixes using special angles
- Find the vertical angle to set on the sextant corresponding to a required distance off.
- Find the distance off using vertical sextant angles.
- Plot a position line using the vertical sextant angle.
- Use the vertical sextant angle as a danger angle.
- Find the vessel's ground track using the above method.
- Find the set and rate by combining additional information with three bearings of the same object.
- Find the course to steer to bring up a point at a pre-calculated angle on the bow.
- Find the course to steer to bring a point abeam using the ship's radius of action.
- Calculate the rising and dipping distances;
  - 'Geographical range', 'luminous range' and 'nominal range' and the factors on which they depend.
  - At which of the above ranges would a light rise.
- Find the sighting distance of a light in reduced visibility.
- Find the nominal range, geographical range and luminous range of navigational lights.
- Estimate meteorological visibility using the luminous range diagram.
- Plot astronomical position lines obtained by the following methods:
  - Intercept method
  - Longitude by chronometer method
  - Meridian latitude

.8 Information from Charts, List Of Lights and Other Publications

34hrs (T) + 4hrs (P) + 8hrs (E).

Knowledge of;

- Chart symbols and abbreviations, identifications, characteristics and range of lights, computing visibility of lights, depth soundings, depth contours, and nature of bottom, coast line contours, bottom topography, and tidal information on charts.

- The general principles regarding the use of navigational lights found on the coast: light arcs on charts, sector lights, colored lights, number and details of lights on charts.
- The statutory requirement for the carriage of charts and navigational publications on board a merchant ship.
- The information contained in navigational publications carried on board explains their use – admiralty chart catalogue, sailing directions, list of lights, admiralty list of radio signals, tide tables, ocean passages of the world, mariners handbook , notices to Mainers, radio navigational warnings and ship routing information.
- The system of supply of charts and navigational publications.
- The scheme of chart folios and how charts are numbered.
- The use of the admiralty chart catalogue to find the charts and publications required for a voyage.
- How navigational warnings are transmitted: navtex, international safety net, VHF.
- How charts and navigational publications are kept up to date on board, with particular reference to the use of notices to mariners, navigational warnings and the chart correction log in this regard.
- The requirement of a chart appropriate for marine navigation.
- The properties of the Mercator chart and the degree to which it meets navigational requirements.
- Detail the worldwide navigational warning services provided to mariner – navareas, coastal warnings and local warnings.
- The limitations of the Mercator chart.
- How to distinguish a well surveyed chart.
- The various types of chart projections and their properties, with particular reference to the Mercator and gnomonic projections.
- How charts are produced and supplied to ships all over the world.

Understanding of;

- Detail of the contents of notices to mariners.

Familiarity with;

- List the different navigational publications that are to be carried on board.
- Lists the information shown on a navigational chart.

Ability to;

- use information from charts, chart catalogue, sailing directions, list of lights, list of radio signals, tide tables, routing charts, distance tables, mariners hand book, notices to mariners, navigational warnings, relevant nautical publications, publication correcting system.
- Use Ocean passage for the world, IMO ship's routing.
- Recognize; suitable passages, approaches and anchorages in good and restricted visibility, traffic lanes and separation zones, danger of relying on floating navigational aids.
- Recognize and demonstrates the use of chart symbols and abbreviations given in admiralty chart NP5011.
- Recognize the information that can be obtained from navigational publications normally found on the bridge of a merchant ship.
- Identify the different characteristics of navigational lights.
- Recognize and demonstrates the use of the symbols and abbreviations on a chart, especially lighthouses, buoys, beacons, radio beacons and other navigational marks, and navigational dangers.
- Recognize the different types of navigational charts carried on board and describes their use
- Identify the characteristics and range of lights.
- Interpret coastline contours, bottom topography, depths and nature of bottom.

- Recognize traffic lanes and separation zones.

.9 Time Zone System 2hrs (T) + 0hrs (P) + 2hrs (E).

Knowledge of;

- The uniform system of time-keeping at sea – time zones.
- Standard time, GMT and local time.

Ability to;

- Calculate ETA and ETD involving different time zones and the International Date Line, Given the passage time.

.10 Tides 12hrs (T) + 0hrs (P) + 14hrs (E).

Knowledge of;

- The basic theory of tides and the various tide raising forces.
- The relationship between tides and the phases of the moon.

Understanding of;

- The meaning of : 'high water', 'low water', 'height of tide', 'range', 'duration', 'tidal oscillation', 'chart datum', 'spring tide', neap tide', 'mean high water springs', 'mean low water springs', 'mean low water neaps'.
- Tidal levels, charted heights and drying heights.
- That tides are the vertical oscillation of the surface of the sea due to tide raising forces.
- That daily predictions are given in the tide tables.
- The coverage, layout and contents of the admiralty tide tables.
- 'Standard' and 'secondary ports'.
- That soundings and charted heights have to be corrected for the height of tide.

Ability to;

- Use the tide tables to obtain daily predictions at standard ports.
- Calculate the spring and neap ranges for standard ports.
- Find the predicted time and height of high and low water at standard ports.
- Find the time at which the tide reaches a specified height or the height of tide at a given time.
- Find the predicted time and height of high and low water at standard and secondary ports in ATT Vol. 1 and 2.
- Find the time at which the tide reaches a specified height or the height of tide at a given time at standard and secondary ports in ATT Vol. 1 and 2.
- Calculate the spring and neap ranges for standard and secondary ports in ATT Vol. 1 and 2
- Apply tidal data to practical situations: finding, under keel clearance at a given time and time window to cross a shoal or pass under an overhead obstruction.

.11 Passage Planning 10hrs (T) + 0hrs (P) + 24hrs (E).

Knowledge of;

- The danger of placing implicit reliance on floating navigational marks.
- The danger of approaching navigational marks too closely.
- The use of clearing and leading marks, and, horizontal and vertical danger angles, in passage planning.

- The basic principles of passage planning: appraisal, planning, execution and monitoring;
  - Various publications to be consulted when planning a passage – making a general decision on the track to be followed.
  - Factors to taken into account while planning the passage which should be from 'berth to berth'.
  - Information to be noted on the charts and for quick reference.
  - Plan alternative tracks at critical areas.
  - Consider tactics to be used when the actual time of departure is known.
  - How route monitoring can be done and corrective action taken for any deviation noticed from the planned track.
- Use of various charts in planning a passage through the important traffic areas especially Persian Gulf area.
- The contents of the current MGN on the subject of passage planning (navigation safety).
- The use of radar in passage planning - blind Pilotage and parallel index technique.
- Passage techniques to be used in;
  - Restricted waters by day and night using terrestrial observations in conjunction with appropriate charts, sailing directions, list of lights, and other publications
  - Restricted visibility in coastal waters using radar (ARPA)
  - Areas of heavy traffic in coastal waters using radar (ARPA)

Understanding of;

- The necessity for planning a satisfactory bridge watch keeping arrangement after taking into consideration the principles of safe manning schemes as given in relevant current MGN.
- The principles laid down in the "operational guidance for officer-in charge of a navigational watch".
- The importance of master's standing orders.
- The procedures as laid down in the bridge check lists.
- How to plan and conduct navigation;
  - In traffic separation schemes and in areas near them
  - Explain the contents of relevant current MGN in this regard
  - In ice
  - In areas of extensive tidal effect
  - In areas of strong winds and heavy weather

Familiarity with;

- Coastlines, coast and radar-responsive.
- Coastline contours, bottom topography, depths and nature of bottom.
- Traffic lanes and separation zones.
- The check list for passage planning.

Ability to;

- Obtains and appraises information from navigational publications including sailing directions, notices to mariners, radio navigational warnings and ship's routing information.
- Recognize suitable passages, approaches and anchorages in clear weather and thick weather, using radar-responsive targets demonstrate planning of a passage between two ports from berth to berth using the procedures for passage planning as per the guidelines for voyage planning provided by IMO in Resolution A.893 (21).
- Demonstrate simple passage planning and execution;
  - Consult relevant navigational publications.
  - Information to be noted on the chart.
  - Prepare a contingency plan (alternate tracks).

- Note times of HW and LW at reference ports and destination, and at critical points enroute.
- Note periods of darkness enroute.
- Draw arcs corresponding to raising and dipping ranges.
- Highlight dangers enroute.
- Mark distances and alteration points along the track.

- List the various navigational publications on the bridge and knows thoroughly the information provided by them to the navigator.
- Follow the appropriate bridge procedures explained in the ICS publication ' bridge procedure guide' with regard to navigation with pilot embarked and keeping of lookout.

.12 Use of Routeing In Accordance With General Provisions on Ships' Routeing 2hrs (T) + 0hrs (P) + 0hrs (E).

Knowledge of;

- Using published IMO ship's routeing in passage planning.

.13 Weather Routeing 2hrs (T) + 0hrs (P) + 0hrs (E).

Knowledge of;

- The basic routines of weather routeing.
- The use of climatological information from routeing charts, sailing directions.
- Mariner's handbook and ocean passages of the world for route planning.
- How meteorological forecasts and synoptic and forecast charts are used to modify the route plan to utilize favorable conditions and mitigate adverse weather conditions.
- That shore based services have comprehensive meteorological information available to issue forecasts advice on the route to be followed.
- That comprehensive meteorological information and on board software may be available to the master to plan the route, monitor the voyage and to use forecasts effectively.
- That when a vessel is weather routed, messages warning of adverse weather conditions may be received and these should be brought to the notice of the master.
- Using published routeing instructions in passage planning.

.14 Vessel Traffic Services (VTS) 2hrs (T) + 0hrs (P) + 0hrs (E).

Knowledge of;

- The purpose of vessel traffic services (VTS) in various parts of the world;
  - The normal procedure of joining, navigating and leaving a VTS.
  - Reporting points established within a VTS where all ships have to report when passing through.

.15 Ship Reporting Systems 2hrs (T) + 0hrs (P) + 0hrs (E).

Knowledge of;

- The purpose of ship's movement and position reporting systems and their advantages.
- The various ship reporting system such as; AMVER and AUSREP systems;
  - Describe their coverage area.
  - List the various reports (containing certain information) that ships taking part in it have to make.

.16 Navigational Warnings 2hrs (T) + 0hrs (P) + 0hrs (E).

Familiarity with;

- The worldwide navigational warning system for the dissemination of navigational warnings.
- The areas, their coverage and the area coordination centre.
- The different types of warnings and how they are sent – long range, coastal and local.
- The navtex and the information it receives.
- The operation of the navtex receiver and states the type of information it receives.

.17 Keeping A Log 4hrs (T) + 0hrs (P) + 0hrs (E).

Understanding of;

- Rules, regulations, and common practice of keeping a navigational and voyage records during ocean passage, coastal and in port in line with the requirements in the Company's ISM Safety Management System.

.18 Buoyage System 12hrs (T) + 8hrs (P) + 0hrs (E).

Knowledge of;

- The principles and rules of the international association of lighthouse authorities (IALA) maritime buoyage system, system 'A' and 'B'.

Understanding of;

- The danger of placing implicit reliance upon floating navigational aids.
- The danger of approaching navigational aids.
- The use of clearing marks, clearing lines and horizontal and vertical danger angles.
- Suitable passages, approaches and anchorages in clear weather and thick weather, using radar-responsive targets.

1.1.3. Electronic systems of position fixing and navigation

- **Ability to determine the ship's position by use of electronic navigational aids**

.1 Basic Principles of Hyperbolic Navigation System 2hrs (T) + 0hrs (P) + 0hrs (E).

Knowledge of;

- basic principles of hyperbolic navigation systems:
- Principles of the hyperbolae, combining patterns to ascertain position

.2 Loran-C System and Enhanced Loran (e-Loran) 6hrs (T) + 0hrs (P) + 0hrs (E).

Knowledge of;

- Basic principle and the basic operating principles of loran-c and enhanced loan (e-Loran) system.
- How ambiguity in a position line is resolved.
- Why third-cycle matching is used.
- How the use of sky waves affects the measured time difference.
- The principal difference between e-Loran and traditional Loran-C system.
- The use of e-Loran when satellite services are disrupted.
- The control, operating and monitoring systems of e-Loran.
- The view mode and signal tracking of e-Loran.
- The advantages and limitations of e-Loran.

Familiarity with;

- Typical radii of coverage areas.
- That e-Loran transmissions are synchronized to an identifiable, publicly- certified, source of Coordinated Universal Time (UTC) by a method wholly independent of GNSS.
- That each user's e-Loran receiver will be operable in all regions where an e-Loran service is provided.

Ability to;

- Draw a block diagram of a Loran-C receiver, showing how time differences are measured.
- Draw block diagram, switch on the equipment and determine the ship's position.
- Identify the Loran chart and the additional information printed thereon.
- Switch on equipment; selects chain and relates the time differences obtained to the correct station pair.
- Recognize warnings which indicate that the system may be faulty.

.3 Global Navigational Satellite Systems (GNSS) and GPS system. 20hrs (T) + 0hrs (P) + 0hrs (E).

Knowledge of;

- The basic principles of the global positioning system.
- The system configuration.
- The frequencies that are used.
- The C/A and P codes.
- How the basic line measurement is obtained.
- The dilution of precision (DOP).
- The various DOPs that are used.
- The various errors of the GPS.
- The reason for selective availability and the effect it has on the accuracy of a fix.
- Differential GPS.
- The accuracy obtainable with the GPS and how the accuracy can be downgraded.
- WGS 84.
- Why a fix obtained from the GPS receiver cannot be plotted direct on to a navigational chart.
- Datum shifts.
- The setting up procedure and operates a GPS receiver.
- The advantages and limitations of GPS.

Understanding of;

- The information provided by the GPS and its ability to provide accurate, reliable, continuous and all-weather position information in three axes.

Familiarity with;

- The uses of the system.

Ability to;

- Operate a shipborne satellite fixing position receiver.

.4 DGPS –Differential GPS 2hrs (T) + 0hrs (P) + 0hrs (E).

Knowledge of;

- The basic principle of Differential GPS.

- How DGPS stations can transmit the corrections.
- The Regional Satellite Navigation Systems such as China's BeiDou (COMPASS) Navigation Satellite System, India's Indian Regional Navigational Satellite System (IRNSS), Japan's Quasi-Zenith Satellite System (QZSS) and France's Doppler Orbitography and Radio positioning Integrated by Satellite (DORIS).
- The limitation of the DGPS receiver.

.5 GLONASS 2hrs (T) + 0hrs (P) + 0hrs (E).

Knowledge of;

- The principle on which the GLONASS works.
- The different satellite constellation configurations under GLONASS and GPS respectively.
- The advantage of the receiver capable of operating both GLONASS and GPS "combined GPS/GLONASS receiver equipment".
- The limitation of the GLONASS system receiver.

.6 GALILEO 2hrs (T) + 0hrs (P) + 0hrs (E).

Knowledge of;

- The principle of Galileo as the European satellite navigation system.
- That Galileo comprises 30 medium earth orbit (MEO) satellites in 3 circular orbits.
- The limitations of the Galileo system receiver.

Familiarity with;

- The satellite geometry and dual atomic clocks in the Galileo system.
- That atomic clock signal information is used to calculate the position of the receiver by triangulating the difference in received signals from multiple satellites.

1.1.4. Echo-sounders

- **Ability to operate the equipment and apply the information correctly**

.1 Echo- Sounders 8hrs (T) + 2hrs (P) + 0hrs (E).

Knowledge of;

- The basic principles of marine echo-sounding equipment.

Understanding of;

- The main components on a simple block diagram of an echo sounder, and the function of each.
- The different types of transducers.
- The accepted value of the velocity of sound in water and the limits within which the true value may lie.
- The physical factors which affect the velocity of sound in water.
- The precautions to be taken in a dry dock to safeguard the transducers.
- The errors arising due to trim, heel and transducer separation (Pythagoras error), and incorrect stylus speed.
- The importance of the echo sounder as a navigational aid for safe navigation.
- The importance of operating the echo sounder when making landfall, in and when approaching shallow waters.
- That the echo sounder shows the depth below the keel.

Familiarity with;

- The causes of inaccuracies to instrument or scale error and states their likely magnitude and measures that may be taken to eliminate them.
- The performance standards required of the echo sounder to be fitted on board a merchant ship.
- Check and test as recommended by the manufacturer and operates the echo sounder in accordance good navigational practice.

Ability to;

- Operate a typical echo sounder and demonstrates basic user maintenance, e.g. Clean platen, change paper, change and adjust stylus.
- Differentiate between range and phase, and demonstrates an awareness of the dangers of using the wrong phase.
- Distinguish between inaccuracies caused by instrument and scale error and those caused by false echoes.
- Recognize the various types of 'false' echo that may be recorded, their formation and the possible action to remove them from the trace.
- Recognize the errors that may be caused due to the actual velocity of sound in water being different from that used for the calibration of the instrument.

.2 Speed Logs **8hrs (T) + 2hrs (P) + 0hrs (E).**

Knowledge of;

- The difference between water track and ground track mode of operation.
- The basic principles of the electro-magnetic log.
- The basic principles of the Doppler speed log.
- The basic principles of the pressure tube log.
- The necessity of withdrawal of the tube before entering port.
- The basic principles of the acoustic-correlation log.
- The 'Janus' configuration to counteract the effect of the ship's trim and pitching.
- The dual-axis configuration and its use during docking operation.
- Calibration of the log.
- The operating procedures for all speed logs.
- The precautions to be taken and performance checks and tests required to be done, in accordance with the manufacturer's recommendation and good navigational practice.
- The minimum performance standards and requirements laid down for speed logs.

Understanding of;

- The difference between ground-reference speed and water-reference speed.
- The accuracies of the various systems.
- The main error sources on the various types of logs.
- How ship's speed is transmitted to remote displays and other navigational aids.

Familiarity with;

- The different types of logs that have been in existence from the early days till now.

Ability to;

Draw a schematic diagram showing how an indication of distance run is derived from a speed log.

1.1.5. Compass – magnetic and gyro

- **Knowledge of the principles of magnetic and gyro-compasses**
- **Ability to determine errors of the magnetic and gyro-compasses, using celestial and terrestrial means, and to allow for such errors**

.1 The Magnetism of the Earth and the Ship's Deviation 8hrs (T) + 0hrs (P) + 0hrs (E).

Knowledge of;

- The theory of magnetism as applied to ferromagnetic materials.
- The magnetic field of the earth.
- How the earth's total field can be split into horizontal and vertical components.
- The principle of the magnetic compass, the horizontal component of the earth's total field is the directive force at the compass needle which causes it to lie always in the magnetic meridian.
- Why a compass needle becomes ineffective in high latitudes.
- That hard iron exhibits permanent magnetism and soft iron, induced magnetism.
- The magnetic field of the earth.
- 'Magnetic poles', 'magnetic equator' and 'magnetic latitude'.
- 'Angle of dip'.

Understanding of;

- The meaning of the terms 'intensity of magnetization', 'permeability' and 'magnetic susceptibility' (without mathematical formula).
- That a magnetic needle on the earth will lie along the earth's line of force at that place.
- That deviation changes with the heading of the ship.
- 'Magnetic variation' and why it is slowly changing quantity.
- The importance of ascertaining the deviation during each watch at sea and the different methods of obtaining the same.
- Simple magnet, its poles and states the laws of attraction and repulsion.
- The magnetic field around a magnet.
- Qualitatively 'flux density' and 'field strength'.
- Magnetic induction and difference between 'hard iron' and 'soft iron'.
- That the ship has a magnetic field due to the hard iron and soft iron in the ship.
- That a compass needle which is constrained to the horizontal can respond only to the horizontal components of the earth's field and the field due to the ship's magnetism.
- The effect of introducing a disturbing magnetic force into the vicinity of a compass needle.
- That the direction and strength of a magnetic field may be represented by a vector.
- That a compass needle will align itself with the resultant field.
- The magnetic moment of a bar magnet as the product of the pole strength and the length of the magnet.
- That for a suspended magnet vibrating in a magnetic field, t^2 is proportional to 1/h, where t is the period of vibration and h is the field strength.
- How the relative strengths of two fields may be found.
- That a magnetic needles on board a steel ship will not lie along the earth's line of force at that position due to disturbing forces.

Ability to;

- Use a vector diagram to find the field at a point resulting from two given fields.

.2 The Magnetic Compass 8hrs (T) + 2hrs (P) + 0hrs (E).

Understanding of;

- The construction of a liquid card magnetic compass.
- How the card is kept practically horizontal in all latitudes.
- The composition of the liquid and explains how allowance is made for changes in volume of the liquid.
- How to remove an air bubble from the compass bowl.
- How to check that the card is turning freely on its pivot.
- How the compass bowl is supported in the binnacle.
- The marking of the lubber line and its purpose.
- 'Variation' and how it is named.
- 'Deviation' and how it is named.
- The need for care in the placing of portable items of magnetic material, including spare corrector magnets, or electrical equipment in the vicinity of compasses.
- The need for regular checking of the compass error.
- Why a compass error should be checked after a major alteration of course.
- Why regular comparison of standard compasses, steering compass and gyro compass should be made.
- That the approximate error of the standard compass can be obtained by comparison with the gyro compass if no other means is available.

Familiarity with;

- A binnacle and the arrangement of correcting devices provided.

Ability to;

- Demonstrate taking magnetic compass bearings of celestial bodies and landmarks.
- Determine error of magnetic compass using terrestrial and celestial means and allow such errors to courses and bearings.
- Sketch a section through the compass to show the float chamber, the pivot support and the arrangement of magnets.
- Illustrate with sketches the deviations on various headings produced by permanent magnetism with a pole or poles lying in the plane of the compass card.
- Illustrate with sketches the deviations on various headings resulting from induction in a notional soft iron rod lying in the plane of the compass card.

.3 The Gyro-Compass 8hrs (T) + 2hrs (P) + 0hrs (E).

Knowledge of;

- The properties of a free gyroscope.
- That the free gyroscope is made into a north seeking gyro compass using the force of the earth's gravity and by the application of certain external forces.
- That the north seeking gyro provides a reference datum for measurement of direction.
- The methods of obtaining gyro error and its application to find true course.
- That in the absence of disturbing forces the spin axis of a free gyroscope maintains its direction in space.
- Gyroscopic inertia and precession.
- The precession resulting from a torque about axes perpendicular to the spin axis.
- That friction at gimbals pivots produces torque which give rise to precession.
- That the rate of precession is proportional to the applied torque.
- 'Tilt' as movement of the spin axis in the vertical plane.
- 'Drift' as the apparent movement of the gyroscope in azimuth resulting from the earth's rotation.

- Non-mathematically the apparent movement of the axis of the free gyroscope on the earth's surface, given its initial position and initial latitude.
- How a free gyroscope can be made north-seeking by the use of gravity control and describes the resulting oscillation of the axis.
- The use of damping in azimuth and damping in tilt to cause settling of the axis and thus produce a gyro compass.
- That control and damping can be achieved by replacing the ballistic elements with electrical signals provided by tilt sensors, to produce torques about the vertical and horizontal axis.
- A familiar gyro compass with particular reference to:
  - The method of support
  - Control and damping arrangements
  - The method of maintaining the heading indication in line with the axis of the gyro
  - The transmission of heading to repeaters
- The necessary time for the compass to settle after switching on prior to sailing.
- How the repeater system is switched on and aligned with the master gyro compass.
- How gyro heading is supplied to a radar installation.
- The alarms fitted to a gyro compass.
- Error of magnetic compass using terrestrial and celestial means and allow such errors to courses and bearings.

Understanding of;

- A free gyroscope and its gimbals mountings.

Familiarity with;

- 'Gyro error' and states its probable causes.
- The settings to be made or adjusted while the compass is in use.

Ability to;

- Use the apparent motion of a celestial body in the direction of the gyro axis to aid the description in the above objective.
- Demonstrate the starting of the gyro compass and explains how to minimize settling time by slewing and leveling it to the correct heading.

.4 Fluxgate Compass **4hrs (T) + 0hrs (P) + 0hrs (E).**

Knowledge of;

- Singles axis and dual axis.
- Basic operation.
- TMC.
- Solid state type.

1.1.6. Steering control system

- **Knowledge of steering control systems, operational procedures and change-over from manual to automatic control and vice versa. Adjustment of controls for optimum performance.**

.1 The Automatic Pilot **6hrs (T) + 0hrs (P) + 0hrs (E).**

Knowledge of;

- The use and principle of the automatic pilot systems and its advantages – reduce work load – saving fuel.
- The various controls on the automatic pilot and their function.
- The operating procedures and procedures for change-over from automatic to manual steering and vice versa.
- The functions of the manual settings.
- The adjustment of the manual controls for optimum performance.
- An adaptive automatic pilot and its functions.
- The operation of the course recorder log.
- The regulations regarding the use of the automatic pilot.
- The performance standards laid down for automatic pilots.
- The need for regular checking of the automatic pilot to ensure that it is steering the correct course.

Understanding of;

- The course monitor (course recorder) and the off-course alarm.
- The other alarms fitted to the system.

Familiarity with;

- Types of steering control systems, emergency controls.
- That automatic pilot should be tested manually at least once per watch.
- The factors to take into account regarding the changeover to manual control of steering in order to deal with weather, sea, traffic conditions, intended maneuvers and other potentially hazardous situations.
- That the automatic pilot should be included in the steering gear testing prior to the ship's departure.

.2 Long Range Identification and Tracking (LRIT) Receiver, Voyage Data Recorder (VDR) and Simplified Voyage Data Recorder (S-VDR) and Automatic Identification System (AIS). 18hrs (T) + 0hrs (P) + 0hrs (E).

Knowledge of;

- The basic principles, objectives, function and operation of Long Range Identification and Tracking (LRIT) Receiver, Voyage Data Recorder (VDR) and Simplified Voyage Data Recorder (S-VDR).
- The objectives of Automatic Identification System (AIS).The system concepts of AIS. The self organising time division multiple access concept of AIS. The modes of operation. The principles of regional operating settings. The major constituents of an AIS shipborne system.
- AIS Class B systems. The propagation characteristics of AIS transmissions and compare with radar. The facility for long-range communication. The IMO requirements and guidelines for AIS. The data transmitted and received by AIS. The information included in static data and the associated transmission intervals. The information included in dynamic data and the associated transmission intervals.The information included in voyage related data and the associated transmission intervals. The functionality of safety and security related messages. The functionality of AIS aids to navigation. The purpose of AIS Binary Messages. AIS ship installation options and the common operational problems that can arise from poor installation. The carriage requirements. Typical MKD installation. Typical ARPA/ECDIS installation. Common detrimental effects given by poor installation or the retrofitting of interfering systems.
- The safe use of AIS at sea. The need and use of bridge procedures for AIS. What static data needs to be entered. what voyage related data needs to be entered, including the use of UN/LOCODES. The need to check dynamic data. The need to enter the navigational status of the ship as part of the dynamic data. The use of safety and security related messages. The use of AIS binary messages. The

use of AIS in areas that may have security or piracy implications. The special precautions on using AIS in oil terminals. AIS alarm conditions. The cautions that should be used when using AIS. How to enhance situational awareness on an MKD based system. The Organization's mandated AIS symbology for use on radar and other navigational displays and how to enhance situational awareness on ARPA/ECDIS based system. The application of the COLREGS when using AIS data.

- The display of AIS aids-to-navigation on shipborne AIS equipment. The manual entering of regional operating settings. The familiarization responsibilities in the use of AIS in order to operate a specific installation.

1.1.7. Meteorology

- **Ability to use and interpret information obtained from shipborne meteorological Instruments.**
- **Knowledge of the characteristics of the various weather systems, reporting procedures and recording systems.**
- **Ability to apply the meteorological information available.**

.1 Ship Borne Meteorological Instruments 8hrs (T) + 2hrs (P) + 0hrs (E).

Knowledge of;

- The basic principle of; barograph, Stevenson screen, hygrometer, anemometer, precession aneroid barometer, cyclometer.

Understanding of;

- The basic principle and use of an aneroid barometer.
- The function of a hygrometer.
- The different instruments on board for the measurement of air temperature, sea temperature, dew point and wind speed: whirling psychrometer, Stevenson's screen, and anemometer.
- The basic principle of wind sensors and ordinary readings of wind speed.

Ability to;

- Read and apply necessary correction where appropriate to the atmospheric pressure from barometers, thermometers, wind speed, anemograph.
- Read the atmospheric pressure from an aneroid barometer and applies the necessary corrections.

.2 The Atmosphere, Its Composition and Physical Properties 4hrs (T) + 0hrs (P) + 0hrs (E).

Knowledge of;

- Physical properties of atmosphere, adiabatic laps rate, relationship between the sun and source of energy for atmospheric processes, solar radiation effects on insulation by variation in the suns declination, latitude and length of day light water vapour and its properties in the atmosphere, distribution of water vapour and its behavior in the atmosphere, evaporation, condensation, latent heat of vaporization, saturated air, humidity, relative humidity, diurnal variation of relative humidity and temperatures, temperature variation with height.
- The effect on insulation of a variation in latitude.
- The effect on insulation of a variation in the sun's declination.
- The effect on insulation of a variation in the length of daylight.

Understanding of;

- The various layers of the atmosphere and their approximate vertical extent.
- The composition of the atmosphere, mentioning dry air and its constituents, water vapour and aerosols.
- The importance of the sun as the principal energy source for atmospheric processes.
- The nature of solar radiation (scattering, reflection and absorption).

Familiarity with;

- 'troposphere', 'tropopause', 'stratosphere', 'stratopause', 'mesosphere', 'mesopause' and 'thermosphere'.
- The main features of the troposphere.
- 'Dew point' and 'relative humidity', 'absolute humidity' and 'vapour pressure'.
- 'Water vapour' and the properties of water vapour in the atmosphere.
- 'Evaporation', 'condensation', 'latent heat of vaporisation'.
- Saturated air.
- The processes of mixing, cooling and the evaporation water vapour, by which a sample of air may be brought to saturation.

Ability to;

- Draw and label a typical vertical temperature profile through the lower 100 kms of the earth's atmosphere.

.3 Atmospheric Pressure and wind

12hrs (T) + 0hrs (P) + 0hrs (E).

Knowledge of;

- The Beaufort scale of wind force.
- The pressure gradient force.
- The surface wind circulation around high and low pressure centers.
- Buys-ballot's law.

Understanding of;

- That pressure equals force per unit area.
- That the atmosphere exerts a pressure on any surface placed within it.
- That the atmospheric pressure on a unit area is equal to the weight of the air column extending from that surface to the outer fringes of the atmosphere.
- That atmospheric pressure acts in all directions.
- That atmospheric pressure decreases with height above sea level.
- That the unit of pressure is N/m^2 and ; 1 millibar = 10^{-3} bar = 10^2 N/m^2
- That 1 hectopascal (hpa) = 1 millibar (mb).
- That atmospheric pressure at sea level normally varies between 940 mb and 1050 mb.
- That the average pressure at sea level is 1013.2 hpa (mb).
- That the surface pressure rises if air is added to the column above the surface, and vice versa.
- The method of estimating the strength of the wind from the appearance of the sea surface, using the beaufort wind scale.
- The three difference between true wind and apparent wind.

Familiarity with;

- 'Isobar'.
- 'Wind'.

- Pressure gradient force Geostrophic (Coriolis) force.
- Surface wind circulation around high and low pressure centers.
- The factors other than wind speed which affect appearance of sea surface.
- Apparent and true wind, true wind velocity by vector diagram, use of geostrophic wind scale.

Ability to;

- Insert surface wind directions on a map showing pressure distribution and indicates relative wind speeds at various places within the pressure field.
- Determine true wind velocity by a vector diagram, given the apparent wind, ship's course and speed.
- Describe the method of estimating wind direction from the appearance of the sea surface.
- Demonstrate the use of a Geostrophic wind scale.

.4 Cloud And Precipitation 6hrs (T) + 0hrs (P) + 0hrs (E).

Understanding of;

- Formation of cloud, cloud classification, lightning and thunder, cloud movement and changes.
- That clouds form when air containing water vapour rises, cools adiabatically and becomes saturated.
- The need for and defines condensation nuclei.
- That a cloud can consist of ice crystals, super cooled water droplets, water droplets or any combination of these.

Familiarity with;

- The ten basic cloud types and their probable base heights.
- 'Cloud and precipitation'.
- Formation of precipitation, 'rain', 'drizzle', 'hail', 'snow' and 'sleet'.

.5 Visibility 6hrs (T) + 0hrs (P) + 0hrs (E).

Knowledge of;

- The formation of radiation fog, advection fog, mentioning areas, seasons and reasons for its dispersal.
- The conditions leading to the formation of sea smoke, and typical areas where sea smoke may be encountered.
- Effect of pollution on the formation of radiation fog, smog, advection fog.
- The methods of estimating the visibility at sea, by day and night and the difficulties involved.

Understanding of;

- The concept of processes leading to super saturation to classification of fogs as mixing, cooling or evaporation fog.

Familiarity with;

- That visibility is reduced by the presence of particles in the atmosphere near the earth's surface.
- 'Fog', 'mist' and 'haze' and their effect on visibility at sea.

.6 The Wind and Pressure Systems over the Oceans and local wind 12hrs (T) + 0hrs (P) + 0hrs (E).

Knowledge of;

- The circulation cells which would exist on a rotating earth, not inclined to its orbit of rotation around the sun, and with a homogeneous surface.
- Characteristics and location of doldrums, inter tropical convergence zone, trade winds, sub - tropical oceanic highs, westerlies, and polar easterlies.
- Monsoon regime.
- The monsoon-type weather along the north-east coast of Brazil.
- The formation of anabatic and katabatic winds.

Familiarity with;

- Wind and pressure system over the oceans.
- Circulation cells exiting on a rotating earth.
- Pressure distribution in northern and southern hemisphere.
- Mean surface and wind distribution in northern and southern hemisphere.
- Mean surface in January and July. Idealized global circulation of surface wind.

Ability to;

- Draw the mean surface pressure and wind distribution over the earth's surface in January and July.
- List the areas which experience a true monsoon regime.
- Apply previous concepts to a qualitative explanation of the causes of monsoon regimes.
- Apply previous concepts to a qualitative explanation of the weather associated with the January and July monsoons of the Indian Ocean, China Sea, north coast of Australia and west coast of Africa.
- Apply the concept of horizontal temperature differences to qualitative explanation of the formation of land and sea breezes.
- List the regions of occurrence of anabatic and katabatic winds.
- Provide example of local winds.

.7 Structure Of Depressions

12hrs (T) + 0hrs (P) + 0hrs (E).

Knowledge of;

- 'Air mass' and explains the formation of an air mass.
- The source-region characteristics of arctic, polar, tropical and equatorial air-mass types.
- The weather experienced during the passage of an idealized warm front.
- The weather experienced during the passage of an idealized cold front.
- The stages in the life cycle of a polar front depression.
- Family of depressions.
- The usual movement of a polar front depression.
- The processes leading to the occlusion of a polar front depression.
- The weather associated with the passage of a trough of low pressure.

Understanding of;

- 'Source region of air mass'.
- 'Warm front', 'cold front'.
- 'Depression'.

Familiarity with;

- Classification of air masses.
- Fronts, associated weather.
- Convergence and divergence, formation of depression.

- Characteristics and movements of polar front depression for both northern and southern hemisphere.
- Weather changes experienced during passage of centre of a frontal depression to pole ward and equatorial side of an observer in the northern and southern hemisphere.
- Formation of occlusion of a polar front depression, trough of low pressure on a surface synoptic or prognostic chart.

Ability to;

- Apply previous concepts to an explanation of the weather changes experienced when a frontal depression passes with its centre on the pole ward side of an observer in the northern hemisphere and the southern hemisphere.
- Recognize the symbols for warm front and cold fronts and identifies them as drawn on a weather map.
- Identify a depression on a surface synoptic or prognostic chart.
- Identify a trough of low pressure on a surface synoptic or prognostic chart.
- Draw a diagram of a polar front depression, for both northern and southern hemispheres, showing isobars, warm and cold fronts, with circulation and warm sector.
- Draw a cross-section through a polar front depression, on the pole ward and equatorial side of the centre, showing fronts, and cloud and precipitation areas.

.8 Anticyclones and Other Pressure Systems

8hrs (T) + 0hrs (P) + 0hrs (E).

Knowledge of;

- The 'anticyclone' and weather associated with anticyclones.
- Ridge of high pressure.
- Typical weather sequence during the passage of a ridge between depressions across the observer's position.
- A COL.
- The weather associated with a COL.

Ability to;

- Draw a synoptic pattern of an anticyclone, for both Northern and Southern hemispheres, showing isobars and wind circulation.
- Identify an anticyclone on a surface synoptic or prognostic chart.
- Draw a synoptic pattern for a ridge, showing isobars and wind directions.
- Draw a synoptic pattern for a COL, showing isobars and wind direction.
- Identify ridges and COL on a surface synoptic or prognostic chart.
- To illustrate a synoptic pattern of anticyclones, ridge and COL showing isobars and wind directions.
- To identify, on a synoptic or prognostic chart; warm front, cold front, warm sector, occluded front, depression, trough of low pressure, anticyclone, ridge of high pressure, COL.

.9 Weather Services For Shipping

6hrs (T) + 0hrs (P) + 0hrs (E).

Knowledge of;

- The organization, services provided, functions and objectives of the world meteorological organizations.
- The sources of weather information available to shipping including internet and email.
- The information exchange between merchant ships and meteorological offices and weather bulletins.
- The services provided for shipping by meteorological offices.
- The appropriate weather bulletin and the contents of each of its sections.

- The type of information received by a facsimile machine and any other means on board.
- The services provided for storm warnings.

Familiarity with;

- Diagrams relating to weather reporting and forecast areas contained in relevant ALRS volume 3.
- The importance of weather information to shipping and their sources.
- The weather report made by ships and their frequency and format.

.10 Weather Forecasting 4hrs (T) + 0hrs (P) + 0hrs (E).

Knowledge of;

- Apply previous concepts to the interpretation of symbols and isobaric patterns on weather charts and facsimile charts.
- Apply previous concepts to the interpretation of synoptic and prognostic charts to ascertain wind directions, areas of strong winds, cloud and precipitation areas, fog areas, ice and areas of fine weather.
- How weather observations at a ship can be used to improve the forecast derived from synoptic and prognostic charts.

Ability to;

- Evaluate the weather forecast information received from internet and email.

.11 Recording and Reporting Weather Observations 2hrs (T) + 0hrs (P) + 0hrs (E).

Knowledge of;

- The need for meteorological codes.

Ability to;

- Ability to identify the Beaufort letter abbreviations for present and past weather and total amount of clouds, interprets a ship or shore station plot.

.12 Tropical Revolving Storms (TRS) 2hrs (T) + 0hrs (P) + 0hrs (E).

Understanding of;

- Tropical Revolving Storm (TRS).

Competence: 1.2 maintain a safe navigational watch

1.2.1. Watchkeeping

- **Thorough knowledge of the content, application and intent of the international regulations for preventing collisions at sea, 1972, as amended.**
- **Thorough knowledge of the principles to be observed in keeping a navigational watch.**
- **The use of routeing in accordance with the general provisions on ships' routeing.**
- **The use of information from navigational equipment for maintaining a safe navigational Watch.**
- **Knowledge of blind pilotage techniques.**
- **The use of reporting in accordance with the general principles for ship reporting systems**

and with VTS procedures.

.1 The Content, Application and Intent of COLREG 72 (As Amended) Including Annexes. 60 Hrs (T) + 40hrs (P) + 0hrs (E).

Knowledge of;

- The application of the rules as set out in Rule 1.
- The term 'traffic separation scheme'.
- The responsibility to comply with the rules as set out in Rule 2.
- Cites examples of precautions which may be required by the ordinary practice of seamen or by the special circumstances of the case.
- Examples of circumstances which may make a departure from the rules necessary.
- The general definitions which apply throughout the rules.
- The term 'vessel constrained by her draught'.
- Distinguishes between 'under way' and 'making way'.
- 'A proper look-out' and interprets the intent of 'full appraisal of the situation and the risk of collision'.
- The use of radar in the context of Rule 5.
    - what is meant by a safe speed
    - with reference to court cases, how 'proper and effective action' and 'within a distance appropriate to the prevailing circumstances and conditions' may be interpreted
    - the factors to be taken into account in determining a safe speed
    - how the use of radar affects the determination of safe speed
- What is meant by risk of collision.
    - the proper use of radar equipment in determining whether a risk of collision exists
    - the dangers of making assumptions on the basis of scanty information, citing examples from clear weather as well as the use of radar
    - using examples from court cases, how failure to plot may lead to a lack of appreciation of a developing situation
- Using examples from court decisions, the following actions to avoid collision referred to in Rule 8.
    - positive action in ample time large enough to be readily apparent
    - alteration of course alone
    - passing at a safe distance
    - checking the effectiveness of action taken
    - reduction of speed
    - taking all way off
- An understanding of Rule 9 by:
    - the terms 'narrow channel' and 'fairway'
    - how to proceed along the course of a narrow channel
    - the navigation of small craft and sailing vessels in a narrow channel
    - the restrictions on crossing the channel or fairway describing the conduct of vessels engaged in fishing
    - the procedure for overtaking in a narrow channel
    - the actions to be taken on nearing a bend in a narrow channel or fairway
- 'Traffic lane', 'separation line', 'separation zone', 'inshore traffic zone'.
- How to navigate in a traffic separation scheme with reference to:
    - entering and leaving the traffic separation scheme
    - entering and leaving traffic lane
    - crossing lanes
    - the use of inshore traffic zones
    - crossing separation lines or entering separation zones other than when crossing, joining or leaving a lane

- The requirements for vessels:
  - navigating in areas near the terminations of traffic separation schemes
  - anchoring
  - not using a traffic separation scheme
  - engaged in fishing
- That a vessel of less than 20 metres in length or a sailing vessel must not impede the safe passage of a power-driven vessel following a traffic lane.
- That the exemptions for vessels restricted in their ability to manoeuvre when engaged in an operation for the.
  - maintenance of safety of navigation
  - laying, servicing or picking up of a submarine cable
- The meaning of 'precautionary area'.
- 'Deep water route' and states describes for whom such a route is intended.
- What is meant by 'vessels in sight of one another'.
- With the use of models displaying proper signals or lights, a navigation light simulator or otherwise, the proper action to take to avoid collision with other vessels in sight.
- How to decide when a vessel is an overtaking vessel.
- Compares and analyses the various avoiding actions which may be taken by an overtaking vessel.
- The application of Rule 14, Head-on Situation.
- Why the give-way vessel in a crossing situation shall, if the circumstances admit, avoid crossing ahead of the other vessel.
- The application of Rule 15 when crossing narrow channels and traffic lanes.
- How Rule 16 and Rule 8 relate regarding the action by a give-way vessel.
- The position of stand-on vessel in cases where a risk of collision exists between more than two vessels.
- How to decide when to take avoiding action as stand-on vessel.
- The actions which may be taken by the stand-on vessel.
- The avoiding action which must be taken by the stand-on vessel.
- That a potential collision situation may be divided into the following four stages:
  - at long range, before risk of collision exists and both vessels are free to take any action
  - risk of collision applies, the give-way vessel is required to take action and the other vessel must keep her course and speed
  - the give-way vessel is not taking appropriate action
  - collision cannot be avoided by the action of the give-way vessel alone
- The responsibilities between vessels with reference to Rules 18 and 3.
- The application of Rule 19.
- Compares Rule 6 and Rule 19 regarding the determination of safe speed.
- How courts have interpreted 'a close-quarters situation'.
- How courts have interpreted 'navigate with extreme caution'.
- Using a manoeuvring board or radar simulator, to determine risk of collision and the proper action to take to avoid collision in restricted visibility.
- The application of the rules concerning Lights and shape.
- The definitions in Rule 21.
- The visibility of lights as prescribed by Rule 22.
- The lights and shapes carried by any type of vessel and the operation or circumstances signified by them, including the additional signals for fishing vessels fishing in close proximity.
- The positioning, spacing and screening of lights.
- The shapes required by the rules.
- The sound signals to be used by vessels in sight of one another.
- The sound signals to be used by vessels in or near an area of restricted visibility.
- The use of signals to attract attention.

- The distress signals set out in Annex IV of COLREG 72.

.2 Principles in Keeping A safe Navigational Watch (Watchkeeping). 14hrs (T) + 0hrs (P) + 0hrs (E).

Knowledge of;

- The principles of navigational watchkeeping at sea, including pilotage, and watchkeeping at anchor and port.
- All bridge equipment and their use, including rate of turn indicators, course recorders, echo sounders and navtex.
- steering control systems, including automatic pilot, operational procedures and change over from manual to automatic and vice-versa.
- The action in the event of failure of bridge control, telegraph or steering
- Emergency steering arrangements.
- The application of the ICS bridge procedures guide.
- The proper helm orders to be given when conning the ship.
- The contents of the muster list and how to make it.
- The organizational procedures for emergency parties and drills.
- The duties which are assigned for the operation of remote controls and operation of essential services (main engine stop, ventilation stop, watertight doors, co2 discharge valves).
- The duties of emergency teams, command team, back up team, engine room emergency team, first aid team, and team to assemble passengers and team to prepare survival craft.
- The actions to be taken in case of fires on board
- the shut down and isolation of power plant and equipment
- escape and breathing apparatus
- Fire and safety plans.
- The use of EPIRB, SART and rocket line throwing apparatus.
- The correct use of distress signals and states the penalties for misuse.
- The contents of SOLAS training manuals and maintenance logs.
- Sources of medical information available on board.
- the precautions to be taken in port and use of anti-pollution equipment to prevent the pollution of the marine environment in accordance with the SOPEP manual and garbage management plan.
- The fundamentals of watertight integrity, and the closing of all openings including hatch covers, access hatches and watertight doors.
- Type of information contained in merchant shipping notices, marine guidance notes and marine information notes and their use.
- The contents and application of the current merchant shipping health and safety legislation, and the code of safe working practices for merchant seamen.
- The purpose of flag state and port state control.

.3 General Duties of the OOW 6hrs (T) + 0hrs (P) + 0hrs (E).

Knowledge of;

- The duties prior to proceeding to sea, making harbour, entering a dock, berthing alongside quays, jetties, or other ships, and securing to buoys.
- The procedure for embarking pilot and the preparations required on board.
- How to keep a deck log in port and at sea.
- The preparations to taken before the onset of heavy weather.
- Duties in connection with protection of the marine environment in port.
- The various equipment on the bridge and their use.

- Conning and engine orders given on the bridge.
- The importance of the bridge note book and the entries to be made in it.

.4 Watchkeeping at sea 6hrs (T) + 0hrs (P) + 0hrs (E).

Knowledge of;

- That the officer of the watch is responsible for navigating safely, with particular regard to avoid collision and stranding.
- That the officer of the watch is responsible for the above duty at all times, including periods when the master is on the bridge and while under pilotage.
- The principles to be observed in keeping a navigational watch as set out in section A-VIII/2 regarding:
  - Navigation.
  - Navigational equipment.
  - Navigational duties and responsibilities.
  - Handing over and taking over the watch.
  - Look-out.
  - Navigation with a pilot embarked.
  - Protection of the marine environment.
  - Bridge Navigation Watch Alarm System.
  - Blind pilotage technique.
  - General principles for ship reporting system and with VTS procedures.
- The recommendations on operational guidance for officers in charge of a navigational watch as set out in Chapter VIII, Section A-VIII/2 of the International Conference on training and Certification of Seafarers, 1978:
- The duties of the officer of the watch with regard to:
  - Maintenance of an efficient look-out.
  - The use of engines and sound signaling apparatus.
  - Watch arrangements.
  - Taking over the navigational watch.
  - Performing the navigational watch.
  - Watchkeeping under different condition and in different areas;
    - Clear visibility.
    - Restricted visibility.
    - In hours of darkness.
    - Coastal and congested waters.
    - Navigation with pilot on board.
    - Ship at anchor.
  - Periodic checks of navigational equipment.
  - Compliance with SOLAS V/19 regarding the use of the automatic pilot and the change-over to manual steering and vice-versa.
  - Electronic navigational aids.
  - The use of radar.
  - Navigation in coastal waters.
  - Conduct of the watch in clear weather.
  - Actions to take in restricted visibility.
  - The circumstances in which the officer of the watch should call the master.
  - Navigation with a pilot embarked.
  - Briefing of watchkeeping personnel.
  - Safety of navigation in areas of heavy traffic.
  - Maintaining the designated course.

- Monitoring other traffic in the vicinity.
- Keeping a careful watch over the ship's movements.
- Ensuring that the lights and shapes conform to requirements contained in the international regulations for preventing collisions at sea.

Understanding of;

- The duties of the officer of the watch while at anchor.

Familiarity with;

- The entries which should be made in the log-book.

.5 Watchkeeping in Port, keeping an Effective Deck Watch in Port under Normal Circumstances

4hrs (T) + 0hrs (P) + 0hrs (E).

Knowledge of;

- Watch arrangements.
- Keeping an effective deck watch in port to ensure; safety of life, ship, cargo, port.
- Observe international, national and local rules.
- Maintain order and the normal routine of the ship.
- Action to take on receiving storm warning or an emergency threatening the safety of the ship, log book entries.
- Hazardous cargo and special precaution for the safe handling of hazardous cargo.
- Precaution to prevent pollution, port regulations.
- Communication with shore in the event of emergency.
- Monitoring work in an enclosed space, permit to work.
- Handing over and taking over, how the watch should be kept and points to which attention should be paid, entries of log-book.

.6 Watchkeeping in Port, Keeping a Watch in Port When Carrying Hazardous Cargo 4hrs (T) + 0hrs (P) + 0hrs (E).

Knowledge of;

- Those sufficient personnel should be readily available on board when carrying hazardous cargo in bulk.
- That special requirements may be necessary for special types of ships or cargo:
  - Number of crew on board.
  - State of readiness of FFA and other safety equipment.
  - Special port regulations.
  - Communications with shore in emergency.
  - Special Precautions to prevent pollution of environment.
- That the officer of the watch should be aware of the nature of the hazards and any special precautions necessary for the safe handling of cargo.
- That the duty officer should be aware of the appropriate action in the event of spillage or fire.
- Procedure for entry into enclosed spaces and emergency rescue arrangements.

Familiarity with;

'Hazardous cargo'.

.7 Shipboard Maintenance 2hrs (T) + 0hrs (P) + 0hrs (E).

Knowledge of;

- The planned maintenance system on board.
- The chemistry of corrosion and the measures to prevent it on board.

.8 Dry Docking 2hrs (T) + 0hrs (P) + 0hrs (E).

Knowledge of;

- The types of dry docks.
- The reasons why ships have to dry-dock.
- The preparations to be done on board prior to dry dock – docking plan, defect list, stability requirements.
- The procedure for docking and un-docking a ship.
- The safety precautions that are to be taken in a dry dock;
  - the various types of work that are done during a routine dry dock with particular reference to: ranging of cables
  - Cleaning and painting of cable locker
- The maintenance of the underwater part of the ship – cathodic protection, painting scheme.

.9 LSA And FFA On Board For Class 1, 7 2hrs (T) + 0hrs (P) + 0hrs (E).

Knowledge of;

- The care and maintenance of LSA and FFA on board.
- Describes the portable and fixed FFA on board.

Familiarity with;

- Lists the equipment required to be carried in the life raft.
- Lists the equipment required to be carried in the life boat.
- Lists the pyrotechnics required to be carried on board, in a life boat and in the life raft.

1.2.2. Bridge resource management

- **Knowledge of bridge resource management principles, including:**
  .i allocation, assignment, and prioritization of resources
  .ii effective communications
  .iii assertiveness and leadership
  .iv obtaining and maintaining situational awareness
  .v consideration of team experience

.1 Bridge Resource Management Teamwork Procedures 12hrs (T) + 0hrs (P) + 0hrs (E).

Knowledge of;

- The basic principles of bridge resource management.
- How responsibility for the safety is clearly defined at all times, including periods when the master is on the bridge and while under pilotage.
- The importance of ensuring the effectiveness of information exchange with pilot.
- The relationship between assertiveness and leadership.
- The importance of challenge and response.
- The importance of obtaining and maintaining situational awareness.

Demonstrate;

- Clear, concise communications and acknowledgements (at all times) in a seaman-like manner.
- The allocation, assignment and prioritisation of resources.
- The importance of ensuring the effectiveness of communication between bridge team members.
- Effective information exchange.
- Appropriate challenges and responses.
- The ability to maintain situational awareness in complex.

Understanding of;

- "Situational leadership" .

Competence: 1.3 responds to emergencies

1.3.1. Emergency procedures

- **Precautions for the protection and safety of passengers in emergency situations**
- **Initial action to be taken following a collision or grounding; initial damage assessment and control**
- **Appreciation of the procedures to be followed for rescuing persons from the sea, assisting a ship in distress, responding to emergencies which arise in port**

.1 Contingency Plans For Response to Emergencies 8hrs (T) + 0hrs (P) + 0hrs (E).

Knowledge of;

- The division of the crew into a command team, an emergency team, a back – up emergency team and an engine-room emergency team.
- The composition of emergency teams.
- The actions to take to deal with :
  - Fire in specific areas such as galley, accommodation, engine-room or cargo space, including co-ordination with shore facilities in port, taking account of the ship's fire-control plan.
  - Rescue of victims of a gassing accident in an enclosed space.
  - Heavy weather damage, with particular reference to hatches, ventilators and the security of deck cargo.
  - Rescue of survivors from another ship or the sea.
  - Leakages and spills of dangerous cargo.
  - Stranding.
  - Abandoning ship.
- The importance of drills and practices.

Familiarity with;

- The contents of a muster list and emergency instructions.
- That duties are assigned for the operation of remote controls such as :
  - Main engine stop.
  - Ventilation stops.
  - Lubricating and fuel oil transfer pump stops.
  - Dump valves.
  - Co^2 discharge.
  - Watertight doors.
- And operation of essential services such as:
  - Emergency generator and switchboard.
  - Emergency fire and bilge pumps.

- That crew members not assigned to emergency teams would prepare survival craft, render first side, assemble passengers and generally assist the emergency parties as directed.
- That the engine-room emergency team would take control of ER emergencies and keep the command team informed.
- That good communications between the command team and the emergency teams are essential.

.2 Protection and Safety of Passengers 4hrs (T) + 0hrs (P) + 0hrs (E).

Familiarity with;

- That some crew members will be assigned specific duties for the mustering and control of passengers.
- The duties as :
  - Warning the passengers.
  - Ensuring that all passengers' spaces are evacuated.
  - Guiding passengers to muster stations.
  - Maintaining discipline in passageways, stairs and doorways.
  - Checking that passengers are suitably clothed and those life jackets are correctly donned.
  - Taking a roll-call of passengers.
  - instructing passengers on the procedure for boarding survival craft of jumping into the sea.
  - Directing them to embarkation stations.
  - Instructing passengers during drills.
  - Ensuring that a supply of blankets is taken to the survival craft.

.3 Precautions To Be Taken When Beaching A Vessel 2hrs (T) + 0hrs (P) + 0hrs (E).

Knowledge of;

- The circumstances in which a vessel may be beached.
- Reasons why beaching should be at slow speed.
- Measures which can be taken to prevent the ship driving further ashore and to assist with subsequent refloating.

Understanding of;

- Suitable sea bed, adjusting speed and direction of approach.

Familiarity with;

- That a gently shelving beach of mud, gravel should be chosen if possible.
- That wind of tide along will quickly swing the ship broadside on to the beach.
- That all tanks and compartments should be sounded and an assessment made of damage to the ship.
- Those soundings should be taken to establish the depth of water round the ship and the nature of the bottom.

.4 Actions To Be Taken On Stranding 2hrs (T) + 0hrs (P) + 0hrs (E).

Knowledge of;

- Measures which can be taken to prevent further damage to the ship and to assist with subsequent refloating.
- How ballast of other weighs may be moved, taken on or discharged to assist refloating.
- The use of ground tackles for hauling off.
- Ways in which tugs may be used to assist in refloating.

- The use of the main engine in attempting to refloat and the danger of building up silt from its use.

Familiarity with;

- That, on stranding, the engines should be stopped, watertight doors closed, the general alarm sounded and, if on a falling tide, the engines should be put full astern to see if the ship will immediately refloat.
- That the engineers should be warned to change to high-level water intakes.
- That a distress or urgency signal should be transmitted and survival craft prepared if necessary.
- That all tanks and compartments should be sounded and the ship inspected for damage.
- Those soundings should be taken to establish the depth of water round the ship and the nature of the bottom.
- Entries in the log book.

.5 Actions To Be Taken Following A Collision 2hrs (T) + 0hrs (P) + 0hrs (E).

Knowledge of;

- Measures to attempt to limit damage to salve own ship.

Familiarity with;

- That after impact the engines should be stopped, all watertight doors closed the general alarm sounded and the crew informed of the situation.
- That in calm weather the colliding ship should generally remain embedded to allow the other ship time to assess the damage to abandon ship.
- That survival craft should be made ready for abandoning ship or assisting the crew of the other ship.
- That damage to own ship should be determined.
- That a distress or an urgency signal should be made, as appropriate.
- That, if not in danger, own ship should stand by to render assistance to the other for as long as necessary.
- That all details of the collision and subsequent actions should be entered in the log-book.

.6 Means of Limiting Damage and Salving the Ship Following a Fire or Explosion 4hrs (T) + 0hrs (P) + 0hrs (E).

Knowledge of;

- Methods of fighting fires (see relevant function Prevent control and fight fires on board).
- Why it is important to drain spaces and pump out water resulting from fire fighting as quickly as possible.
- The inspection for fire damage.
- The safety measures to be observed when carrying out a fire damage inspection.
- Measures which may be taken to plug holes, shore up damaged or stressed structure, blank broken piping, make safe damaged electrical cables and limit ingress of water through a damaged deck or superstructure.

Familiarity with;

- That cooling of compartment boundaries where fire has occurred should be continued until ambient temperature is approached.
- That a watch for re-ignition should be maintained until fire area is cold.
- That one person should enter a compartment where a fire has been extinguished without breathing apparatus until it has been thoroughly ventilated.

Familiarity with;

- That rescue boats or motor-lifeboats would be used if conditions permitted.
- That unnecessary equipment should be removed from the boats and be replaced by life jackets, lifebuoys, immersion suits, blankets and a portable VHF radio.

.10 Measures For Assisting A Vessel In Distress 2hrs (T) + 0hrs (P) + 0hrs (E).

Knowledge of;

- How to approach a disable vessel and pass the first connection by line-throwing apparatus or other methods.
- How to pay out the towing wire under control.
- methods of securing the towing wire at the towing ship
- Why the wire is usually shackled to the anchor cable at the tow.
- The preparations made by the disabled ship.
- How to disconnect the tow on arrival at the destination.
- The arrangements for emergency towing of tankers greater than 50,000 tonnes deadweight.

Familiarity with;

- That both vessels should have everything prepared and have agreed on communications before the arrival of the ship.
- That the tow normally passes a messenger, followed by a wire messenger, to the towing vessel to haul across the towing wire.
- That the towing wire should be protected from chafing at fairleads.
- That wires and cables should be inspected frequently and the nip freshened if any sign of wear or chafe is found.
- That the towed vessel should be steered to reduce yawing.
- That both ships should remain alert for signals from other vessel.
- The information to be transmitted to the towing ship.

.11 Actions That Can Be Taken When Emergencies Arise In Port 2hrs (T) + 0hrs (P) + 0hrs (E).

Knowledge of;

- Actions to take in the event of fire on own ship, with particular reference to co-operation with shore facilities.
- Actions to be taken when fire occurs on a nearby ship or adjacent port facility.
- the actions which can be taken to avoid a ship Dragging anchor towards own ship in an anchorage

Familiarity with;

- That a duplicate set of fire control plans is stored for the assistance of shore-side fire-fighting personnel.
- Situations in which a ship should put to sea for reasons of safety such as leakages, spills of dangerous cargo leakage of oil.

Competence: 1.4 responds to a distress signal at sea

1.4.1. Search and rescue

- **Knowledge of the contents of the International Aeronautical and Maritime Search and Rescue (IAMSAR) manual**

.1 Searches and Rescue 8hrs (T) + 0hrs (P) + 0hrs (E).

Knowledge of;

- The content and application of the IAMSAR manual volume III.
- The maritime search and rescue organization existing to render assistance to ships at sea as laid down the IAMSAR manual volume III;
  - Basic structure of the SAR organization
  - The responsibility
  - Need for an SAR organization
  - The responsibility of the coastal state
  - Co-operation between coastal states
  - Planning of a search and rescue
  - Selection of components for SAR units
  - SAR supplies and equipment
  - SAR communications practices and procedures (aeronautical mobile service, maritime mobile service, aircraft communications, visual signals)
  - Ship reporting systems
  - SAR procedures
  - The maritime SAR incident communications
  - Determination of search area (possibility area, probability area, assignment of search area to individual search units, designation and description of search areas)
  - Search techniques (search area coverage, search patterns, co-ordinate air / surface search patterns)
  - Conduct of search (briefing of search personnel, search by surface units, continuation of search, termination of search)
  - Rescue of survivors (immediate care of survivors, briefing of survivors, evaluation of SAR operations, report of SAR operations)
  - Abbreviations and definitions connected with SAR
- The contingency plan for assisting a ship in distress which includes :
  - Calling master,
  - Establishing type of distress,
  - Signal received by assisting vessel,
  - Use of merchant ship position reporting systems,
  - Action to be taken whilst proceeding to scene of distress (lookout, preparation of survival crafts, preparation of gangway and cargo nets and hospital)

Competence: 1.5 uses the IMO standard marine communication phrases and use English in written and oral form

1.5.1. English language

- **Adequate knowledge of the English language to enable the officer to use charts and other nautical publications, to understand meteorological information and messages concerning ship's safety and operation, to communicate with other ships, coast stations and VTS centers and to perform the officer's duties also with a multilingual crew, including the ability to use and understand the IMO standard marine communication phrases (IMO SMCP)**

.1 Maritime English in Written and Oral Form 320hrs (T) + 0hrs (P) + 0hrs (E).

Knowledge of;

- That cross-referencing of signals in the right-hand column is used to facilitate coding.
- That time of origin may be included codes and decodes messages, using the General Section codes and decodes messages, using the Medical Section and complements.
- That there are single-letter signals for use between an ice-breaker and assisted vessels.

Ability to;

- Recognises all International Code flags and pendants.
- Correctly uses substitute flags.

Demonstrates;

- How to call, using flags.
- The use of the answering pendant.
- How to signal azimuth or bearing, course, date, latitude, longitude, distance, speed, time.

Competence: 1.7 maneuver the ship

1.7.1. Ship maneuvering and handling

- **Knowledge of:**
  .i the effects of deadweight, draught, trim, speed and under-keel clearance on turning circles and stopping distances
  .ii the effects of wind and current on ship handling
  .iii maneuvers and procedures for the rescue of person overboard
  .iv squat, shallow-water and similar effects
  .v proper procedures for anchoring and mooring

.1 The Effects of Various Displacement, Draughts, Trim, Speed and Under Keel Clearance on Turning Circles and Stopping Distances 6hrs (T) + 4hrs (P) + 0hrs (E).

Knowledge of;

- The accelerating turn and decelerating turn.
- How speed reduces during a turn.
- Why a loaded ship carries her way longer than when in ballast.
- The steering behavior of directionally stable and directionally unstable ships.
- The use of the Rate of Turn Indicator to assist turning of vessel.

Understanding of;

- The provision and display of maneuvering information recommended in IMO res. A. 601 (15).
- The terms: advance, transfer, drift angle, tactical diameter, track reach, head reach and side reach.
- 'Directional stability'.

Familiarity with;

- The size of the turning circle increases as the under keel clearance decreases.
- The stopping distance of a loaded ship may be up to three times the stopping distance when in ballast.
- That in shallow water a ship will carry her way longer than in deep water.

Ability to;

Compare the turning circles of a ship - loaded and in ballast – for different speeds.

- The English language to be able to use; chart and nautical publications.
- To communicate with other ships and coast stations.
- To perform officer's duties.
- To communicate with multi-lingual crew.
- To use standard marine navigational vocabulary as replaced by IMO standard marine communication phrases.
- To understand meteorological information and messages concerning ship's safety and operation.
- Understand different part of the ship and cargo gears.
- Understand manufacturer's technical manuals and specifications and to converse with technical shore staff concerning ship and machinery repairs.

Competence: 1.6 transmits and receives information by visual signalling

1.6.1. Visual signalling

- **Ability to use the international code of signals**
- **Ability to transmit and receive, by morse light, distress signal SOS as specified in annex iv of the international regulations for preventing collisions at sea, 1972, as amended, and appendix 1 of the international code of signals, and visual signalling of single-letter signals as also specified in the international code of signals**

.1 Signalling by Morse code (Transmission & Reception) 2hrs (T) + 0hrs (P) + 0hrs (E).

Familiarity with;

- Send and receive the distress signal SOS by flashing light.
- The recommendations on sound signaling.
- The single-letter signals which may be sounded only in compliance with the requirements of the International Regulations for Preventing Collisions at Sea.
- The use and maintenance of aldis lamp and battery.

.2 International Code of Signals 6hrs (T) + 4hrs (P) + 0hrs (E).

Knowledge of;

- The purpose of the International Code of Signals.
- Actions to take when signals are not understood.
- How the end of a signal is indicated.
- The use of identity signals.
- The arrangement of the Code into:
  - single-letter signals
  - two-letter signals for the General Section
  - three-letter signals beginning with 'M' for the Medical Section
- The use of complements and the tables of complements.
- How to signal depths.
- The significance of text in brackets.
- The International Code Signal of distress.
- The meanings of single-letter signals.

Familiarity with;

- That names in the text of a signal are to be spelt out in plain language.
- That, in flag signalling, the answering pendant is used to indicate the decimal point in numbers.

- The measures to be taken the inert gas main and gas lines to a mast riser are fractured.
- That continuous watch should be kept on the damaged area and temporary repairs.

.7 Procedures for Abandoning Ship 4hrs (T) + 0hrs (P) + 0hrs (E).

Knowledge of;

- Other distress signals which may be used to attract attention.
- The launching of boats including free fall lifeboats and life rafts when the ship is listing heavily.
- The launching of boats including free fall lifeboats and life rafts in heavy weather.
- The on load release system of davit launched boats.
- The use of oil to calm the sea surface and explains shy fuel oil is not suitable.
- The use of rocket line-throwing appliances and breeches buoy.

Familiarity with;

- That a ship should only be abandoned when imminent danger of sinking, breaking up, fire or explosion exists or other circumstances make remaining on board impossible.
- That a distress call should be transmitted by all available means until acknowledged.
- The information to include in the distress message.
- That extra food and blankets should be placed in boats when time allows.
- That the emergency radio should be placed in a survival craft to which a radio officer, where one is carried, is assigned.
- That warm clothing and life jackets should be worn.
- That the lifeboats with motors should be used to tow craft clear of ship, pick up survivors from the water and marshal survival craft.
- That survival craft should remain together in the vicinity of the sinking ship to aid detection and rescue.

.8 Uses of Auxiliary Steering Gear and the Rigging and Use of Jury Steering Arrangements 2hrs (T) + 0hrs (P) + 0hrs (E).

Knowledge of;

- Typical arrangement of auxiliary steering gear.
- How the auxiliary steering gear is brought into action.
- Change over procedure from bridge control to local control in the steering gear compartment.
- Methods of securing the rudder, jury steering arrangement, construction of a jury rudder.

.9 Rescuing a Person from a Vessel in Distress or From a Wreck 2hrs (T) + 0hrs (P) + 0hrs (E).

Knowledge of;

- How both ships can spread oil in rough weather.
- The preparations for taking survivors on boa/d from the boats.
- How to provide a lee and launch boats.
- How boats should approach the wreck and pick up survivors.
- The methods of recovery of boats and survivors.
- Methods of rescue which may be used when sea conditions are too dangerous to use boats.

Understanding of;

- That it is preferable to wait for daylight when no immediate danger exists.

- Compare the stopping distances of a ship – loaded and in ballast.

.2 The Effect Of Wind And Current On Ship Handling

4hrs (T) + 2hrs (P) + 0hrs (E).

Knowledge of;

- Position of pivot point of a ship stopped, making headway and making sternway.
- The significance of the pivot point position on the response of the vessel to applied forces.
- The behavior of a ship moving ahead with a wind from various directions.
- The effect of wind when :
  - Making large turns
  - Making headway and sternway
  - Ship is disabled
- The effect of current on the motion of a ship.
- The importance of creating lee when requiring smaller vessels to come alongside.
- That in rivers or narrow channels the current is usually stronger in the center of a straight channel or at the outside of bends.
- Use of current when turning in a channel.
- Use of current to control lateral movement toward or away from a river berth.
- Use of anchor to dredge down with a current.

Understanding of;

- The wind; wind speed, direction and windage area.
- The current; in confined water, trim, draft, speed of vessel, turning in a channel, to control lateral movement towards or away from a river berth, use of an anchor to dredge with a current.

Familiarity with;

- That, as a ship is slowed, a speed is reached at which the wind prevents maintaining course.
- How the effect of wind on given ship depends on:
  - Wind strength
  - Relative wind direction
  - Above water area and profile
  - Draft and trim
  - Ship's fore and movement

Ability to;

- Demonstrate the ability to manoeuvre the vessel in simple turning and anchoring manoueuvres in various conditions.

.3 Manoeuvres and Procedures for the Rescue of Person Over Board

4hrs (T) + 2hrs (P) + 0hrs (E).

Knowledge of;

- The single turn, Williamsons turn and scharnow turn and maoeuvres.
- The situation when each turn is appropriate.

Understanding of;

- Difference between 'immediate action', 'delayed action' and 'person missing' situations.

Familiarity with;

- The standard manoeuvres are not guaranteed to return ship into its wake because of the effects of particular ship characteristics and environment conditions on the ship and the person in the water.
- The sequence of actions when a person is seen to fall overboard.
- The action to take when a man-overboard report is received on the bridge.

Demonstrates

- The ability to manoeuvre the vessel for the rescue of a person overboard.

.4 Squat, Shallow Water And Similar Effect

4hrs (T) + 0hrs (P) + 0hrs (E).

Familiarity with;

- Shallow water as a depth of less than 2 x ship's draft.
- Shallow water effect increases as depth decreases.
- Shallow water effect as;
  - Increased directional stability
  - A large increase in turning radius
  - The ship carrying her way longer and responding slowly to changes in engine speed
  - Speed falling less during turns
  - Squat increasing
  - Trim changing, usually by the head for a full hull form and by stern for fine form
  - Increase in vibration
- 'Squat' as reduction of under keel clearance resulting from bodily sinkage and change of trim when moving in shallow water.
- That squat is considerably reduced by speed reduction.
- 'Blockage factor' as the ratio of the cross-sectional area of the ship to the cross-sectional area of water in a channel.
- That squat and other shallow water effects increase as blockage factor increases.
- That excessive speed in shallow-water can ground a ship in water of sufficient depth to float it at slow speed.
- That approaching shoal patches or banks may give rise to an expected sheer.
- That reduced speed is to be used in shallow water and narrow channels to reduce shallow water effects and allow time to correct an unwanted sheer.
- That increased vibration may be experienced in shallow water.

.5 Proper Procedures for Anchoring and Mooring

4hrs (T) + 0hrs (P) + 0hrs (E).

Knowledge of;

- How anchors should be cleared away ready for use.
- How the approach to an anchorage is made with regard to current and wind.
- The use of anchor buoys.
- The safety measures to be taken by the anchor party.
- The method of letting go and the amount of cable to veer initially.
- The marking of the cable and the reports to be made to the bridge.
- How to determine when the ship is brought up.
- The procedures for anchoring in water too deep to let the anchor go on the brake.
- The securing of anchors on the completion of anchoring.
- The preparation for and procedure during heaving up.
- How to handle cable safely in a non-self-stowing locker.
- How to secure anchors and seal spurling pipes for a sea passage.

- The use of head ropes, stern ropes, breast ropes and springs.
- The safety measures to be taken when handling mooring ropes and wires.
- How to join two mooring ropes together.
- Typical mooring arrangements.
- The use of self-tensioning winches.
- How to make fast tugs on towing hawsers or lashed up alongside.
- The use of fenders during berthing and when secured in position.
- Methods of mooring to a buoy.
- How to use a messenger to pass a wire or chain to a buoy.
- How to set up and secure a ship wire.
- The method of securing ropes and wires to a buoy.
- The procedures for singling up and letting go from berths and buoys.
- How to slip a slip wire.
- How to stow mooring ropes and wires for a sea passage.
- How to rig and light the pilot ladder.

Familiarity with;

- That anchors should be walked back clear of the hawse pipes when approaching the anchorage.
- That the lights or shape for a vessel at anchor should be displayed as soon as the ship is brought up.
- The preparations to be made for berthing alongside.
- The importance of keeping mooring lines clear of the propeller and notifying the bridge when the propeller is not clear.
- Equipment should be at hand ready for use at the pilot ladder.
- That the rigging of the ladder and the embarkation and disembarkation of the pilot should be supervised by a responsible officer.

Ability to;

- Demonstrate how to put a stopper on a rope or wire rope.
- Demonstrate how to make a mooring rope or wire fast to bitts.

Function: 2 cargo handling and stowage at the operational level

Competence: 2.1 monitor the loading, stowage, securing, and care during the voyage and the unloading of cargoes.

2.1.1. Cargo handling, stowage and securing

- **Knowledge of the effect of cargo, including heavy lifts, on the seaworthiness and stability of the ship**
- **Knowledge of safe handling, stowage and securing of cargoes, including dangerous, hazardous and harmful cargoes, and their effect on the safety of life and of the ship**
- **Ability to establish and maintain effective communications during loading and unloading**

.1 Draught, Trim And Stability 6hrs (T) + 0hrs (P) + 6hrs (E).

Knowledge of;

- Concept of seaworthiness.
- Deadweight and displacement tonnage, draft, trim, mean draft, draft marks, deck line, freeboard, centre of gravity (COG), centre of floatation (CF), TPC .

Understanding of;

- Use of tables to calculate weights loaded or discharged, effect of weight loaded or discharged on trim.
- 'Deadweight' and 'displacement tonnages'.
- Ability of vessel to return to an upright position when heeled by external force, position of center of gravity (COG) due to distribution of cargo, tender and stiff ship.

Familiarity with;

- That, for a cargo ship, the recommended initial GM should not normally be less than 0.15m.

Ability to;

- Sketch a ship's load line indicating marks for various seasonal zones, areas and periods.
- Use a ship's hydrostatic particulars and given mean draughts to determine the approximate weight loaded or discharged.
- Use a deadweight scale to determine the change in mean draught resulting from loading or discharging a given tonnage.
- Given the present draughts and the density of dock water, calculates the draughts in seawater.
- Given the draught amidships and dock-water density, calculates the amount to load to bring the ship to the appropriate load line in seawater.
- Use hydrostatic data to find the position of the centre of flotation, MCT and TPC for a given draught.
- Calculate the change of trim resulting from loading or discharging a given weight at a specified position.
- Given the initial draughts, forward and aft, calculates the new draughts after loading or discharging a given quantity of cargo.
- Use a trimming table or curves to determine changes in draughts resulting from loading, discharging or moving weights.
- Calculate final draughts and trim for a planned loading by considering changes to a similar previous loading.
- Calculate, by using moments about the keel, the position of G for a given disposition of cargo, fuel and water.
- Use hydrostatic data to find the KM and thence the GM.
- Use KN curves to construct a curve of statical stability and from it reads the maximum righting lever and angle at which it occurs.
- Calculate the arrival GM from the departure conditions and the consumption of fuel and water, including the loss of GM due to FSE.
- Plan the use of fuel and water to keep free surface effects to a minimum.
- Estimate the loss of GM resulting from absorption of water by deck cargo.

.2 Securing Cargoes **8hrs (T) + 0hrs (P) + 0hrs (E).**

Knowledge of;

- The need for solid stow and securing of all cargoes.
- Method of :
  - Blocking, shoring, lashing, chocking and tombing cargo.
  - Securing cargo faces resulting from part discharge before making a sea passage
  - Securing heavy loads and heavy lifts
  - Stowing and securing vehicles and trailers
- Passenger operations including passenger cargo, passenger comfort and safety.

Familiarity with;

- That unitized, containers, trailers, portable tanks and other cargo units should be secured in accordance with the ship's cargo securing manual.
- That cargo liable to slide during rolling, such as steel rails should be stowed fore and aft.

.3 Deck Cargo 8hrs (T) + 0hrs (P) + 0hrs (E).

Knowledge of;

- Why efficient securing is essential for the safety of the ship and cargo.
- How the effects of a concentrated load can be spread over a wider area by the use of dunnage and deck shoring taking into consideration the positioning of girders, transverses and longitudinals under the tank top.
- The effect of deck cargo on stability with reference to:
  - Vertical moment about the keel
  - Water absorption or ice accretion
  - Clearing of water from deck in heavy weather
  - Increased reserve buoyancy of a timber deck cargo
- The guard lines or rails to be provided at the sides of a deck stow and near openings in the stow.
- The provision of means of safe access between the deck and the top of the stow.
- The method of safe stowage and securing of containers on deck on vessels not especially designed for the carriage of containers.
- The safe loading/discharging of Ro-Ro cargoes.

Understanding of;

- The recommendations on the stowage and lashing of timber deck cargoes as set out in the IMO Code of Safe Practice for Ships Carrying Timber Deck Cargoes.

Familiarity with;

- That cargoes, other than in containers, commonly carried on deck are:
  - Dangerous goods not permitted below decks
  - Large units difficult to stow below, which can be safely be expose to the elements
  - Cargoes which can be exposed to the weather and which would occupy a very large space below decks
  - Livestock in limited numbers
- That stowage and securing should be adequate for the worst conditions which could be experienced.
- That hatches should be securely closed and cleated before loading over them.
- That stowage must leave safe access to essential equipment and spaces such as:
  - Sounding pipes.
  - Devices for remote operation of valves.
  - Mooring arrangements.
  - FFA and LSA.
  - Crew accommodation and working spaces.
  - Protection for the crew.
- That deck cargo should not obstruct view from bridge or over side at the bow.
- That the weight of the deck cargo should not exceed the maximum permissible load on the deck or hatch covers.

.4 Container Cargo 8hrs (T) + 0hrs (P) + 0hrs (E).

Knowledge of;

- The arrangements of a container ship and how the position of a particular container is designated.
- The sequence of operation during discharging and loading at a terminal.
- The factors involved in planning a container stow with reference to:
  - Stability, trim and list
  - Stresses
  - Stack height and weight
  - Dangerous goods.
  - Special stowage restrictions
  - Out of gauge
- Methods of securing containers on deck.
- The types and sizes of containers in use.

.5 Bulk Cargo (Other Than Grain) 8hrs (T) + 0hrs (P) + 0hrs (E).

Knowledge of;

- The contents of the IMO IMSBC code, (International Maritime Solid Bulk Cargo).
- that the main hazards associated with the shipment of bulk solids are :
  - Structural damage due to improper distribution of the cargo.
  - Loss or reduction of stability during a voyage
  - Chemical reactions
- The preparation of cargo holds prior to loading bulk cargoes.
- That separation between certain bulk cargoes and other than bulk cargoes or package of dangerous goods is required.
- That some bulk cargoes may deplete the oxygen content of holds or produce toxic gases and describes the precautions to take before entry of holds.
- The hazards associated with coal cargoes.
- The importance of monitoring the temperature of the holds associated with carriage of coal cargoes.
- The precautions to take during loading and discharging coal.
- How coal should be ventilated.
- The distribution of a high- density cargo between holds when detailed information is not available.
- The precautions to be taken before, during and after loading of coal and bulk cargo.
- The trimming methods of cargoes having an angle of repose less than or equal to 35 degrees.

Understanding of;

- Angle of repose, cargoes which may liquefy, flow moisture point, flow state, transportable moisture limit.

Familiarity with;

- The information, which should be supplied by the shipper.
- That the :
  - Loading calculator should be used to check the suitability of a proposed stow for stresses and stability.
  - The data in the ship's stability information book to be used where appropriate.
- That a copy of the medical first aid guide (MFAG) for use in accidents involving dangerous goods is to be on board.
- That certificate stating transportable moisture limits are to be accompanied by a statement that the moisture content is the average moisture content at the time of presenting the certificate.
- That if materials possess chemical hazards, a certificate listing the hazards should be given to the master.

- That :
  - Information on sampling procedures and the factors which must be taken into account when obtaining representative samples are mentioned in the code of safe practice for solid bulk cargoes.
  - The test procedures for cargoes which may liquefy are described in the code.
- That some bulk cargoes can cause corrosion in the cargo spaces, and describes the measures to take to minimize this.

Ability to;

- Use the BC code to extract all the necessary information for the safe carriage in bulk of a stated cargo and its method of loading.

.6 Bulk Grain Cargo

8hrs (T) + 0hrs (P) + 0hrs (E).

Knowledge of;

- Content of chapter VI of SOLAS on bulk grain cargoes.
- The cleaning and preparation of holds and decks for the carriage of grain.
- The dangers associated with using insecticide in cargo holds.
- The importance of trimming and how it should be made.
- The use and fitting of shifting boards.
- Measures to reduce heeling moments resulting from shift of grain.
- How the surface of a partly filled compartment is secured against movement.
- How to separate two different bulk grain cargoes loaded into the same compartment.

Understanding of;

- Preparation of holds for carrying bulk grain, trimming, check for insects and rodent, shifting boards, heeling moment, separation, filled and partly filled compartments, saucering, bundling.

Familiarity with;

- The following terms as used in the grain code:
  - Grain
  - Filled compartment
  - Partly filled compartment
- That a thorough check for rodents and infestation should be made.
- Trimming of filled and partly filled compartments.

.7 Inspections and Preparation of Holds

6hrs (T) + 0hrs (P) + 0hrs (E).

Knowledge of;

- The importance of cleaning holds before loading.
- How to clean holds after discharge of a general cargo and bulk cargo.
- The reasons for using dunnage.
- The types and size of material used for dunnage.
- The methods of dunnaging a hold for various cargoes and how to dispose of old dunnage.
- That dirty dunnage may taint or contaminate the next cargo.
- The fitting of spar ceilings and its purpose.
- How bilge suctions should be checked for efficient working.

- The attention to be paid to bilges, bilge suction, limbers and drain wells to keep them clean and sweet smelling.
- How limbers and drain well covers should be treated to prevent suctions being blocked by small debris, but ensuring free drainage to the suctions.

Understanding of;

- Hold, hatch covers, dunnage, spar ceiling, bilges, wells, stowage capacity (bale and grain).
- Different types of vessels and know their trading pattern.

Familiarity with;

- The reasons for a general inspection of the holds before loading.
- Items to be inspected in the hold.
- That bilges or drain wells should be clean, dry and sweet smelling and disinfectant used.
- That the ballast lines to the deep tanks should be blanked when preparing to load dry cargo.
- That the use of a deodorizing wash for ozone plant may be necessary to remove strong odours from a previous cargo.

.8 Segregation And Separation of Cargoes

4hrs (T) + 0hrs (P) + 0hrs (E).

Knowledge of;

- The need for the segregation of different cargoes with reference to:
  - Dangerous goods
  - Dry / wet cargo
  - Clean / dirty cargo
  - Delicate cargo
  - Valuable cargo, e.g. Bank notes, personal effects
- How the cargo in the above objectives can be segregated.
- The need for the segregation of different cargoes.
- The different methods of segregation.
- That cargo for different consignees or different ports of discharge also need to be segregated.
- Method of separating adjacent parcels of cargo.
- The use of port marking to separate parcels for discharge at different ports.

.9 Ventilation And Control

4hrs (T) + 0hrs (P) + 0hrs (E).

Knowledge of;

- The causes of sweat and the need for ventilation.
- The ventilation system.
- Difference between ship's sweat and cargo sweat and the conditions in which each is experienced.
- The system of natural ventilation and how it should be controlled to minimize the formation of sweat.
- Forced ventilation and humidity control for cargo holds and the properties measured and recorded at the control panel.
- How to operate the ventilation system described above.

Understanding of;

- The factors involved in the control of sweat by ventilation.

Familiarity with;

- That ventilation is also required for the removal of heat, gases and odours.
- Cargoes requiring special ventilation.

.10 Refrigerated Cargoes 4hrs (T) + 0hrs (P) + 0hrs (E).

Knowledge of;

- How holds and lockers are prepared for loading.
- The need for the pre-cooling of spaces and dunnage to be used.
- The dunnaging requirements for refrigerated cargo.
- The use of brine traps in compartment drains – before and during the loading.
- The purpose of compartment temperature recordings.

Familiarity with;

- Examples of commodities carried chilled.
- Examples of frozen cargoes.
- The inspections of the cargo which should be made before and during the loading.

.11 General Cargo 4hrs (T) + 0hrs (P) + 0hrs (E).

Knowledge of;

- Preparation of hold and care for during loading, discharging and carriage of cargoes such as rice, steel cargo, palletised cargo, CKDs, vehicles.

.12 Dangerous, Hazardous and Harmful Cargoes 12hrs (T) + 0hrs (P) + 0hrs (E).

Knowledge of;

- The different types of containment covered by the term "packaged form".
- The classification of dangerous goods in the International Maritime Dangerous Goods (IMDG) Code.
- The properties, characteristics and physical state of the different substances, materials and articles covered by the 9 classes of the IMDG Code.
- Where to look for damage and defects most commonly encountered due to:
  - loading and unloading operation
  - corrosion
  - severe weather conditions
- that the actions to be taken are laid down in the IMO Emergency Procedures for Ships Carrying Dangerous Goods (EmS), the IMO Medical First Aid Guide for Use in Accidents Involving Dangerous Goods (MFAG) and the International Medical Guide for Ships (IMGS).
- That the IMDG Code lays down the packing requirements.
- The meaning of the following stowage and segregation requirements for the different types of ships, with the aid of diagrams:
  - on deck only
  - on deck or under deck
  - away from
  - separated from
  - separated by a complete compartment or hold from
  - separated longitudinally by an intervening complete compartment or hold
- The precautions which should be taken while loading or discharging explosives.

Understanding of;

- Briefly describes the segregation separation, labelling and stowage of dangerous goods.

Familiarity with;

- The marking, labelling and placarding of dangerous goods as required by the IMDG Code and DGs in limited quantities, e.g. schedule 18.
- That the duty officer should have information on the quantities, types of package, proper shipping names (correct technical names), classification, stowage and segregation of the dangerous goods to be handled.
- That the duty officer should have information on the special measures to be taken when a certain dangerous cargo is handled.
- That the measures to be taken in the event of an incident or accident should be made known and that any necessary equipment and sufficient crew to operate it should be available.
- That any incident or accident during the handling of dangerous goods should be reported immediately to the person in charge of the operation and all cargo operations to be ceased.
- That any doubts about the suitability and integrity of packages should be reported to the master or chief mate.
- The fire precautions which should be taken when carrying dangerous goods.

.13 Cargo Handling Equipment and Safety

12hrs (T) + 0hrs (P) + 0hrs (E).

.1 Cargo Handling Equipment

Knowledge of;

- The various cargo handling equipment on board.
- The use of slings, snotters, canvas slings, trays, pallets, nets, chain slings, cant hooks, bale hooks and vehicle slings.
- The care and maintenance of cargo gear.
- That rigging plan is to be followed when setting up.
- Limitations and effect of angles between runners.
- Handling of common unitised and pre-slung cargo.
- Compares the advantages and disadvantages of ship's cranes and derricks for handling cargo – types of derricks – hallen, stulken, thompson, velle and other types.
- Familiarises with cargo gear test certificates and registration – chain register.
- How to determine when a cargo runner needs replacing.
- How hatch covers are secured for sea.
- That hatch covers should be secured by locking devices to prevent them moving accidentally.
- The provisions for adequate lighting for working spaces, portable lights and precautions with dangerous cargoes.
- Means of securing lifting appliances for sea.
- The use of slings, snotters, canvas slings, trays, pallets, nets, chain slings, cant hooks, bale hooks and vehicle slings.
- The precautions to take when lifting bales with hooks in the bale bands and damage caused by hooks generally.
- The handling of common unitized and pre-slung loads.
- How hatch covers are secured for sea.

Understanding of;

- The advantages and disadvantages of ship's cranes and derricks for handling cargo – types of derricks – hallen, stulken, thompson, velle and other types.

Familiarity with;

- The different type derricks and its rigging.
- The precautions to be taken when fork-lift trucks or similar devices are used in the 'tween-decks or holds.
- The precautions to take when lifting bales with hooks in the bale bands and damage caused by hooks generally.
- That all cargo gear should be visually inspected before the start of cargo operations each day.
- That ropes, wire, blocks and loose gear should be subject to frequent inspections while in use.
- That beams and covers of partially opened hatches should be secured to prevent their accidental displacement.
- That it is the ship's responsibility to cover hatches when notice of completion of work for the day is given by the stevedores.
- That no person should stand or pass under a suspended load.
- That each item of cargo gear has its safe working load which should never be exceeded.
- That mechanically or hydraulically operated hatches should be opened or closed under supervision.
- That hatch openings should be properly fenced to a minimum height of 1 metre.
- The care and maintenance of:
  - Standing rigging, topping lifts, cargo runner guys and preventers.
  - Cargo blocks and topping lift blocks.
- That gear should be set up in accordance with the ship's rigging plan and explains limitations and effect of angles between runners.

.2 Cargo Handling Safety

Knowledge of;

- The importance of having a Safe Working Load (SWL) for the cargo gear.
- How to determine when a cargo runner needs replacing.
- The provisions for adequate lighting for working spaces, portable lights and precautions with dangerous cargoes, e.g. jute.
- The importance of maintaining close communication with the shore during the loading and unloading stage.
- The information that should be agreed between ship and shore before any loading or unloading operation.

Familiarity with;

- That all cargo gear should be visually inspected before the start of cargo operations each day.
- Cargo gear test certificates and registration – chain register.
- That all ropes and wires should come with the certificate of their properties.
- That ropes, wire, blocks and loose gear should be subject to frequent inspections while in use.
- Why the load on the cargo gear should never exceed its safe working load.
- That mechanically or hydraulically operated hatches should be opened or closed under supervision of a responsible person.
- That hatch covers should be secured by locking devices to prevent them moving accidentally.
- That beams and covers of partially opened hatches should be secured to prevent their accidental displacement.
- That hatch openings should be properly fenced to a minimum height of 1 metre.
- That it is the ship's responsibility to cover hatches when notice of completion of work for the day is given by the stevedores incharge.
- That no person should stand or pass under a suspended load.

14 Oil Tanker Piping And Pumping Arrangements 12hrs (T) + 0hrs (P) + 0hrs (E).

.1 Tanker arrangements
Knowledge of;

- The general arrangement of crude carriers and product carriers;
  - cargo tanks,
  - pump rooms,
  - segregated ballast tanks,
  - slop tanks,
  - cofferdams, peak tanks and deep tanks
  - accommodation
  - ventilators leading to accommodation and machinery spaces

.2 Cargo piping system
Knowledge of;

- Pipeline arrangement in crude carriers.
- The piping system in tankers with particular reference to:
  - Direct pipeline arrangement in crude carriers
  - Ring main system in a product carrier
  - Piping arrangements in a pump-room
  - Individual deep-well pumps of a product carrier
- The arrangement and use of;
  - deck lines,
  - drop lines,
  - stripping lines,
  - crossovers,
  - bypasses,
  - master valves,
  - tank suction valves and
  - sea suction valves

.3 Cargo pumps
Knowledge of;

- The main operating features of centrifugal pumps.
- Why most cargo pumps are of centrifugal type.
- The main operating features of reciprocating and screw type positive displacement pumps.
- How eductors work and give examples of their use.
- The conditions for which the pumps are being used such as stripping.
- The safe handling of chemical cargoes.
- The safe handling of liquefied gas cargoes.
- The used of ship/shore checklist.
- The importance of setting the right pumping rate during the loading and unloading operation.

Familiarity with;

- Cargo handling arrangements and safety precaution of oil/chemical and liquefied gas tanker.
- The application for which positive displacement pumps are most suitable.

Precautions Before Entering Enclosed Or Contaminated Spaces 4hrs (T) + 0hrs (P) + 0hrs (E).

Knowledge of;

- Why periodical tests of the atmosphere should be made by persons working in an enclosed space.
- The permit-to-enter system using safety checklists to be followed by the responsible person and the persons entering the enclosed space.

Understanding of;

- TLV (Threshold Limit Value), TWA (Time Weighted Average) and STEL (Short Term Exposure Limit), and gives examples of their value.

Familiarity with;

- The potentially dangerous spaces, including;
  - Cargo spaces, cargo, fuel and ballast tanks,
  - Pump rooms,
  - Cofferdams and
  - Duct keels, peak tanks, double bottom tanks.
- That enclosed spaces should be entered only with authorization and after appropriate safety checks have been carried out.
- The dangers associated with enclosed or contaminated spaces, they may be lacking in oxygen or contain flammable or toxic gases.
- that the master or responsible officer must ensure that a space is safe for entry by:
  - Ensuring that the space has been thoroughly ventilated
  - Testing at several levels for oxygen content and harmful vapours
  - Requiring breathing apparatus to be worn when there is any doubt about the adequacy of ventilation or testing
- That the oxygen content should be 21% by volume before entry is permitted.
- That the concentration of harmful vapour should be zero.
- That a space where the atmosphere is known to be unsafe should be entered only in an emergency, after safety checks have been carried out, and wearing breathing apparatus.
- That risk assessment must be carried out before the entry into enclosed spaces.
- The items appearing on the check list.
- The protective clothing and equipment which should be used by or be available to those entering the space.
- That mechanical ventilation should be maintained throughout the time persons are in an enclosed space.
- That all safety checks should be repeated before re-entering a space after a break.
- That a permit-to-work system should only be for the specific duration of the work for that particular day and not valid for the following day.
- That after work is completed; the area must be closed and secured.

.16 Cargo Calculations and Cargo Plans

6hrs (T) + 0hrs (P) + 4hrs (E).

Knowledge of;

- The use of tank calibration tables and given cargo density to calculate the weight in a given tank.
- The use of tank calibration tables and given weights and densities of cargoes to determine the ullage required.

Understanding of;

- Difference between bale capacity and grain capacity.
- 'Stowage factor'.
- Broken stowage' and how an allowance is made for it.

- 'Ullage'.

Ability to;

- Calculates the weight that the holds will contain, given the capacity of the hold and the stowage factor of the cargo.
- Calculates the space required, given the weights and stowage factors of one or more cargoes.
- Calculates the number of packages of given dimensions which can be loaded in a stated space, making allowance for broken stowage.
- Calculates the depth of each required to fill the space at the maximum permitted deck loading, given the maximum permissible loading of a 'tween deck, and the stowage factor of two commodities.
- Correct densities for temperature.
- Determines the ullage to leave to produce a given minimum ullage after allowing for expansion of cargo.
- Extract information from cargo plans of general cargo ships or container ships.
- Draws up a cargo plan from given information.
- Demonstrate the use of a hold capacity plan to estimate the depth of cargo in a hold or the area of 'tween deck required for a given cargo.
- Demonstrate the use of a capacity plan to estimate the quantity of cargo which can be loaded in part of a 'tween deck.

.17 Communications 2hrs (T) + 0hrs (P) + 0hrs (E).

Knowledge of;

- The importance of maintaining effective communications between all concerned during loading and discharging.

Familiarity with;

- The various persons/stations involved during cargo operations and the methods of communication available between them.
- That the communication arrangements should be checked before the commencement of cargo operations.

Competence: 2.2 inspect and report defects and damage to cargo spaces, hatch covers and ballast tanks

2.2.1. Knowledge and ability to explain where to look for damage and defects most commonly encountered due to:

.1 loading and unloading operations
.2 corrosion
.3 severe weather conditions

2.2.2. Ability to state which parts of the ship shall be inspected each time in order to cover all parts within a given period of time

2.2.3. Identify those elements of the ship structure which are critical to the safety of the ship

2.2.4. State the causes of corrosion in cargo spaces and ballast tanks and how corrosion can be identified and prevented

2.2.5. Knowledge of procedures on how the inspections shall be carried out

2.2.6. Ability to explain how to ensure reliable detection of defects and damages

2.2.7. Understanding of the purpose of the "enhanced survey programme"

.1 Cargo Space Inspections 4hrs (T) + 0hrs (P) + 0hrs (E).

Knowledge of;

- The possible causes of damage to the cargo space during cargo operation.
- The general layout of a cargo space for a bulk carrier.
- The general layout of the cargo space for an oil tanker.
- The general layout of the cargo space for a container vessel.
- The general layout of a general cargo ship.
- The defects that could arise due to the nature of cargo carried.
- The corrosion effect that could arise due to structural stress, uneven distribution of cargo, chemical reactions on the ship structure.
- The damage to cargo space due to severe weather condition.
- The safety procedures before entry into the cargo tank for inspection.

Understanding of;

- Structural or parts to be inspected each time in order to cover all parts within a given period of time.

Familiarity with;

- The methods in use to prevent the occurrence of corrosion in cargo spaces.

.2 Hatch covers inspection 4hrs (T) + 0hrs (P) + 0hrs (E).

Knowledge of;

- The working principles of a hatch cover.
- The construction of a hatch cover.
- The testing methods for a hatch cover.

Understanding of;

- The difference between watertight and weather tight.
- The critical components of the hatch cover that contribute to weather tightness.
- The critical components of the hatch cover that contribute to water tightness.
- The structural components of a hatch cover which are most likely to experience corrosion.

.3 Ballast tanks inspection 4hrs (T) + 0hrs (P) + 0hrs (E).

Knowledge of;

- The purpose of ballast tanks.
- The corrosion prevention methods for ballast tanks.

Understanding of;

- The parts in the ballast tanks which are most likely to experience corrosion.

Familiarity with;

- The period of interval for the inspection of ballast tanks.

Ability to;

- Reproduce the construction sketch of a ballast tank.

.4 Damage report 4hrs (T) + 0hrs (P) + 0hrs (E).

Familiarity with;

- The items that need to be taken into account where preparing a damage report.
- The evidence that needs to be collected in assisting the preparation of a damage report.

.5 Enhanced Survey Programme 4hrs (T) + 0hrs (P) + 0hrs (E).

Knowledge of;

- The guidelines on the Enhanced Programme of Inspections during surveys of Bulk Carriers.
- The guidelines on the Enhanced Programme of Inspections during surveys of Oil Tankers.

Function: 3 controlling the operation of the ship and care for persons on board at the operational level

Competence: 3.1 ensure compliance with pollution- prevention requirements

3.1.1. Prevention of pollution of the marine environment and anti-pollution procedures

- **Knowledge of the precautions to be taken to prevent pollution of the marine environment**
- **Anti-pollution procedures and all associated equipment**
- **Importance of proactive measures to protect the marine environment**

.1 International Convention for Prevention of Pollution from Ships, 1973, And Protocol of 1978 Relating there To (MARPOL 73/78) 4hrs (T) + 0hrs (P) + 0hrs (E).

Knowledge of;

- The inspections which may be made by port State authorities and outlines actions which they may take.
- The provisions for the detection of violations and enforcement of the Convention.

Understanding of;

- For the purpose of MARPOL 73/78:
  - harmful substance
  - discharge
  - ship
  - incident

Familiarity with;

- That violations of the Convention are prohibited and that sanctions should be established for violations, wherever they occur, by the Administration of the ship concerned.
- That reports on incidents involving harmful substances must be made without delay.

.1.1 Annex I – Oil 2hrs (T) + 0hrs (P) + 0hrs (E).

Knowledge of;

- The surveys and inspections required under the provisions of MARPOL 73/78.
- The steps which may be taken if a surveyor finds that the condition of the ship or its equipment is unsatisfactory.
- The conditions under which the provisions do not apply to the discharge of oily mixtures from machinery spaces where the oil content without dilution does not exceed 15 parts per million.

- Conditions in which processed bilge water from machinery spaces may be discharged in a special area.
- The exceptional circumstances in which the regulations on the discharge of oil or oily mixtures do not apply.
- The exceptions in which ballast may be carried in cargo tanks.
- The requirements for the provision of oil record books
- The entries required for accidental or other exceptional discharge of oil.

Understanding of;

- For the purposes of annex 1:
  - Oil
  - Oily mixture
  - Oil fuel
  - Oil tanker
  - Combination carrier
  - Nearest land
  - Special area
  - Instantaneous rate of discharge of oil content
  - Wing tank
  - Centre tank
  - Slop tank
  - Clean ballast
  - Segregated ballast

Familiarity with;

- That the condition of the ship and its equipment should be maintained to conform with the provisions of the convention.
- That the certificate issued after survey is the international oil pollution prevention (IOPP).
- That the IOPP certificate should be available on board the ship at all times.
- The condition under which oily mixtures may be discharged into the sea from an oil tanker.
- The condition under which oily mixtures from machinery-space bilges may be discharged into the sea.
- That the provisions do not apply to the discharge of clean or segregated ballast.
- That residues which cannot be discharged into the sea in compliance with the regulations must be retained on board or discharged to reception facilities.
- Special areas for the purposes of annex - I as the - Antarctic area, the Baltic sea area, Mediterranean sea area, Black sea area, the Gulf area(Persian Gulf), Gulf of Aden area, Red sea area and North-West European waters.
- That any discharge into the sea of oil or oily mixtures from an oil tanker or other ships of 400 tons gross tonnage and above is prohibited while in a special area.
- The conditions under which a ship, other than an oil tanker, may discharge oily mixtures in a special area.
- That the regulation does not apply to the discharge of clean or segregated ballast.
- That ballast water should not normally be carried in cargo tanks of tankers provided with segregated ballast tanks.
- That every oil tanker operating with crude oil washing systems should be provided with an operations and equipment manual.
- That, in new ships of 4,000 tons gross tonnage and above and in new oil tankers of 150 tons gross tonnage and above, no ballast water should normally be canned in any oil fuel tank.
- The entries required for machinery space operations in part A of the Oil Record Book.

- The entries required in respect of cargo or ballast operations in oil tankers.
- That the oil record book should be kept on board readily available for inspection and should be preserved for a period of three years after the last entry has been made.

.1.2 Annex II - Noxious Liquid Substances In Bulk 2hrs (T) + 0hrs (P) + 0hrs (E).

Knowledge of;

- That the requirements of annex II apply to all ships carrying noxious liquid substances in bulk
- The surveys required for ships carrying noxious liquid substances in bulk.

Familiarity with;

- That noxious liquid chemicals are divided into four categories X, Y, Z and OS Such that substances in category X pose the greatest threat to the marine environment and those in category Z the least.
- That the conditions for the discharge of any effluent containing substances falling in those categories are specified.
- That more stringent requirements apply in special areas, which for the purposes of Annex II are the Baltic Sea area and the Black Sea area.
- That pumping and piping arrangements are to be such that, after unloading, the tanks designated for the carriage of liquids of categories Z do not retain more than certain stipulated quantities of residue.
- That the discharge operations of certain cargo residues and certain tank cleaning and ventilation, operations may only be carried out in accordance with approved procedures and arrangements based on standards developed by IMO.
- That each ship which is certified for the carriage of noxious liquid substances in bulk should be provided with a procedures and arrangements manual.
- That the Manual identifies the arrangements and equipment needed to comply with Annex II and specifies the operational procedures with respect to cargo handling, tank cleaning, slops handling, residue discharging, ballasting and deballasting which must be followed in order to comply with the requirements of Annex II.
- That each ship should be provided with a cargo record book which should be completed, on a tank-by-tank basis, whenever any operations with respect to a noxious liquid substance take place.
- That a surveyor appointed or authorized by the Government of a Party to the Convention to supervise any operations under this Annex should make an appropriate entry in the Cargo Record Book
- That a surveyor appointed or authorized by the government of a party to the convention to supervise any operations under this annex should make an appropriate entry in the cargo record book.
- That the certificate issued on satisfactory completion of the survey is an international pollution prevention certificate for the carriage of noxious liquid substances in bulk.

.1.3 Annex III – Harmful Substances Carried By Sea In Packaged Forms, Or In Freight Containers, Portable Tanks Or Road And Rail Tank Wagons 2hrs (T) + 0hrs (P) + 0hrs (E).

Knowledge of;

- The requirements for marking and labeling packages, freight containers, tanks and wagons.
- The documentation relating to the carriage of harmful substances by sea.

Familiarity with;

- That for the purpose of this annex, empty receptacles, freight containers and portable road and rail tank wagons which have been used previously for the carriage of harmful substances are treated as harmful substances themselves unless precautions have been taken to ensure that they contain no residue that is hazardous to the marine environment.
- That packaging, containers and tanks should be adequate to minimize hazard to marine environment.
- That certain harmful substances may be prohibited for carriage or limited as to the quantity which may be carried aboard any one ship.
- That jettisoning of harmful substances is prohibited except for the purpose of securing the safety of the ship or saving life at sea.

.1.4 Annex IV - Sewage 2hrs (T) + 0hrs (P) + 0hrs (E).

Knowledge of;

- The provisions regarding the discharge of sewage into the sea.

.1.5 Annex V – Garbage 2hrs (T) + 0hrs (P) + 0hrs (E).

Understanding of;

- For the purposes of annex V:
  - Garbage
  - Nearest land
  - Special area

Familiarity with;

- That the provisions of annex V apply to all ships
- That the disposal into the sea of all plastics is prohibited.
- The regulations concerning the disposal of other garbage.

.1.6 Annex VI – Air Pollution 2hrs (T) + 0hrs (P) + 0hrs (E).

Knowledge of;

- The provision for the issuance of International Air Pollution Prevention certificate.
- The duration of validity of the certificate.
- The regulation regarding NOX in Regulation 13 of Annex VI.
- The requirement for SOX emission control area.
- The requirement for fuel oil quality in Regulation 18 of Annex VI.

Understanding of;

- For the purposes of Annex VI:
  - describes the types of inspection required under Annex VI
  - continuous feeding
  - emission
  - new installations
  - NOX technical code
  - Ozone depleting substances
  - sludge oil
  - shipboard incineration

- shipboard incinerator
- SOX emission control area

.2 Convention of the Prevention of Marine Pollution by Dumping of Wastes and Other Matter (London Dumping Convention) (LDC) 2hrs (T) + 0hrs (P) + 0hrs (E).

Knowledge of;

- The aims of the Convention.

Understanding of;

- For the purpose of the Convention:
  - dumping
  - wastes or other matter
  - special permit
  - general permit

Familiarity with;

- That the dumping of wastes or other matter in whatever form or condition, as listed in annex I, is prohibited.
- That the dumping of wastes or other matter listed in annex II requires a prior special permit.
- That the dumping of all other wastes or matter requires a prior general permit.
- That the provisions of Article IV do not apply when it is necessary to secure the safety of human life or of vessels in cases of force majeure caused by stress of weather, or in any case which constitutes a danger to human life or a real threat to vessels.
- That such dumping should be done so as to minimize the likelihood of damage to human or marine life and must be reported immediately.
- That the Addendum to Annex I contains regulations on the incineration of wastes at sea.
- That the appropriate authority of a Contracting Party should issue prior special or general permits in respect of matter intended for dumping:
  - loaded in its territory
  - loaded by a vessel flying its flag when the loading occurs in the territory of a State not party to the Convention

.3 International Convention Relating to Intervention on the High Seas in Cases of Oil Pollution Casualties, 1969 2hrs (T) + 0hrs (P) + 0hrs (E).

Knowledge of;

- The rights of Parties to the Convention to intervene on the high seas following a maritime casualty.

.4 International Convention on Civil Liability for Oil Pollution Damage, 1969 (CLC 1969) 2hrs (T) + 0hrs (P) + 0hrs (E).

Knowledge of;

- The occurrences to which the Convention applies.

Understanding of;

- For the purposes of the Convention:
  - ship

- owner
- oil
- pollution damage
- preventive measures
- incident

Familiarity with;

- That the owner of a ship is strictly liable for any oil pollution damage caused by the ship as the result of an incident.
- The exceptions to liability.

.5 Anti-Pollution Procedures and All Associated Equipment 2hrs (T) + 0hrs (P) + 0hrs (E).

Knowledge of;

- Regulation 26 Annex 1 MARPOL 73/78.
- Typical shipboard oil pollution emergency plan (SOPEP Plan).
- Antipollution equipment required by national legislation, for example, Oil Pollution Act of Islamic Republic of Iran 1389(Latest Edition).

Understanding of;

- Special areas, oil record book, garbage record book, cargo record book, control of discharge of oil and oily water procedures, methods for the prevention of oil pollution from ships while operating in special areas and outside special areas, crude oil washing, Ship Board Oil Pollution Emergency Plan (SOPEP), garbage disposal, garbage management plan, discharge of sewage, discharged of oil or other harmful substances into sea, accidental oil spillage, bunker checklist, reports on incidents involving oil or harmful substances .
- Procedures and arrangements for chemical carriers, record book for chemical Cargoes, and carriage of chemicals in package form.
- Sewage plant and incinerator.
- Oil discharge monitoring and control system and oil filtering equipment with associated alarms.
- Pumping, piping and discharge arrangements in oil tankers.
- Segregated ballast tanks in oil tankers and product carriers.
- Oil tankers with dedicated clean ballast tanks, and crude oil washing tanks.
- Tanks for oil residues, slop tanks, sludge tanks, E/R bilge holding tanks.
- Oily water separator.
- Shore reception facility, discharging to shore facility.
- Ballasting/ DE ballasting operations in ports, anchorages and at sea in all types of ships
- Pumping out bilges of all types.
- Bunkering operations while alongside or at anchor.
- Loading/ discharging in oil tankers, chemical and product carriers.
- Loading/discharging dangerous cargoes and harmful substances in event of collision or stranding.

Competence: 3.2 maintain seaworthiness of the ship

3.2.1. Ship stability

- **Working knowledge and application of stability, trim and stress tables, diagrams and stress-calculating equipment**

Understanding of fundamental actions to be taken in the event of partial loss of intact buoyancy

Understanding of the fundamentals of watertight integrity

.1 Displacement 8hrs (T) + 0hrs (P) + 4hrs (E).

Knowledge of;

- Archimedes principle and the law of flotation.
- How, when the mass of a ship changes, the mass of water displaced changes by an equal amount.
- The relationship between the displacement and the mean draft of a ship by using the graph or scale.
- Why TPC varies with different drafts.

Understanding of;

- That, for a ship to float, it must displace a mass of water equal to its own mass.
- 'Light displacement' and 'load displacement'.
- 'Deadweight' and 'displacement tonnage'.
- The displacement of a vessel as its mass and that it is measured in tonnes.
- 'Block coefficient' (Cb).
- 'Tonnes Per Centimeter immersion' (TPC)

Familiarity with;

- That displacement is represented by the symbol Δ
- The content of ship's stability book let such as:
  - Hydrostatic tables.
  - Tanks / hold capacity tables.
  - Draft correction tables.
  - Worked example of displacement and stability calculation.
  - Position of C.F, MCTC, TPC.

Ability to;

- Given a displacement/draft curve, finds:
  - Displacements for given mean drafts.
  - Mean drafts for given displacement.
  - The change in mean draft when given masses are loaded or discharged.
  - The mass of cargo to be loaded or discharged to produce a required change of draft.
- Use the deadweight scale to find the deadweight and displacement of a ship at various drafts in sea water.
- Use a deadweight scale to obtain TPC at given drafts.
- Use TPC obtained from a deadweight to find:
  - The change of mean draft when given masses are loaded or discharged
  - The mass of cargo to be loaded or discharged to produce a required change of draft
- Calculate Cb from given displacement and dimensions.
- Calculate displacement from given Cb and dimensions.
- Sketch a load line and indicates marks for various seasonal zones, areas and periods.
- Use a ship's hydrostatic particulars and given mean drafts to determine the approximate weight loaded or discharged.
- Use deadweight scale to determine change in mean draft on loading or discharging given an example of draft calculation after loading certain amount of cargo, considering water density.

Buoyancy 6hrs (T) + 0hrs (P) + 0hrs (E).

Knowledge of;

- What is meant by buoyancy.
- 'Reserve buoyancy'.
- How freeboard is related to reserve buoyancy.
- The purpose of load lines.
- Requirement for maintaining water-tight integrity.
- Reasons for damage stability requirements.
- Damage stability requirements for type A vessels, type (B-60) and type (B-100) vessels.

Familiarity with;

- The force of buoyancy as an upward force on a floating Object created by the pressure of liquid on the object.
- That the buoyancy force is equal to the displacement of a floating object.
- Equilibrium condition after flooding for Type A, and all Type B vessels.
- Damage stability requirements for certain vessels such as passenger vessels.

.3 Fresh Water Allowance (F W A) 6hrs (T) + 0hrs (P) + 6hrs (E).

Knowledge of;

- Why the draft of ship decreases when it passes from fresh water to sea water and vice versa.
- What it meant by the Fresh Water Allowance (FWA)
- The use of a hydrometer to find the density of dock water.
- The effect of changes of tide and rain on dock water density.
- How to obtain the correct dock water density.

Familiarity with;

- That when loading in fresh water before proceeding into sea water, a ship is allowed a deeper maximum draft.

Ability to;

- Calculate the amount which can be loaded after reaching the summer load line when loading in fresh water before sailing into sea water, given the FWA and TPC for fresh water.
- Calculates the TPC for dock water, given the density of dock water and the TPC for sea water.
- Calculates the amount by which the appropriate load line may be submerged, given the density of dock water and FWA.
- Calculate the amount to load to bring the ship to the appropriate load line in sea water, given the present draft amidships and the density of dock water.

.4 Statical Stability 8hrs (T) + 0hrs (P) + 12hrs (E).

Knowledge of;

- That the total force of buoyancy can be considered as a single force acting through B.
- Stability of a ship as the ability to return to an upright position after being heeled by an external force.
- How variations in displacement and GZ affects the stability of the ship.

Understanding of;

The centre of buoyancy (B) as being the centre of the underwater volume of the ship.

Familiarity with;

- That weight is the force of gravity on a mass and always acts vertically downwards.
- That the total weight of a ship and all its contents can be considered to act at a point called the centre of gravity (G).
- That the force of buoyancy always acts vertically upwards.
- That when the shape of the underwater volume of a ship changes the position of B also changes.
- That the position of B will change when the draft changes and when heeling occurs.
- That the buoyancy force is equal to the weight of the ship.
- That the forces of weight and buoyancy form a couple.
- That the magnitude of the couple is displacement x lever; Δ x GZ.
- The lever GZ as the horizontal distance between the vertical forces acting through B and G.
- That the length of GZ will be different at different angles of heel.
- That if the couple Δ x GZ tends to turn the ship toward the upright, the ship is stable.
- That for a stable ship:
  - Δ X GZ is called the righting moment.
  - GZ is called the righting lever.

Ability to;

- Label a diagram of a midships cross section of an upright ship to show the weight acting through G and the buoyancy force acting through B.
- Label a diagram of a midships cross section of a ship heeled to a small angle to show the weight acting through G and the buoyancy force acting through B.
- Show on a diagram of a heeled ship:
  - The forces at b and G
  - The lever GZ

.5 Initial Stability **6hrs (T) + 0hrs (P) + 6hrs (E).**

Knowledge of;

- The effect on a ship's behavior of :
  - A large GM (stiff ship)
  - A small GM (tender ship)

Understanding of;

- The transverse metacentre (M) as the point of intersection of successive buoyancy force vectors as the angle of heel increases by a small angle.

Familiarity with;

- That it is common practice to describe the stability of a ship by its reaction to heeling to small angles (up to approximately 10 degrees).
- That, for small angles of heel, M can be considered as a fixed point on the center line.
- That the value of GM is a measure of the stability of the ship.
- That KM is only dependent on the draft of a given ship.
- That for a cargo ship, the recommended initial GM should not normally be less than 0.15m.

Ability to;

Indicates, on a diagram of a ship heeled to a small angle, G, B, Z, and M.
Show on given diagram of a stable ship that M must be above g and states that the metacentric height GM is taken as positive.

- Show that for small angles of heel (θ), GZ = GM x sin θ.
- Use hydrostatic curves to find the height of the metacentre above the keel (KM) at given drafts.
- Given the values of KG, uses the values of km obtained from hydrostatic curves to find the metacentric height GM.

.6 Angle of Loll

4hrs (T) + 0hrs (P) + 2hrs (E).

Knowledge of;

- How B may move sufficiently to reduce the capsizing moment to zero at some angle of heel.
- Why the condition described in the above objective is potentially dangerous.
- Ways in which to correct this situation and thus reduce danger.

Familiarity with;

- That in this condition, GM is negative and Δ x GZ is now called the upsetting moment or capsizing moment.
- The angle at which the ship becomes stable is known as the angle of loll.
- That the ship will roll about the angle of loll instead of the upright.
- That an unstable ship may loll to either side.

Ability to;

- Show that if G is raised above M, the couple formed by the weight and buoyancy force will turn the ship further from the upright.

.7 Curve Of Statical Stability

6hrs (T) + 0hrs (P) + 4hrs (E).

Familiarity with;

- That for any one draft the length of GZ at various angles of heel can be drawn as a graph.
- That the graph described in the above objective is called a curve of statical stability.
- That different curves are obtained for different drafts with the same initial GM.
- That angles of heel beyond approximately 40° are not normally of practical interest because of the probability of water entering the ship at larger angles.

Ability to;

- Identify cross curves (KN curves and MS curves).
- Derive the formula GZ = MS + GM sin θ.
- Derive the formula GZ = KN - KG sin θ.
- Derive GZ curves for stable and initially unstable ships from KN curves.
- Obtain from a given curve of statical stability,:
  - The maximum righting lever and the angle at which it occurs.
  - The angle of vanishing stability.
  - The range of stability
- Show how lowering the position of G increases all values of the righting lever and vice versa.

.8 Movement Of Centre Of Gravity (G)

6hrs (T) + 0hrs (P)+ 6hrs (E).

Understanding of;

The movement of the centre of gravity with movement of weights on board (gg1):

- Vertical and horizontal shift of g resulting from adding, removing or shifting weights on board

- horizontal shift of g resulting from adding, removing or shifting weights on board
- The shift of g when the weight is lifted by ship's cranes or derricks
- The new position of g after the weight is loaded or discharged

Familiarity with;

- That the center of gravity (g) of a ship can move only when masses are moved within, added to, or removed from the ship.
- That:
  - G moves directly towards the centre of gravity of added masses
  - G moves directly away from the centre of gravity of removed masses
  - G moves parallel to the path of movement of masses already on board
- That if a load is lifted by using a ship's derrick or crane, the weight is immediately transferred to the point of suspension.
- That if the point of suspension is moved horizontally, the center of gravity of the ship also moves horizontally.
- That if the point of suspension is raised or lowered, the center of gravity of the ship is raised or lowered.

Ability to;

- calculate the movement of G (GG1) from:
  - $GG1 = \frac{\text{mass added or removed x distance of mass from G}}{\text{new displacement of the ship}}$
  - $GG1 = \frac{\text{mass moved x distance mass is moved}}{\text{displacement of the ship}}$
- perform calculations as in the above objective to find the vertical and horizontal shifts of the centre of gravity resulting from adding, removing or moving masses
- Calculate by using moments about the keel, the position of g after loading or discharging given masses at stated positions
- Calculate the change in KG during a passage resulting from:
  - Consumption of fuel and stores
  - Absorption of water by deck cargo
  - Accretion of ice on decks and superstructures given the masses and their positions

.9 List And Its Correction

6hrs (T) + 0hrs (P) + 6hrs (E).

Knowledge of;

- With reference to moments about the centre line, how the list may be removed.

Familiarity with;

- That the listing moment is given by:
  - Displacement x transverse distance of g from the centre line
- That in a listed condition the angle of stability is reduced.

Ability to;

Show on a diagram the forces which cause a ship to list when g is to one side of the centre line
Show on a diagram that the angle of list (θ) is given by:

- $\tan\theta = gg1/GM_f$, where gg1 is the transverse shift of g from the centre line

- Calculate the angle of list resulting from loading or discharging a given mass at a stated position, or from moving a mass through a given transverse distance, given the displacement, km and kg of a ship.
- Calculate the mass to load or discharge at a given position to bring the ship upright, given the displacement, GM and the angle of list of a ship.
- Calculate the mass to move through a given transverse distance to bring the ship upright, given the displacement, GM and the angle of list of a ship.
- Calculate the increase in draft resulting from a stated angle of list, given the draft, beam and the rise of the floor.

.10 Effect Of Slack Tanks 4hrs (T) + 0hrs (P) + 0hrs (E).

Knowledge of;

- How the center of gravity of the liquid in a partly filled tank moves during rolling, by means of diagrams.

Familiarity with;

- That if a tank is full of liquid, its effect on the position of the ship's center of gravity is the same as if the liquid were a solid of the same mass.
- That when the surface of a liquid is free to move, there is a virtual increase in kg, resulting in a corresponding decrease in GM.
- That the increase in kg is affected mainly by the breadth of the free surface and is not dependent upon the mass of liquid in the tank.
- That in construction of tanks with special regard to tankers, the tanks are often constructed with a longitudinal subdivision to reduce the breadth of free surface.

.11 Trim: 6hrs (T) + 0hrs (P) + 10hrs (E).

Familiarity with;

- 'Trim' as the difference between the draft aft and draft forward.
- That trim may be changed by moving masses already on board forward or aft, or by adding or removing masses at a position forward of or abaft the centre of flotation.
- 'centre of flotation' as the point about which the ship trims, and states that it is some times called the tipping center.
- That the centre of flotation is situated at the centre of area of the water plane, which may be forward or abaft amidships.
- Trimming moment as:
  - Mass added or removed x its distance forward or aft of the centre of flotation, or
  - For masses already on board as:
  - Mass moved x the distance moved forward or aft
- The moment to change trim by 1 cm (MCTC) as the moment about the centre of flotation necessary to change the trim of a ship by 1 cm.
- That in cases where the change of mean draft is large, calculation by change of trim by taking moments about the centre of flotation or by means of trimming tables should not be used.

Ability to;

- Use hydrostatic data to find the position of the centre of flotation for various drafts.
- Use hydrostatic curves or deadweight scale to find the MCTC for various drafts.
- Calculate the change in trim, given the value of MCTC, masses moved and the distances moved forward or aft.

- Calculate the change of trim, given the value of MCTC, the position of the centre of flotation, masses added or removed and their distances forward or abaft the centre of flotation.
- Extend the calculation in the above objective to find the new drafts, given initial drafts and the centre of flotation.
- Extends the calculation in the above objective to find the new drafts, given initial drafts and the TPC.
- Use a trimming table or trimming curves to determine changes in drafts resulting from loading, discharging or moving weights
- Calculate final drafts and trim for a planned loading by considering changes to a similar previous loading.

.12 Action to Be Taken In The Event Of Partial Loss of Intact Buoyancy. 2hrs (T) + 0hrs (P) + 0hrs (E).

Knowledge of;

- The fundamental action to be taken in the event of partial loss of intact buoyancy.
- The effect of:
  - Flooding on intact stability
  - Permeability of a space on stability in case of flooding
  - Flooding on trim

Familiarity with;

- That flooding should be countered by prompt closing of watertight doors, valves and any other openings which could lead to flooding of other compartments.
- That cross-flooding arrangements, where they exist, should be put into operation immediately to limit the resulting list.
- That any action which could stop or reduce the inflow of water should be taken.

.13 Stability Tables and Diagrams 4hrs (T) + 0hrs (P) + 0hrs (E).

Familiarity with;

- The use stability, trim and stress tables and diagrams.
- The use of stress calculating equipment.
- That ships carry an approved stability data booklet.
- The minimum statutory stability requirements that a ship should comply with.
- Content of ship's stability book let such as:
  - Hydrostatic tables.
  - Tanks / hold capacity tables.
  - Draft correction tables.
  - Worked example of displacement and stability calculation.
  - Position of C.F, MCTC, TPC, KM, etc.

3.2.2. Ship construction

- **General knowledge of the principal structural members of a ship and the proper names for the various parts**

.1 Ship Dimension and Form 20hrs (T) + 0hrs (P) + 0hrs (E).

Understanding of;

- And ability to illustrate:
  - camber,

  - rise of floor,
  - tumblehome,
  - flare,
  - sheer,
  - rake,
  - parallel middle-body,
  - entrance,
  - run
- Followings:
  - forward perpendicular (FP),
  - after perpendicular (AP),
  - length between perpendicular (LBP),
  - length on the water line (LWL),
  - length overall (LOA),
  - base line,
  - moulded depth and
  - extreme depth, beam and draft

Ability to;

- Illustrates the general arrangement of the following ship types:
  - General cargo
  - Tankers
  - Bulk carriers
  - Combination carriers
  - Container
  - RO-RO
  - Passenger
- Reproduce an elevation of a general cargo ship, showing holds, engine room, peak tanks, double bottom tanks, hatchways, tween deck and position of bulkheads.
- Reproduce an elevation of a typical crude oil carrier, showing bulkheads, cofferdams, pump-room, engine-room, bunker and peak tanks, cargo tanks, slop tank and permanent ballast tanks.
- Reproduce a plan view of a tanker showing the arrangement of tanks.

.2 Ship Stresses **14hrs (T) + 0hrs (P) + 0hrs (E).**

Knowledge of;

- Terms shear force and bending moments.
- 'Hogging' and 'sagging' and differentiates between them.
- The loading conditions that give rise to hogging and sagging.
- How hogging and sagging stresses are caused by the sea state.
- How hogging and sagging stresses result in tensile or compressive forces in the deck and bottom structure.
- Water pressure loads on the ship's hull.
- Liquid pressure loading on the tank structures.
- The stresses set by liquid sloshing in a partly filled tank.
- Racking stresses and its causes.
- 'Panting', 'pounding', and 'slamming' and states which part of the ship is affected.
- Stresses caused by localized loading.
- Corrosion.
- The causes of corrosion on board.

- The various methods being used to minimise the effect of corrosion.

Understanding of;

- Modern methods of determining the effects of different loading and ballasting on the ship's structure.
- The input and output data from stress calculating machines and has a working knowledge of the stress tables.
- Bending moment as difference between moment of buoyancy and moment of weight.
- How output data from ship stress finding systems may be used.
- Torsion stress particularly with reference to container ship loading.
- The stress areas created by bending moments and shearing forces derived by a stress calculator.
- The causes and effects of bending moments and shearing forces on ships' structures.
- The constructional features which compensate for stress.

Familiarity with;

- The purpose of a ship board stress finding system, including details of input data and the output obtained.

Ability to;

- Calculates the pressure at any depth below the liquid surface, given the density of the liquid.
- Use one of the modern mechanical or electrical aids to determining stress.
- Extracts information from shear force and bending moment diagrams.

.3 Hull Structure 22hrs (T) + 0hrs (P) + 0hrs (E).

Knowledge of;

- The types of materials that are used in the construction of a ship.
- Function and illustrates standard steel sections:
  - flat plate,
  - offset bulb plate,
  - equal angle,
  - unequal angle,
  - channel,
  - tee
- The arrangements of frames, webs and transverse members for longitudinal, transverse and combined system of framing on transverse sections of ships.
- The stress concentration in the deck around hatch openings.
- Compensation for loss of strength at hatch openings.
- Why transverse bulkheads have vertical corrugations and fore and aft bulkheads have horizontal ones.
- The purpose of bilge keels and how they are attached to the ships side.

Understanding of;

- That transverse section of ships can have longitudinal, transverse and combined systems of framing.
- The various types of modern weather-deck mechanical steel hatch covers.
- The importance of load lines and how they are marked.

Familiarity with;

- Structural components on ships' plans and drawings:

- frames, floors, transverse frames, deck beams, knees, brackets,
- shell plating, decks, tank top, stringers,
- bulkheads and stiffeners, pillars,
- hatch girders and beams, coamings, bulwarks,
- bow and stern framing, cant beams, breast hooks

Ability to;

- Illustrate double-bottom structure for longitudinal and transverse framing.
- Describe the hold drainage systems and related structure.
- Illustrate a duct keel.
- Sketch the deck edge, showing the attachment of sheer strake and stringer plate.
- Sketch a radiused sheer strake and attached structure.
- Sketch a transverse section through a hatch coaming, showing the arrangement of coamings and deep webs.
- Sketch a hatch corner in plan view, showing the structural arrangement.
- Sketch deck freeing arrangements, scuppers, freeing ports, open rails.
- Illustrate the connection of superstructures to the hull at the ship side.
- Sketch a plain bulkhead showing connections to the deck, sides and double bottom and the arrangement of stiffeners.
- Sketch a corrugated bulkhead.

.4 Bow And Stern

6hrs (T) + 0hrs (P) + 0hrs (E).

Knowledge of;

- The provision of additional strength to withstand pounding and panting, with illustration.
- The function of the stern frames and sketch a stern frame for a single screw ship.
- The construction of a transom stern, showing the connections to the stern frame, with illustration.

.5 Fittings

12hrs (T) + 0hrs (P) + 0hrs (E).

Knowledge of;

- Arrangement of modern weather deck mechanical steel hatch covers, with illustration.
- How water tightness is achieved at the coamings and cross joints.
- The cleating arrangement of the hatch covers.
- Roller- multi angle, pedestal and panama fairlead and mooring bits with their attachment to the deck, with illustration.
- The construction and fitting to the deck of tension winches and explains how they are used.
- The anchor handling arrangements from hawse pipe to chain locker.
- The construction of masts, Sampson posts, derricks and deck cranes and how they are supported at the base.
- The bilge piping system of a cargo ship including strum box stating that each section is fitted with a screw-down non-return suction valve.
- A ballast system in a cargo ship, the arrangements of a fire main and what pump may be used to pressurise it.
- The provision of sounding pipes and sketches a sounding pipe arrangement.
- The fitting of air pipes to ballast tanks or fuel tanks.
- The arrangement of fittings and lashings for the carriage of containers on deck.
- The arrangement of portable beams, wooden hatch covers and tarpaulins.
- The construction of chain lockers and how the bitter-ends are secured in the lockers.

- How to secure anchors and make spurling pipes watertight in preparation for a sea passage.
- The construction and use of a cable stopper.
- The construction of derricks and deck cranes.

Ability to;

- Sketch an oil/water tight hatch cover.
- Sketch typical forecastle mooring and anchoring arrangement showing the leads of moorings.
- Sketch mooring bitts, showing their attachment to the deck.

.6 Rudder and Propellers

8hrs (T) + 0hrs (P) + 0hrs (E).

Knowledge of;

- The action of the rudder in steering a ship.
- The purpose of the rudder carrier and pintles.
- How the weight of the rudder is supported by the rudder carrier.
- The rudder trunk.
- The arrangement of a watertight gland around the rudder stock.
- The principle of screw propulsion.
- A propeller and followings with respect to it:
  - Boss,
  - rake,
  - skew,
  - face,
  - back,
  - tip,
  - radius,
  - pitch
- How the propeller is attached to the tail shaft.
- Why the shaft tunnel should be of water tight construction and how water is prevented from entering the engine room if the tunnel becomes flooded.

Familiarity with;

- Fixed-pitch and controllable-pitch propellers.

Ability to;

- Reproduce drawings of modern rudders: semi-balanced and spade.
- Sketch the arrangement of an oil-lubricated stern tube and tail shaft.
- Sketch a cross section of a shaft tunnel for water cooled and oil cooled types.

.7 Load Lines and Draught Marks

6hrs (T) + 0hrs (P) + 0hrs (E).

Knowledge of;

- Where the deck line is marked.
- What is meant by 'assigned summer freeboard'.
- How the chart of zones, areas and seasonal periods is used to find the applicable load line.
- That the freeboard, measured from the upper edge of the deck line to the water on each side, is used to check that the ship is within its permitted limits of loading.

- Why the height of sill of openings varies between different types of vessels based on Load Line Rules.

Understanding of;

- 'Freeboard'.
- How to read draft.

Familiarity with;

- The items in the conditions of assignment of freeboard.

Ability to;

- Draws to scale the load line mark and the load lines for a ship of a given summer moulded draft, displacement and TPC in salt water.

Competence: 3.3 monitor compliance with legislative requirements

3.3.1. Basic working knowledge of the relevant IMO conventions concerning safety of life at sea, security and protection of the marine environment

.1 Introduction to Maritime Law 2hrs (T) + 0hrs (P) + 0hrs (E).

Familiarity with;

- Followings:
  - flag State jurisdiction
  - coastal State jurisdiction
  - port State jurisdiction
- Main elements of relevant IMO Conventions, e.g. SOLAS, MARPOL and STCW.
- The significance of the 'no more favourable treatment' clause in the SOLAS, MARPOL, STCW and ILO Minimum Standards in Merchant Ships Conventions.
- That public maritime law is enforced through:
  - surveys, inspection and certification
  - penal sanctions (fines, imprisonment)
  - administrative procedures (inspection of certificates and records, detention)
- That differences of detail usually exist in the national laws of different states implementing the same convention.
- That, when serving in a ship flying a foreign flag, it is essential that the master and chief mate familiarise themselves with the laws and regulations of the flag State.
- The importance of keeping up to date with developments in new and amended legislation
- Private and public international law.
- The adoption of international conventions and agreements is intended to provide uniform practice internationally.
- To implement a convention or other international agreement, a State must enact national legislation giving effect to and enforcing its provisions.
- That recommendations which are not internationally binding may be implemented by a State for ships flying its flag.
- That maritime law is based partly on generally accepted customary rules developed over many years and partly on statute law enacted by states.
- Matters of safety, protection of the marine environment and conditions of employment are covered by statute law.
- That the main sources of maritime law are international conventions.

- That a convention is a treaty between the States which have agreed to be bound by it to apply the principles contained in the convention within their sphere of jurisdiction.
- The main originators of international conventions concerned with maritime law as are:
  - International Maritime Organisation (IMO)
  - International Labour Organisation (ILO)
  - Committee Maritime International (CMI)
  - United Nations
- That the operation of a ship is governed by the national laws and regulations of the flag State, including those laws and regulations giving effect to international conventions.
- That, when in port, a ship must also comply with the appropriate laws and regulations of the port State.

.2 Law of the Sea

.2.1 Conventions on the Law of the Sea 1hrs (T) + 0hrs (P) + 0hrs (E).

Familiarity with;

- That the law of the sea is embodied in the Geneva Conventions of 1958 and the United Nations Convention on the Law of the Sea, 1982 (UNCLOS).
- The legal status of UNCLOS.
- The legal status of the Geneva Conventions.
- The pollution of the marine environment.
- "dumping".
- "Force majeure'.

.2.2 Territorial Sea and the Contiguous Zone 1hrs (T) + 0hrs (P) + 0hrs (E).

Familiarity with;

- The legal status of the territorial sea and its breadth.
- 'Internal waters'.
- The legal status of road steads.
- The right of innocent passage.
- 'Passage'.
- 'Innocent passage'.
- Matters on which coastal State laws or regulations may affect innocent passage.
- The obligations during innocent passage in a territorial sea.
- The use of sea lanes and traffic separation schemes (TSS) in the territorial sea.
- The obligations of nuclear-powered ships and ships carrying dangerous or noxious substances.
- The additional rights of a coastal State regarding ships proceeding to internal waters or calling at a port facility.
- The charges which may be levied on ships passing through a territorial sea.
- The criminal jurisdiction of a coastal State on board a foreign ship passing through the territorial sea.
- That a coastal state may take any steps authorized by its laws for the purpose of an arrest or investigation on board a foreign ship passing through the territorial sea after leaving internal waters.
- The coastal State's obligation to facilitate contact between the consular authority of the flag State and the ship's crew when taking measures to arrest a ship.
- That the coastal State may not take any steps on board a foreign ship passing through the territorial sea to arrest any person or to conduct any investigation in connection with any crime committed before the ship entered the territorial sea if the ship, proceeding from a foreign port, is only passing through the territorial sea without entering internal waters.
- The civil jurisdiction of a coastal State on board a foreign ship passing through the territorial sea.

- The extent of the contiguous zone and the control a coastal State may exercise therein.

.2.3 International Straits

1hrs (T) + 0hrs (P) + 0hrs (E).

Familiarity with;

- The legal status of waters forming straits used for international navigation.
- The right of transit passage.
- 'Transit passage'.
- The duties of ships in transit passage.
- The meaning of 'generally accepted international regulations, procedures and practices'.
- The duty of ships in transit passage regarding sea lanes and TSS.
- Matters on which coastal State laws or regulations may affect transit passage.
- The obligations of ships during transit passage.
- The application of innocent passage to straits used for international navigation.
- 'Archipelago'.
- 'Archipelagic state'.
- The right of innocent passage through archipelagic waters.
- That an archipelagic State may designate sea lanes through its waters.
- How sea lanes should be defined and how ships should follow them.
- That an archipelagic State may designate TSS for any sea lanes.
- That ships must respect established sea lanes and TSS.
- That the laws and regulations which may be made by an archipelagic State relating to sea lanes and the obligations of ships during their passage are the same as those relating to the transit of international straits.

.2.4 Exclusive Economic Zone and Continental Shelf

1hrs (T) + 0hrs (P) + 0hrs (E).

Familiarity with;

- The exclusive economic zone and states its breadth.
- The continental shelf.
- The coastal State's jurisdiction over artificial islands, installations and structures within its exclusive economic zone.
- The establishmentof safety zones around artificial islands, installations and structures and states the breadth of those zones.
- The obligations of ships regarding safety zones.

.2.5 High Seas

1hrs (T) + 0hrs (P) + 0hrs (E).

Familiarity with;

- The freedom of the high seas.
- The nationality of ships.
- That each State must issue to ships to which it has granted the right to fly its flag documents to that effect.
- That, except in exceptional circumstances, ships must sail under the flag of one State only and be subject to its exclusive jurisdiction.
- That a ship may not change its flag during a voyage or while in a port of call, save in case of real transfer of ownership or change of registry.
- The status of ships regarding nationality.
- The duties of the flag State with respect to ships flying its flag.

- That in taking such measures each State is required to conform to generally accepted international standards.
- That in the event of a collision or of any other incident of navigation no penal or disciplinary proceedings may be instituted except before the judicial authorities either of the flag State or of the State of which such a person is a national.
- Who may withdraw a master's certificate or a certificate of competence or a license.
- That no arrest or detention of a ship, even as a measure of investigation, may be ordered by any authorities other than those of the flag State.
- That every State must require the master of a ship sailing under its flag, to render assistance to any person found at sea in danger of being lost, and, after a collision, to render assistance to the other ship, her crew and her passengers and, where possible, to inform the other ship of the name of his own ship, her port of registry and the nearest port at which she will call.
- That the breaking or injury of submarine cables so as to interrupt or obstruct telegraphic or telephonic communications, and similarly the breaking or injury of a submarine pipeline or high-voltage power cable, is, except for the purpose of saving lives or ships, a punishable offence.
- That the owners of ships who can prove that they have sacrificed an anchor, a net or any other fishing gear in order to avoid injuring a submarine cable or pipeline should be indemnified by the owner of the cable or pipeline.

.2.6 Protection and Preservation of the Marine Environment 1hrs (T) + 0hrs (P) + 0hrs (E).

Familiarity with;

- The rights of coastal states to adopt laws and regulations for the prevention, reduction and control of pollution in respect of their exclusive economic zones.
- The enforcement by flag States of measures for the prevention, reduction and control of pollution from ships.
- The enforcement by port States of measures for the prevention, reduction and control of pollution from ships.
- The measures relating to seaworthiness of vessels to avoid pollution.
- The enforcements by coastal States of measures for the prevention, reduction and control of pollution from ships.
- The rights of States to take and enforce measures beyond their territorial seas to avoid pollution arising from maritime casualties.
- 'Maritime casualty'.
- That the United Nations Convention on the Law of the Sea,1982, will replace the Geneva Conventions on the Law of the Sea, 1958, when it enters into force.
- That UNCLOS does not alter the rights and obligations of States Parties which arise from other agreements compatible with that Convention.

.3 Safety

.3.1 International Convention on Load Lines, 1966 (LL 1966), as amended 2hrs (T) + 0hrs (P) + 0hrs (E).

Familiarity with;

- That no ship to which the Convention applies may proceed to sea on an international voyage unless it has been surveyed, marked and provided with an International Load Line Certificate (1966) or an International Load Line Exemption Certificate, if appropriate.
- To which ships the Convention applies.
- The duration of validity of an International Load Line Certificate (1966).

- The circumstances in which an International Load Line Certificate (1966) would be cancelled by the Administration.
- The control to which ships holding an International Load Line Certificate (1966) are subject when in the ports of other Contracting Governments.
- For the purposes of the Regulations:
  - freeboard
  - freeboard deck
  - superstructure
- The position, dimensions and marking of:
  - the deck line
  - the load Line Mark
  - lines to be used with the load Line Mark
- That the ring, lines and letters are to be painted in white or yellow on a dark ground or in black on a light ground and that they should be permanently marked on the sides of the ship.
- That the International load Line Certificate (1966) will not be delivered to a ship until the surveyor has certified that the marks are correctly and permanently indicated on the ship's sides.
- The terms 'position l' and 'position 2' with regard to the positions of hatchways, doorways and ventilators.
- That hatchway covers made of mild steel are constructed for assumed loads or not less than 1.75 tonnes/m2 in position 1 and of not less than 1.30 tonnes/m2 in position 2.
- The requirements concerning the provision of closing appliances for ventilators.
- That means, permanently attached, should be provided for closing the openings of air pipes to ballast tanks and other tanks.
- The provisions for the protection of the crew.
- That deck cargo should be so stowed as to allow for the closing of openings giving access to crew's quarters, machinery space and other parts used in the necessary work of the ship.

.3.2 International Convention for the Safety of Life at Sea, 1974 as amended (SOLAS) – General Provisions 2hrs (T) + 0hrs (P) + 0hrs (E).

Familiarity with;

- That unless expressly provided otherwise, the regulations apply only to ships engaged on international voyages.
- 'International voyage'.
- followings:
  - passenger
  - passenger ship
  - cargo ship
  - tanker
  - age of a ship
- Who may carry out surveys for the enforcement of the provisions of SOLAS.
- The powers of a nominated surveyor.
- The procedures which apply if the surveyor finds that the ship does not comply with the provisions or is in such a condition that it is not fit to proceed to sea without danger to the ship or to persons on board.
- The surveys to which a passenger ship must be subjected.
- The extent of the surveys of passenger ships.
- The requirements for surveys of life-saving appliances and other equipment of cargo ships, including mandatory annual surveys.
- The requirements for surveys of radio and radar installations of cargo ships.

- The requirements for surveys of hull, and their extent, machinery and equipment of cargo ships, including mandatory annual surveys.
- The extent of the surveys of hull, machinery and other equipment of cargo ships.
- That the condition of the ship and its equipment must be maintained to conform with the provisions of the regulations.
- That after any survey of a ship required by SOLAS, no change should be made in the structural arrangements, machinery, equipment or other items covered by the survey without the sanction of the Administration.
- That any accident to a ship or defect affecting the safety of the ship or the efficiency or completeness of the life-saving appliances or equipment should be reported to the Administration or organisation responsible for issuing the relevant certificate, who will decide whether a survey is required.
- The surveys and their extent to which a passenger ship must be subjected.
- That an accident or defect should also be immediately reported, by the master or owner, to the appropriate authorities of the port State when the ship is in a port of another Party to the SOLAS Convention.
- The certificates, including attachments and supplements, where appropriate, issued after survey to ships satisfying the requirements of SOLAS.
- The period of validity of each of the certificates.
- That an Exemption Certificate is not valid for longer than the period of validity of the certificate to which it refers.
- That no extension of the five-year period of validity of the Cargo Ship Safety Construction Certificate is permitted.
- The circumstances under which other certificates may be extended and states the maximum extension permitted.
- The circumstances in which certificates cease to be valid.
- That all certificates or certified copies of them should be posted up in a prominent and accessible place in the ship.
- That certificates issued under the authority of a contracting Government should be accepted by other contracting Governments.
- That a ship in the port of another Party is subject to control by officers authorized by that Government so far as verifying that the SOLAS Convention certificates are valid.
- The procedures which may be followed by officers authorised by a port State in exercising control regarding SOLAS Convention Certificates or Load Line Convention Certificates.
- That the surveyor should also take into account the requirements of SOLAS reg. V/13 that all ships should be sufficiently and efficiently manned.
- That, at the conclusion of a control, the master should be provided with a document giving the results of the control and details of any action taken.
- That Parties to the Protocol of 1978 to the SOLAS Convention, 1974, should apply the requirements of the Convention and Protocol as may be necessary to ensure that no more favourable treatment is given to ships of non-parties to the Convention and Protocol.

.3.3 SOLAS - Subdivision and Stability, Machinery and Electrical Installation 2hrs (T) + 0hrs (P) + 0hrs (E).

Familiarity with;

- Following, with reference to chapter 11-1:
  - subdivision load line
  - deepest subdivision load line
  - length
  - breadth

  - draught
  - bulkhead deck
  - margin line
  - permeability of a space
  - machinery space
  - passenger spaces
  - weathertight
- 'Floodable length'.
- 'Factor of subdivision'.
- The application of the factor of subdivision to a passenger ship's ability to withstand the flooding of adjacent main compartments.
- The requirements regarding unsymmetrical flooding.
- That the master should be supplied with suitable information concerning the use of cross-flooding fittings.
- The final conditions of the ship after assumed critical damage.
- That the master should be supplied with the data necessary to maintain sufficient intact stability under service conditions to enable the ship to withstand the critical damage.
- That the conditions of stability on which the calculations of heel are based should be supplied to the master of the ship.
- That excessive heeling might result should the ship sustain damage when in a less favorable condition.
- That water ballast should not in general be carried in tanks intended for oil fuel and describes the arrangement for ships which cannot avoid putting water in oil fuel tanks.
- The marking of subdivision load lines on passenger ships.
- That details of the subdivision load lines assigned and the conditions of service for which they are approved should be clearly indicated on the Passenger Ship Safety Certificate.
- That a ship should not be loaded so as to submerge the load line mark appropriate to the season and locality, as determined in accordance with the International Convention on load Lines, whatever the position of the subdivision load line marks may be.
- That' a ship should not be loaded so as to submerge the subdivision load line mark appropriate to the particular voyage and condition of service.
- Classification of watertight doors as:
  - class 1 - hinged doors
  - class 2 - hand-operated sliding doors
  - class 3 - sliding doors which are power-operated as well as hand-operated
- The provisions regarding the fitting of watertight doors in passenger ships.
- That watertight doors in bulkheads dividing cargo between deck spaces must be closed before the voyage commences and must be kept closed during navigation.
- That the time of opening tween-deck doors in port and the time of closing them before leaving port should be entered in the log-book.
- That all watertight doors should be kept closed during navigation except when necessarily opened for the working of the ship, in which case they should always be ready to be immediately closed.
- That in passenger ships carrying goods vehicles and accompanying personnel, indicators are required on the navigating bridge to show automatically when each door between cargo spaces is closed and all door fastenings are secured.
- That sidescuttles, the sills of which are below the margin line, should be of such construction as will effectively prevent any person opening them without the consent of the master.
- That certain sidescuttles in between-deck spaces must be closed watertight and locked before the ship leaves port and must not be opened before arrival at the next port.
- The requirements for deadlights.
- That sidescuttles and deadlights which will not be accessible during navigation must be closed and secured before the ship leaves port.

- That the closing and locking of sidescuttles and deadlights in spaces used alternatively for the carriage of passengers or cargo should be recorded in a log-book when carrying cargo.
- The requirements for the closure of cargo loading doors in passenger ships.
- The requirements for drills, operation and inspection of watertight doors and other openings in passenger ships.
- That valves, doors and mechanisms should be suitably marked to ensure that they may be properly used to provide maximum safety.
- The entries which should be made in the log-book regarding the opening and closing of doors, sidescuttles and other openings and the drills and inspections required by the regulations.
- That every passenger ship and every cargo ship of 24 meters and upwards must be inclined upon its completion and the elements of its stability determined.
- That the master should be supplied with such information as is necessary to obtain accurate guidance as to the stability of the ship under varying conditions of service.
- The contents of damage control plans for passenger ships.
- That booklet containing the damage control information should be made available to the ship's officers.
- The recommendations on damage control for dry cargo ships.
- The indicator system which must be provided on the navigating bridge of passenger ro-ro ships to show if shell doors, loading doors and other closing appliances are not fully closed or not secured.
- The requirements for the detection of water leakage through shell doors or vehicle loading doors which could lead to major flooding of special category spaces or ro-ro cargo spaces.
- The requirements for ro-ro cargo spaces to be monitored whilst the ship is under way.

.3.4 SOLAS - Fire Protection, Fire Detection and Fire Extinction

2hrs (T) + 0hrs (P) + 0hrs (E).

Familiarity with;

- The basic principles of the regulations on fire protection.
- The properties of class 'A' and class 'B' divisions.
- defines:
  - main vertical zones
  - accommodation spaces
  - public spaces
  - service spaces
  - cargo spaces
  - ro-ro cargo spaces, open and closed
  - special category spaces
  - machinery spaces of category A
  - control stations
- That fire hoses should be used only for the purposes of extinguishingfires or testing the apparatus at fire drills and surveys.
- The information included in fire control plans or booklets.
- That instruction concerning the maintenance and operation of all fire- fighting equipment and installations on board should be kept under one cover in an accessible position.
- That a duplicate set of fire control plans or booklet should be permanently stored in a prominently marked weathertight enclosure outside the deckhouse for the assistance of shoreside fire-fighting personnel.
- That all fire-extinguishing appliances must be kept in good order and available for immediate use at all times during the voyage.
- That passenger ships must at all time when at sea, or in port, be so manned or equipped that any initial fire alarm is immediately received by a responsible member of the crew.

- That a special alarm, operated from the navigating bridge or from the fire control station, should be fitted to summon the crew and should be capable of being sounded independently of the alarm to the passenger spaces.
- That an efficient patrol system must be maintained for ships carrying more than 36 passengers.
- The training required by the fire patrol.
- That there are special requirements for ships carrying dangerous goods.
- That a ship should have a document provided by the Administration as evidence of compliance of construction and equipment with the requirements for the carriage of dangerous goods.

.3.5 SOLAS - Life-Saving Appliances and Arrangements 2hrs (T) + 0hrs (P) + 0hrs (E).

Familiarity with;

- Followings, with reference to chapter III of SOLAS:
  - certificated person
  - float-free launching
  - inflatable appliance
  - inflated appliance
  - launching appliance or arrangement
  - rescue boat
  - survival craft
- That life-saving appliances and arrangements required by chapter III ofSOLAS must be approved by the Administration.
- The requirements for exhibiting muster lists.
- The illustrations and instructions to be displayed in passenger cabins and other spaces.
- The items to be included in muster lists and emergency instructions.
- The provision of operating instructions for life-saving appliances.
- How the crew should be assigned to survival craft to ensure satisfactory manning and supervision of survival craft.
- That the person in charge of a survival craft should have a list of its crew and should see that they are acquainted with their duties.
- The requirement for the provision of training manuals.
- The items which should be contained in the training manuals.
- The frequency of abandon ship drills and fire drills and how they should be conducted.
- The guidelines for training crews for the purpose of launching lifeboats and rescue boats from ships making headway through the water.
- The on-board training which should be given in the use of life-saving appliances and in survival at sea.
- The records which should be made of abandon ship drills and fire drills, other drills of life-saving appliances and on-board training.
- That before leaving port and at all times during the voyage, all life-saving appliances must be in working order and ready for immediate use.
- The instructions for on-board maintenance of life-saving appliances which should be carried.
- The regulation regarding the maintenance of falls.
- The weekly and monthly tests and inspections required and the entries which should be made in the log-book.
- The requirements regarding the periodic servicing of inflatable liferafts, inflatable lifejackets, inflated rescue boats and hydrostatic release gear.
- The requirements for passenger muster stations.
- That, on passenger ships, an abandon ship drill and a fire drill must take place weekly.

.3.6 SOLAS-Radio communications (amended chapter IV) 2hrs (T) + 0hrs (P) + 0hrs (E).

Familiarity with;

- That the 1988 amendments to the 1974 SOLAS Convention replace the existing Chapter IV with a new Chapter IV covering the global maritime distress and safety system (GMDSS).
- That the amended Chapter IV applies to passenger ships, irrespective of size, and cargo ships of 300 tons gross tonnage and upwards engaged on international voyages.
- That every ship must comply with the regulations concerning NAVTEX and satellite EPIRB.
- That every ship constructed on or after 1 February 1995 must comply with all applicable requirements.
- The applicability to ships built before 1 February 1995.
- Followings, for the purpose of the amended Chapter IV, of:
  - bridge to bridge communications
  - continuous watch
  - digital selective calling (DSC)
  - direct-printing telegraphy
  - general radio communications
  - international NAVTEX service
  - locating
  - maritime safety information
  - polar orbiting satellite service
  - sea area A1
  - sea area A2
  - sea area A3
  - sea area A4
- That every ship, while at sea, must be capable of:
  - transmitting ship-to-shore distress alerts by at least two separate and independent means
  - receiving shore-to-ship distress alerts
  - transmitting and receiving ship-to-ship distress alerts
  - transmitting and receiving search and rescue co-ordinating communications
  - transmitting and receiving on-scene communications
  - transmitting and receiving signals for locating
  - transmitting and receiving maritime safety information
  - transmitting and receiving general radio-communications
  - transmitting and receiving bridge-to-bridge communications
- The radio equipment to be carried by all ships.
- The requirements regarding the installation and operation of the satellite EPIRB.
- The additional equipment required by ships engaged on voyages exclusively within sea area A1.
- The additional equipment required by ships engaged on voyages within sea areas A1 and A2.
- The additional equipment required by ships engaged on voyages within sea areas A1, A2, and A3.
- That equipment using the INMARSAT geostationary satellite service is not an acceptable alternative for ships engaged on voyages which include sea area A4.
- The requirements for maintaining watch on distress frequencies.
- That every ship, while at sea, must maintain a watch for broadcasts of maritime safety information.
- How the availability of radio equipment required by the regulations is to be ensured.
- That every ship must carry personnel qualified for distress and safety radio communications purposes who hold certificates specified in the Radio Regulations.
- That one person is designated to have primary responsibility for radio communications during distress incidents.
- That a record must be kept of all incidents connected with the radio communication service which appears to be of importance to the safety of life at sea.

.3.7 SOLAS - Carriage of Grain 1hrs (T) + 0hrs (P) + 0hrs (E).

Familiarity with;

- The intact stability requirements for a ship carrying bulk.
- The contents of the grain loading information referred to in the document of authorization.

.3.8 SOLAS - Carriage of Dangerous Goods 1hrs (T) + 0hrs (P) + 0hrs (E).

Familiarity with;

- That the regulations concerning the carriage of dangerous goods in packaged form or in solid bulk form apply to all ships to which the SOLAS regulations apply and to cargo ships of less than 500 gross tons.
- That the provisions do not apply to ships' stores and equipment.
- That the carriage of dangerous goods is prohibited except in accordance with the provisions of the regulations.
- That the provisions should be supplemented by detailed instructions on safe packaging and stowage, which should include the precautions necessary in relations to other cargo, issued by each Contracting Government.
- Classification of dangerous goods according to the IMDG code.
- That the correct technical name of goods, and not trade names, should be used in all documents relating to the carriage of dangerous goods.
- That the documents prepared by the shipper should include or be accompanied by a signed certificate or declaration that the shipment offered for carriage is properly packaged and marked and in proper condition for carriage.
- The requirements for a special list or manifest of dangerous goods on board and their location or a detailed stowage plan showing the same information.
- The stowage requirements for dangerous goods.
- That substances which are liable to spontaneous heating or combustion should not be carried unless adequate precautions have been taken to minimise the likelihood of the outbreak of fire.
- The explosives which may be carried in a passenger ship.
- Followings:
  - International Bulk Chemical Code (IBC code)
  - Chemical tanker
- That the regulations apply to chemical tankers constructed on or after 1July 1986, including those of less than 500 gross tons.
- That a chemical tanker must comply with the survey requirements for a cargo ship and, in addition, be surveyed and certified as provided for in the IBC code.
- That the IBC code prescribes the design and construction standards of such ships, the equipment they should carry and marine pollution aspects.
- That the requirements of the IBC code are mandatory and subject to port State control
- Followings:
  - International Gas Carrier Code (IGC code)
  - Gas carrier

.3.9 The International Safety Management (ISM) Code 1hrs (T) + 0hrs (P) + 0hrs (E).

Familiarity with;

That a Safety Management System in compliance with the ISM Code must be in place on board all passenger ships, tankers and bulk carriers of500gt and upwards.

- That a Safety Management System in compliance with the ISM Code must be in place on board all vessels of 500gt and upwards from 1 July 2002.
- That the details of the ship's system may be found in the ship's SafetyManagement Manual.

.3.10 International Convention on Standards of Training, Certification and Watch keeping for Seafarers, 1995 (STCW) 2hrs (T) + 0hrs (P) + 0hrs (E).

Familiarity with;

- The general obligations under the Convention.
- Followings, for the purpose of the Convention:
  - Certificate of Competency
  - Certificate of Proficiency
  - certificated
  - seagoing ship
  - Radio Regulations
- The application of the Convention.
- The issue of certificates and their endorsement by the issuing Administration.
- The conditions under which dispensations may be granted.
- That ships, when in a port of a party to the Convention, are subject to control to verify that all seafarers serving on board who are required to be certificated are so certificated or hold a valid dispensation.
- That a ship which extends its voyage beyond what is defined as a near-coastal voyage by a Party must fulfill the requirements of the Convention without the relaxation allowed for near-coastal voyages.
- The control which may be exercised by a duly authorized control officer.
- The circumstances in which the control officer should supply written information to the master regarding deficiencies and the grounds under which the ship may be detained.
- That the regulations contain:
  - mandatory minimum requirements for the certification of masters, officers, radiotelephone operators, able seafarers deck or engine and ratings forming part of a navigational watch or an engineering watch
  - mandatory minimum requirements for the training and qualifications of masters, officers and ratings of oil, chemical and gas tankers
  - mandatory minimum requirements to ensure the continued proficiency and updating of masters and deck, engineer, and radio officers and ratings
  - basic principles to be observed in keeping navigational and engineering watches
  - mandatory minimum requirements for the issue of a Certificate of Proficiency in Survival Craft and Rescue Boats other than Fast Rescue Boats

.3.11 Special Trade Passenger Ships Agreement, 1971, and Rules, 1971 (STP 1971)

1hrs (T) + 0hrs (P) + 0hrs (E).

Familiarity with;

- The application of the agreement.
- Followings, for the purpose of the rules:
  - Convention
  - special trades
  - weather deck
  - upper deck
  - special trade passenger
  - special trade passenger ship
- The issue of certificates.

- That certificates or certified copies issued under this agreement should be posted in a prominent and accessible place in the ship.
- The qualification of certificates when the number on board is less than stated in the Special Trade Passenger Ship Safety Certificate.
- The rule regarding the carriage of dangerous goods in special trade passenger ships.
- That ships to which the Agreement applies should comply with the International Health Regulations, having regard to the circumstances and nature of the voyage.

.3.12 Protocol and Rules on Space Requirements for Special Trade Passenger Ships, 1973 (SPACE STP 1973) 1hrs (T) + 0hrs (P) + 0hrs (E).

Familiarity with;

- The application of the Protocol.
- That a certificate called a Special Trade Passenger Ship Space Certificate is to be issued after inspection and survey of a special trade passenger ship which complies with the applicable requirements of these rules.
- That the Certificate or a certified copy of it should be posted up in a prominent and accessible place in the ship.
- The spaces not suitable for the carriage of passengers.
- That spaces, including airing spaces, allotted for the accommodation or use of special trade passengers must be kept free of cargo.
- That ships to which the rules apply should comply with the International Health Regulations, having regard to the circumstances and nature of the voyage.
- That the 1974 SOLAS Convention provides that special trade passenger ships may be exempted from full compliance with the requirements of chapters 11-1, 11-2 and III, provided they fully comply with the provisions of the Rules annexed to the Special Trade Passenger Ships Agreement, 1971, and to the Protocol on Space Requirements for Special Trade Passenger Ships, 1973.

.3.13 Athens Convention relating to the Carriage of Passengers and their Luggage by Sea (PAL 1974) 1hrs (T) + 0hrs (P) + 0hrs (E).

Familiarity with;

- Followings, for the purposes of the Convention:
  - carrier
  - performing carrier
  - ship
  - passenger
  - luggage
  - cabin luggage
  - carriage
  - international carriage
- The application of the Convention.
- That when the carrier is liable for the damage suffered as a result of the death of or personal injury to a passenger and the loss of or damage to luggage.
- The presumption of fault or neglect of the carrier, unless the contrary is proved.
- The carrier's liability in respect of monies and valuables.
- That, in the case of contributory fault on the part of the passenger, the court hearing the case may exonerate the carrier wholly or partly from his liability.
- That limits of liability for personal injury and for loss of or damage to luggage are prescribed.

- That if an action is brought against a servant or agent of the carrier arising out of damage covered by this Convention, such servant or agent, if he proves that he acted within the scope of his employment, will be entitled to the same defenses and limits of liability as the carrier.
- That where entitlement to limit liability exists, the aggregate of the amounts recoverable from the carrier, or performing carrier, and a servant or agent must not exceed the prescribed limit of liability.
- The circumstances in which the right to limit liability will be lost.
- Where an action arising under this Convention may be brought.
- The invalidity of contractual provisions more favourable to the carrier than the provisions of this Convention.

.3.14 International Convention on Tonnage Measurement of Ships, 1969

1hrs (T) + 0hrs (P) + 0hrs (E).

Familiarity with;

- Followings, for the purposes of the Convention:
  - international voyage
  - gross tonnage
  - net tonnage
  - new ship
  - existing ship
- The applications of the Convention to new and existing ships.
- That an International Tonnage Certificate (1969) will be issued to every ship, the gross and net tonnages of which have been determined in accordance with the Convention.
- The alterations in construction or use of spaces which would lead to the cancellations of the International Tonnage Certificate.
- That a ship flying the flag of a State the Government of which is a Contracting Government is subject to inspection, when in the ports of other Contracting Governments, for the purpose of verifying that the ship is provided with a valid International Tonnage Certificate and that the main characteristics of the ship correspond to the data given in the certificate.
- That certain ships, required to be measured under the 1969.
- That Tonnage Convention, may be allowed by their Administrations to use the gross tonnage as measured by the national tonnage rules in effect prior to the coming into force of the Tonnage Convention, for the application of certain provisions of the SOLAS, MARPOL and STCW Conventions.
- That the tonnage as measured by the national rules appears only on the relevant certificates required by SOLAS and MARPOL, together with an explanatory note.

.3.15 International Convention for the Control and Management of Ship's Ballast Water and Sediments, 2004

1hrs (T) + 0hrs (P) + 0hrs (E).

Familiarity with;

- Followings the following:
  - ballast water
  - ballast water management
  - sediments
- The conditions where the application of this convention may be exempted.
- The application of this convention.
- The management and control requirement from Section B Regulation B1-B6.
- The standards that need to be observed in ballast water exchange.

.3.16 International Convention on the Control of Harmful Anti-fouling

Systems on Ships, 2001 1hrs (T) + 0hrs (P) + 0hrs (E).

Familiarity with;

- Anti-fouling system.
- The control of waste material in Annex 1 of the Convention.

.3.17 Guidelines on the Enhanced Programme of Inspections during Surveys of Bulk Carriers and Oil Tankers 1hrs (T) + 0hrs (P) + 0hrs (E).

Familiarity with;

- The application of the guidelines.
- The following:
  - overall survey
  - close-up Survey
  - substantial corrosion
  - corrosion prevention system
  - critical structure areas
  - intermediate enhanced survey
- The requirement for enhanced survey carried out during periodical survey.
- The requirement for enhanced survey carried out during annual survey.
- The intermediate enhanced survey.
- The preparation for survey.

Competence: 3.4 application of leadership and teamworking skills 34hrs (T) + 0hrs (P) + 0hrs (E).

3.4.1. Working knowledge of shipboard personnel management and training
3.4.2. A knowledge of related international maritime conventions and recommendations, and national legislation
3.4.3. Ability to apply task and workload management, including:
.1 planning and co-ordination
.2 personnel assignment
.3 time and resource constraints
.4 prioritization
3.4.4. Knowledge and ability to apply effective resource management:
.1 allocation, assignment, and prioritization of resources
.2 effective communication onboard and ashore
.3 decisions reflect consideration of team experiences
.4 assertiveness and leadership, including motivation
.5 obtaining and maintaining situational awareness
3.4.5. Knowledge and ability to apply decision-making techniques:
.1 situation and risk assessment
.2 identify and consider generated options
.3 selecting course of action
.4 evaluation of outcome effectiveness

3.4.1. Working knowledge of shipboard personnel management and training

Organization of crew, authority structure, responsibilities 0.5hrs (T) + 0hrs (P) + 0hrs (E).

Knowledge of;

- Typical shipboard organization.
- Management level, states positions and describes roles.
- Operational level, states positions and describes roles.
- Support level, states positions and describes roles.
- Chain of command.
- Awareness, inherent traits, attitudes and behaviours, cross-cultural communication.

.2 cultural awareness 0.5hrs (T) + 0hrs (P) + 0hrs (E).

Knowledge of;

- Inherent cultural traits.
- Association between inherent traits, attitudes and behaviours.
- Special care needed in cross-cultural communication, especially on board ship.

.3 Shipboard situation, informal social structures on board 0.5hrs (T) + 0hrs (P) + 0hrs (E).

Knowledge of;

- Common informal structures with multi-cultural crews.
- Why informal social structures need to be recognized and allowed for.
- Actions to improve cross-cultural relationships.

.4 Human error, situation awareness, automation awareness, complacency, boredom 0.5hrs (T) + 0hrs (P) + 0hrs (E).

Knowledge of;

- Terms "active failures" and "latent conditions".
- Errors of omission and errors of commission.
- A typical error chain.
- Situation awareness and gives a shipboard example.
- Actions subsequent to a near miss.
- Linkage between automation, complacency and boredom.
- Actions to address complacency and boredom.

.5 Leadership and teamworking 1hrs (T) + 0hrs (P) + 0hrs (E).

Knowledge of;

- Functional and designated leadership.
- Leadership qualities including self-awareness, situation awareness, interpersonal skills, motivation, respect.
- Leadership characteristics, including persona, assertiveness, decisiveness, applying emotional intelligence.
- Leadership techniques, including, leading by example, setting expectations, providing oversight, delegating.
- The differences between team and group behavior.
- The advantages of a team approach in shipboard operations.
- The difference between a "standing team" and a "mission" or "task" team.
- "team-of-one" and why it is common on board.
- The features of good team communications.

.6 Training, structured shipboard training programme 1hrs (T) + 0hrs (P) + 0hrs (E).

Knowledge of;

- Importance of structured shipboard training.
- Effective implementation of structured shipboard training.
- Responsibility of officers to provide structured shipboard training.
- Mentoring and coaching.
- How trainee progress through shipboard training programmes is assessed.
- Recording and reporting of trainee progress.
- Company involvement in structured shipboard training programmes.
- That training programmes have to be adjusted to suit ship's operational needs.

3.4.2. A knowledge of related international maritime conventions and recommendations, and national legislation

.1 International maritime conventions 1hrs (T) + 0hrs (P) + 0hrs (E).

Knowledge of;

- Intent, history and application of SOLAS convention, including the ISM and ISPS Codes.
- Intent, history and application of MARPOL Convention.
- Intent, history and application of STCW Convention and role of STW Sub-Committee.
- Intent, history and application of Maritime Labour Convention.
- The role of IMO with respect to maritime conventions.
- The role of ILO with respect to maritime conventions.
- How IMO and ILO collaborate with respect to maritime conventions.
- How convention provisions are implemented.
- Role of flag state in implementing provisions of maritime conventions.
- Role of port state in implementing provisions of maritime conventions.

.2 Recommendations and state legislation 1hrs (T) + 0hrs (P) + 0hrs (E).

Knowledge of;

- How recommendations differ from regulations.
- The IMO guidelines on the mitigation of fatigue.
- The IMO principles of safe manning and the guidelines for their implementation, gives examples of recommendations.
- Legislation dealing with human factors.

3.4.3. Ability to apply task and workload management, including:

.1 planning and co-ordination 1hrs (T) + 0hrs (P) + 0hrs (E).

Knowledge of;

- What planning means with respect to individuals and groups.
- How planning outcomes are measured.
- The role of feedback with respect to planning outcomes.
- Coordination, gives examples of shipboard coordination.

.2 personnel assignment 0.5hrs (T) + 0hrs (P) + 0hrs (E).

Knowledge of;

- What personnel assignment means, gives examples of personnel assignment on board.

.3 Human limitations 1hrs (T) + 0hrs (P) + 0hrs (E).

Knowledge of;

- Common human limitations such as fatigue, misunderstanding, complacency.
- Onboard activities that test human limitations, including use of technology.
- Indicators that human limitations are being exceeded.
- Steps taken to avoid pushing crew members beyond personal limitations.
- How hidden pressures can cause personal limitations to be exceeded.
- The consequences of pushing a person beyond their personal limitations.
- STCW "Fitness for Duty" requirements.

.4 Personal abilities 1hrs (T) + 0hrs (P) + 0hrs (E).

Knowledge of;

- Personal characteristics essential to effective leadership and teamwork on board.
- Own abilities contributing to leadership and teamwork on board.
- How personal characteristics are managed and strengthened.
- How to personally contribute to leadership and teamwork on board.

.5 time and resource constraints 1hrs (T) + 0hrs (P) + 0hrs (E).

Knowledge of;

- And examples of time constraints.
- Factors that cause time constraints.
- How time constraints are usually addressed on board.
- And examples of resource constraints.
- Factors that cause resource constraints.
- How resource constraints are usually addressed on board.

.6 prioritization 0.5hrs (T) + 0hrs (P) + 0hrs (E).

Knowledge of;

- And examples of prioritization.
- Why prioritization is necessary.

.7 Workloads, rest and fatigue 1hrs (T) + 0hrs (P) + 0hrs (E).

Knowledge of;

- Own shipboard workload.
- The dangers of high workload.
- The disadvantages of low workload.
- How workload can be assessed.
- How to ensure an appropriate workload.
- The provisions for seafarers to get adequate rest.
- Recording of hours of rest.
- Signs of fatigue.

- How fatigue can result in very serious consequences.
- And gives examples of fatigue management guidelines and regulations.

.8 Management (leadership) styles 1hrs (T) + 0hrs (P) + 0hrs (E).

Knowledge of;

- How leadership and management differ.
- And gives examples of designated and functional leadership.
- Leadership qualities.
- Leadership techniques.
- Development of an effective leadership persona.
- The need for a leader to "have an honest look at himself or herself".

.9 Challenges and responses 1hrs (T) + 0hrs (P) + 0hrs (E).

Knowledge of;

- What is meant by a "challenge and response" environment.
- Why a challenge and response environment is not always appropriate.
- When an authoritarian approach is justified.
- "Chain of command".

3.4.4. Knowledge and ability to apply effective resource management:

.1 effective communication onboard and ashore 2hrs (T) + 0hrs (P) + 0hrs (E).

Knowledge of;

- The essence of effective communication.
- The main components of a communication system.
- The barriers to effective communication.
- Four lines of communication.
- Effective communication techniques..
- Why closed loop communication is used when manoeuvring the ship.
- Communication protocols commonly used at sea.
- And gives examples of internal and external communication.
- How communication with people ashore may differ from communication on board.
- What needs to be done to create a good communication climate.

.2 allocation, assignment, and prioritization of resources 1hrs (T) + 0hrs (P) + 0hrs (E).

Knowledge of;

- The resources to be managed aboard a ship at sea.
- How use of resources is managed.
- And gives examples of shipboard resource allocation, assignment and prioritization.

.3 decisions reflect consideration of team experiences 1.5hrs (T) + 0hrs (P) + 0hrs (E).

Knowledge of;

How to get the best out of a team.
Allocation of work based on competence.

- That good teamwork and leadership are indivisible.
- How a good leader can exploit a team dynamic.

.4 assertiveness and leadership, including motivation 1hrs (T) + 0hrs (P) + 0hrs (E).

Knowledge of;

- The leadership required of a junior watchkeeper.
- Why assertive leadership may not be effective.
- How an individual or a team may be motivated and de-motivated.

.5 obtaining and maintaining situational awareness 2hrs (T) + 0hrs (P) + 0hrs (E).

Knowledge of;

- And gives examples of situation awareness while watchkeeping.
- And gives examples of lack of situation awareness while watchkeeping.
- How modern electronic aids can lead to lack of situation awareness.
- The dangerous link between fatigue and situation awareness.

.6 Appraisal of work performance 1hrs (T) + 0hrs (P) + 0hrs (E).

Knowledge of;

- How work performance can be appraised.
- The benefits of effective work performance appraisal.

.7 Short and long term strategies 1.5hrs (T) + 0hrs (P) + 0hrs (E).

Knowledge of;

- Strategy.
- The role of short term strategies in effective onboard resource management.
- When the use of short term strategy is necessary.
- The role of long term strategies in effective onboard resource management.

3.4.5. Knowledge and ability to apply decision-making techniques:

.1 situation and risk assessment 2hrs (T) + 0hrs (P) + 0hrs (E).

Knowledge of;

- How a situation is assessed and gives an example.
- Key characteristics of situation assessment.
- How situation awareness may be weakened.
- Risk.
- The relationship between situation assessment and risk.
- How risk may be assessed.
- How risk may be managed.
- The role of risk assessment in risk management.
- The role of situation and risk assessment in decision making.

.2 identify and consider generated options 1hrs (T) + 0hrs (P) + 0hrs (E).

Knowledge of;

- And gives examples of consideration of options available.
- How an option may be created.
- The role of leadership in creating options.

.3 selecting course of action 1hrs (T) + 0hrs (P) + 0hrs (E).

Knowledge of;

- Obligation to identify most appropriate course of action.
- Considerations in identifying most appropriate course of action.

.4 evaluation of outcome effectiveness 1hrs (T) + 0hrs (P) + 0hrs (E).

Knowledge of;

- And gives examples of outcomes of shipboard courses of action.
- How the outcome of a course of action can be assessed.
- Possible follow-up actions once outcome is assessed.

.5 Decision making and problem solving techniques 1hrs (T) + 0hrs (P) + 0hrs (E).

Knowledge of;

- And gives examples and explains problem solving techniques.

.6 Authority and assertiveness 1hrs (T) + 0hrs (P) + 0hrs (E).

Knowledge of;

- The various forms of authority.
- The form of authority found on board a ship.
- And gives meaning of assertiveness.
- Shipboard situations justifying greater assertiveness.

.7 Judgement 1hrs (T) + 0hrs (P) + 0hrs (E).

Knowledge of;

- And give meaning of judgement.
- Difference between "reality judgement" and "value judgement".
- And give example of use of judgement on board.
-

.8 Emergencies and crowd management 1hrs (T) + 0hrs (P) + 0hrs (E).

Knowledge of;

- The most common shipboard emergencies
- Leadership requirements when dealing with a shipboard emergency
- The preparations for dealing with a shipboard emergency
- The preparatory steps taken for crowd management on board a passenger ship
- Roles of master and management personnel in dealing with an emergency
- Own role in dealing with an emergency

.9 Opportunities and availability 1hrs (T) + 0hrs (P) + 0hrs (E).

Knowledge of;

- The opportunities available for personnel development.
- How to benefit from these opportunities.
- Own intentions with respect to professional development .

5-7 facilities and equipment required for conducting the course:

Apart from those facilities, equipments and or requirements mentioned in Code of practice for approval and monitoring of maritime training courses followings have to be provided:

5-7-1 Classroom with air conditioning facilities, sufficient lighting and other facilities, suitable for delivering theoretical subjects(such as: chart table, white board, computer, multimedia projector and its curtain)

5-7-2 library with related technical books and references (such as suitable number of Almanac, Nories, Tide table and etc,)

5-7-3 English lab with audio and visual facilities.

5-7-4 Chart room with sufficient number of chart work facilities in relation to the number of trainees.

5-7-5 relevant educational and training films

5-7-6 Earth structure model, different buoys, ships model in day and night and relevant facilities for exercising rule of the road and Col.Reg in channels / rivers and lake or sea and berthing /unberthing exercises, ships model fitted with crane and other deck fittings. In addition followings to be provided:

- Working models of derricks and cranes to illustrate different rigs in handling cargo models or drawings of various types of hatch cover and their operating and securing arrangements, examples of head and heel cargo blocks.
- Cut-away three-dimensional models showing the structure of parts of the ship.
- Photographs, drawings and plans illustrating various types of ship and constructional details.
- A floating ship stability demonstration model and a flotation tank. The model should be capable of demonstrating the effects of adding or removing masses, shifting masses, suspending masses and free liquid surface.
- Copies of approved stability information books and computer loading programmes from ships.
- Schematic model of a product tanker, tanks and pump-room, showing piping and valves.
- Schematic model of a crude carrier, tanks and pump-room, showing piping and valves.
- Photographs, drawings and plans to illustrate different types of ship.
- Examples of cargo plans for various types of ship.

5-7-7 Instrument Room equipped with following items:

- Thermometers, Stevenson Screen, Aneroid Barometer, Psychrometer, Marine Hydrometer , Sea Temperature Bucket, Hygrometer, Chronometer, Marine Sextant, Magnetic Compass, Binnacle With Magnetic Compass/ Accessories and Sighting Devices, Gyro Compass and Pelorus , Azimuth Mirror, International Code of Signal and Flags and a set of Visual Signalling Equipment and Accessories(or a computer based system), SART, EPIRB, Line Throwing Apparatus and Pyrotechnics.

5-7-8 navigational aids such as : Echo Sounder, GPS, VHF, AIS, NAVTEX, Weather facsimile receiver and speed log(replacing such equipments with approved simulation system or carry out ship visit to carry out relevant training may be accepted upon consultation and seeking approval of central monitoring office).

5-7-9 seamanship workshop equipped with following items:

- Tables and sittings suitable for practical exercises, hand lad line with markings, pilot ladder and its spares, different types of fiber/ synthetic/wire ropes together with stoppers and various types of shackles, five set of relevant tools for hitching/splicing ropes, Bosun Chair, Stage, different blocks, two pieces of Joining and kenter Shackles with relevant tools for mantling/dismantling, mooring ropes fiber/synthetic/wire, Winch/ Windlasses and mooring Arrangements, five sets of scrappers flat/triangle, grinding machines/tools, different types of marine paints, different types of paint roller and brush, airless paint spraying machine, wire ropes joints and fittings.

5-8 Lecturers and instructors minimum qualifications:

5-8-1 Lecturers and instructors shall have completed a course in instructional techniques (TFT) in one of the training centers approved by the PMO, and:

5-8-1-1 for lecturing in theoretical subjects should;

5-8-1-1-1 for lecturing following theoretical subjects should:

- Plan and conduct a passage and determine position
- Maintain a Safe navigational watch
- Respond to emergencies
- Manoeuvre the ship
- Monitor the loading, Stowage, Securing, handling and Care during the voyage and the unloading of Cargoes
- Inspect and report defects and damage to cargo spaces, hatch covers and ballast tanks.
- Ensure compliance with pollution prevention requirements.
- Monitor Compliance with legislative requirements.

Possess valid chief mate certificate of competency for ships of GT≥3000 engaged on unlimited voyages as well as having two years of seagoing service in that rank,

5-8-1-1-2 for lecturing theoretical subjects other than those mentioned in paragraph 5-8-1-1-1 should possess relevant M.Sc degree and minimum of 12 months of teaching experience or B.Sc degree and minimum of 12 months of teaching experience in maritime institute.

5-8-1-1-3 holder of M.Sc degree or higher in Meteorology can be assigned in teaching meteorology subject.

5-8-1-1-4 holder of M.Sc degree or higher in ship architecture and Shipbuilding can be assigned in teaching ship stability and ship construction subject.

5-8-1-1-5 training officer for the cadets on board training should:

5-8-1-1-5-1 in addition to completing a course in instructional techniques (TFT) in one of the training centers approved by the PMO, should Possess valid chief mate certificate of competency for ships of GT≥3000 engaged on unlimited voyages as well as having two years of seagoing service in that rank

5-8-1-2 for delivering practical training should;

5-8-1-2-1 posses minimum higher diploma in nautical science as well as having two years of seagoing service, or possess valid deck rating certificate of proficiency and 5 years of experience on that rank on merchant ships.

5-9 Assessment and Certification:

5-9-1 upon successful completion of the examination which is carried out during and at the end of the course, the trainee will be awarded relevant course completion certificate issued by the approved training center;

5-9-2 then after trainee applies for the PMO competency assessments specified in above paragraph 5-6-1; and

5-9-3 finally, Seafarers' Examination and Documents Directorate (in Tehran or Ports) of the PMO will issue a CoC for those candidates who have passed above mentioned PMO competency assessments and fulfill other relevant certification requirements set out in the "Codes of practices for issuing, revalidating and renewing certificates of competency and certificates of proficiency for seafarers".

5-10 revalidation/renewal of certificates:

5-10-1 CoPs and CoCs will be revalidated and renewed in accordance with provisions of the Codes of practices for issuing, revalidating and renewing certificates of competency and certificates of proficiency for seafarers.

5-11 course approval:

5-11-1 It will be carried out as per code of practice for approval and monitoring of maritime training courses.

6-Records

6-1 All records which present the implementation of the content of this code of practice.

7- References

7-1 STCW Convention and STCW Code;

7-2 IMO Model course number7.03

7-3 Code of practice for approval and monitoring of maritime training courses; and

7-4 Codes of practices for issuing, revalidating and renewing certificates of competency and certificates of proficiency for seafarers.

8- Appendixes

Nil